

Fish Architecture – A framework to create Interspecies Spaces

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Fish Architecture embraces the common spaces that we inhabit with aquatic animals. Here, we develop an approach to redesign these spaces as an interspecies collaboration. First, we should empathise with the non-human perspectives, while acknowledging limitations in understanding non-human perspectives of our mutual Umwelt. Next, we imagine new spaces that do not follow pre-existing human concepts. To achieve this in the framework of Fish Architecture, we merge the two disciplines art and science and apply their complementary methods to understand and imagine Interspecies Spaces. The Fishy Manifesto captures our process and explorations, as well as, offering a practical approach to coexistence. Fish Architecture is divided into three distinct phases, each offering room for observation and experimentation in different ecosystems. The third phase allows us to join aquatic and terrestrial life at the surface, paving a path to genuine ecological coexistence.

Interspecies. Transdisciplinarity. Coexistence. Art-Science. Biology. Architecture. Marine Science. Fish.

1. INTRODUCTION

Humans are not alone on this planet. We share both our external and even our internal world with other organisms. Indeed, there are as many bacterial cells in a human body as there are human cells, influencing not only our mood but also our behaviour (Sender *et al.*, 2016). These bacteria can transfer their genes into the human genome, blurring the boundaries between individuals as well as different lifeforms. Underpinning the concept of the human as a hybrid or cyborg (Riley *et al.*, 2013; Haraway, 2006). This transgression of human uniqueness on the molecular level may be easy to overlook but has already been intensively illuminated. And today, facing the consequences of the Anthropocene, humankind has to take the next step and not only debate its existence as a hybrid but must recognise its existence in an ecological context. Existence is a reciprocal relationship with a multitude of different organisms at once. Like others before us, we argue that the narratives of nature and civilisation as they are used today are normative concepts and therefore obsolete (Morton, 2010). Rather we and other species are equally contributing agents in an ecosystem. Therefore its time to initiate interspecies exchange and co-create our mutual world.

2. COEXISTENCE

It is a truly wonderful fact – the wonder of which we are apt to overlook through familiarity – that all animals and all plants throughout all time and space should be related to each other in group subordinate to group, in the manner which we everywhere behold [...] The several subordinate groups in any class cannot be ranked in a single file, but seem rather be clustered round points, and these round other points, and so on in almost endless cycles.

In this extract from *On the Origin of Species* Darwin (1996) described the interconnectedness of all species, organised in a network-shaped relationship. Nevertheless, the image of the tree of life, which he also adopted in this very book, was better disseminated, and is often depicted with the human on the treetop, resulting in today's western speciesism as described in *Animal Liberation*. As pointed in Timothy Morton's *Dark Ecology*, the Anthropocene might just be an example of speciesism or it may even be its result, the human species claiming its superiority, treating the planet and its ecosystems without any consideration of other inhabitants and therefore a consequence of the artificial division between nature and civilisation. In this narrative civilisation corresponds

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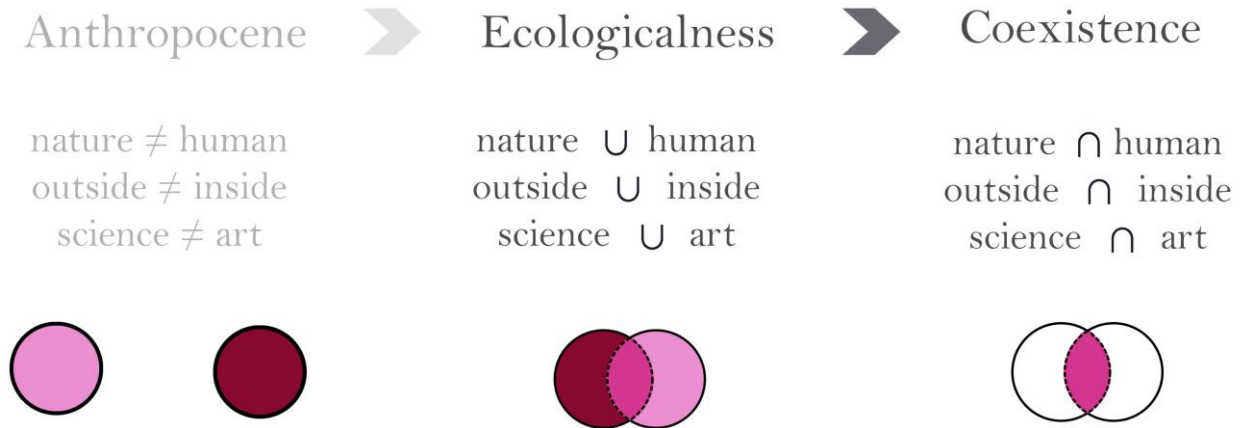


Figure 1: Steps toward Coexistence. Fish Architecture offers a tool to transition from ecologicalness to coexistence. The transitions between the different phases demand paradigm shifts substantiating new ties between existing concepts. First unifying opposites will enable us to then work on the intersections where new concepts, ethics and politics can be developed.

to progress and development, and nature is often associated with a pristine, unspoiled, unchanging landscape, narratives that gained momentum particularly during the Enlightenment. Humankind created an inside and outside to free itself from the inner animal by banishing it to the outside and diminishing its intellectual value. During this period formerly intertwined disciplines, such as art and science, became progressively separated into a subjective (pristine) and objective (progress) realm. Biology and Architecture grew into very distinct disciplines, yet both disciplines attempt to connect and compare “exterior bodies distributed in space and time” to develop a deeper understanding of the biological and architectural interiority of those bodies (Ingraham, 2006). With Fish Architecture, we want to reunite those two different disciplines that over time have taken on very distinct perspectives, but which may follow the same underlying motivation to understand the world surrounding us.

In *Dark Ecology* Morton suggests a concept of three threads or phases at whose core lies the idea of ecological awareness, the realisation that we coexist with other animals and organisms on this planet. Embracing this coexistence and living it implies a shift not only of our mindsets but also of the socio-culture structure of our society. *Dark Ecology* questions the nature-civilisation dualism and organises our awareness in a loop structure, a cyclical conception because obtaining and keeping ecological awareness demands constant reflection of oneself. The first phase is the darkness and depression of the Anthropocene, which separates worlds and concepts of the same origin (Fig.1). This first step realises the human is non-independently evolved organism, humans descend from other species, our organs did not evolve to make functional humans but to make other

organisms from which we evolved. This organises the human in a network of organisms, one species transforming into another and many organisms doing this simultaneously while humans only play a minor role, one little node in a huge network, the big evolutionary spectacle. Understanding this leads to the second bittersweet phase during which one becomes aware of their ecologicalness. This implies acknowledging other species and their form of consciousness and accepting that other species also influence the human species. Vinciane Despret calls this the ‘anthropo-zoo-genetic practice’, a practice that is not only focused on the agency of one species but considers the interaction between them, which eventually gives both an identity. One of her conclusions regarding the scientist and their study organism is “[...] some of these scientists create access to the creatures they study, the way they are moved by their subjects of interest, the way they give them a chance to be interesting and to articulate other things, [...], subjectivity and objectivity, are redistributed in a new manner.” (Despret, 2004) The scientist studies the other animal and their behavioural repertoire, which attributes an identity to this animal. Thereby the observed animal proposes new ways of being together and influences the scientific repertoire of the scientist. They shape each other’s behaviour and offer each other new identities through their interactions. Hence, biology can offer a platform to engage in a reciprocal interspecies exchange. Such an exchange will always contain an anthropomorphising component since human beings are not able to experience another animal’s consciousness. But the attempt to understand another animal and to empathise with it does not mean to become it but to be aware of its existence and to talk about how and what this existence implies. With this awareness, the third thread of

Dark Ecology sets in, when new ethics and politics have to be imagined and created to build an ecological coexistence together with other species.

Fish Architecture can be considered a tool to reach coexistence, which is found at the intersection of concepts, disciplines and species (Fig. 1). It takes the bittersweet darkness of ecologicalness, the awareness of being part of an ecological network, and envisages a future in which humanity will have already reached the state of bittersweet acceptance of non-uniqueness, and rather want to exist an equitable coexistence with other organisms. Creating and shaping those new habitats follow the cyclic structure of *Dark Ecology* but it also follows the biological, cyclic concept of niche construction (Day *et al.*, 2003), the ability of an organism to select and modify its direct environment and thereby influencing the exerted evolutionary pressure. Hence influence on its world but also on the world of coexisting species. Thus, Fish Architecture considers the human in a network with all other species, some of which we share habitats. And shared habitats or spaces offer the possibility to enter an ecological and evolutionary dialogue with those other species, shaping the ever-changing cyclic processes we are part of while celebrating our ecologicalness.

2.1. Three Phases of Fish Architecture

By acknowledging our ecologicalness, we can eventually commit to a dialogue with non-human species. Fish Architecture offers a new entry point: instead of dominating a space, we aim at co-creating spaces with other inhabitants. By combining art and science, two disciplines often considered as opposing realms, we aim at converging two domains often perceived as incompatible, the human world on land and the fish world underwater. Former attempts to elevate the non-human on the same level as the human include Donna Haraway's text about her dog

Cayenne, Laurie Anderson's documentary about her dog Lolabelle or Jacques Derrida's text about his cat Logos (Haraway, 2013; Heart of a dog, 2016; Derrida, 2008). Haraway and Derrida consider the human and non-human relationship from a philosophical perspective questioning the status of the human and the non-human. Though Haraway tries to rethink ideas like domesticated and wild, she and the others examine relationships with species that for generations have been bred alongside humans. Hence, over the last centuries, the evolution of those animals has been immensely and deliberately impacted by humans. Targeted breeding rendered it easy for humans to connect with the. Additional to behavioural adaptations in dogs, Haraway's companion species, the facial muscle anatomy of dogs adapted through domestication to facilitate communication with humans (Kaminski *et al.*, 2019). This deliberate interference into natural selection and evolution delineates the opposite of coexistence but shows how these non-human animals have been subjected to human will. Interspecies Architecture, therefore, Fish Architecture, focuses on the others, the animals we live with yet often ignore and thereby miss out on an opportunity for exchange and mutual evolution. In particular, the ocean is a world few humans have access to, although we can no longer deny the anthropogenic imprint on this largely unexplored world (Doney *et al.*, 2012; Halpern *et al.*, 2008).

Fish Architecture is a commitment to coexist and co-create spaces of encounter and exchange, when agency does not have to be granted but is inherent in all involved organisms, who together shape new ethics and politics (Morton, 2010). The process of Fish Architecture consists of three phases together forming Fish Architecture. We refer to those phases as "Deep/Them", "Surface/Us", "Land/We". In the evolution of Fish Architecture "Land/We" represents the first stage,



Figure 2: The eight theses of the Fishy Manifesto developed during the evolution of Fish Architecture.



Figure 3: *Dive-in*: originally commissioned by Desert X in collaboration TBA21–Academy with music composed by Dark Morph (Jónsi and Carl Michael von Hausswolff). Photo: Lance Gerber (left). Fish-sized Dive-In at the Alligator Head Foundation in Port Antonio, Jamaica. Picture: Alex Jordan (right).

immediately followed by “Deep/Them”, both of which transition into the phase “Surface/We”, where our and other species come together and coexist. The three distinct phases do not emphasise the separation between the unknown outside and the known inside but rather value the differences and acknowledge that other lifeforms experience and exist differently than we do. This age-old discourse on the unknown, unheimlich or the uncanny generated concepts such as Derrida’s monstrous arrivant, Haraway’s cyborg and Morton’s stranger strangers (Haraway, 2006; Derrida, 1995; Morton, 2010). And as pointed out by those scholars, we should welcome the monstrous arrivants and the uncanny strangers and appreciate the different ecological relevance and experiences before engaging in a collective practice with other species (Shildrick, 2002).

Fish Architecture started as a joint exploration of SUPERFLEX and the lab of Integrative Behavioural Ecology with a focus on social behaviour of fish. The first phase started with SUPERFLEX and Alex Jordan asking what fish want from a space and if elements of human architecture can offer a space where fish will exhibit their social behaviour. Explorations happened in Tonga, Portland, Jamaica and Palm Springs, US offering fish and humans the same structures. After testing human structures and deconstructing its elements in a fish context the second phase zoomed mainly on “Deep/Them”, the fish. Anja Wegner then considers the social interactions of fish in a specific physical space, so we can better understand how their social network is impacted by physical features. For the quantitative biological component of the projects, damselfish populations in Portland Jamaica and Corsica, France were chosen because of their social behaviour their typically exhibit in groups and which is linked to their physical environment. Structures were designed by SUPERFLEX, following continuous discussions

that happened in the field, studio and lab. The third phase zooms again out and considers multiple species who together co-created spaces which address the needs of all of them and simultaneously offers a possibility to change the perspective to better understand our co-species. During the Fish Architecture journey, eight theses concerning living with or by the sea were formulated - The Fishy Manifesto (Fig. 2). The manifesto is one out of many possible approaches to coexistence of the aquatic and terrestrial, aiming at a utilitarian and architectural purpose but allows explorations from different perspectives and for different purposes. The here defined theses matured during the evolution of Fish Architecture and might change during the ongoing process.

2.1.1. Land/Us

Before designing novel architecture that meets the demands of both marine and terrestrial creatures, the long-established elements of human architecture should be analysed and reimagined in a different ecological embedding. We started with “Land/Us” to re-examine human architecture and long-established concepts but from an aquatic perspective. With the intention to reduce human architecture to the simplest elements, which then can be revised in a different ecological context. With *Dive-In* (Fig. 3), an installation by SUPERFLEX, the elementary principles of a human shelter, such as walls and a ceiling, mainly arranged in 90°-angles, were used. Those elements were then presented to the marine world in Port Antonio, Jamaica. During this first experiment, the first two theses were established:

- (i) Paint it Pink: A tribute to the oldest architects on the planet, the polyps, builders of the first underwater coral cities. And who prefer to settle in pink surroundings due to their affection for the



Figure 4: *Pink Elements: Tobacco basslet (Serranus tabacarius) as first resident on Pink Element at Alligator Head Foundation, Jamaica. Photo: Anja Wegner (left); There are other fish in the sea by SUPERFLEX in Galería OMR, Mexico City, 2019. Photo: Enrique Macías Martínez. (right)*

pink crustose coralline algae (Mason *et al.*, 2011).

- (ii) **Say No to Gravity:** Since humans are bound to the 2-dimensional surface of the Earth, the human-built environment follows the same pattern. Gravity is a fundamental force in the universe as well as for the culture of human habitation. Other animals are less concerned and burdened by this infinite force. We should blend the horizontal mindset with the vertical mindset and build less concerned by gravity, as other fellow species do who move in a 3-dimensional world.

2.1.2. Deep/Them

After a self-reflection, the subsequent phase shifts the focus from the human-animal to the non-human marine animals. “Deep/Them” does not reinforce the old narratives of the separated outside (nature) and inside (human) but acknowledges the different worlds and ecological niches inhabited by different animals. Therefore, we want to study those diverse lifeforms and appreciate them in their uncanny strangeness. Complementary to the architectural imagination, behavioural ecology, a sub-discipline studying the evolutionary origin of behaviour, should focus on the influence physical structures have on social groups of structure-dwelling marine organisms whereas artistic imagination creates shapes and forms that may appeal to substrate-dwelling marine fish. Systematic and repeated observations of the emerging social dynamics inform us about the wants and needs of those non-human species. *Pink Element* was a first attempt to systematically track other species on this new structure, meanwhile, the same elements were rearranged in a human space on land (Fig. 4). Another approach to underwater construction is *FishLego* (Fig.5) a modular set that consists of rearrangeable pieces with two round and two angular sides. The pieces can be arranged on the

respective underwater site depending on the needs of the inhabitants. *FishLego* was installed in the Mediterranean Sea to offer a nesting substrate to the damselfish *Chromis chromis* during the spawning season in the summer months. Only during this period, the males of this species dwell on substrate, where they establish their temporary territories, court females and carry out brood care. Both *Pink Element* and *FishLego* should offer surfaces but also crevices to hide, feed and mate. Corner and angles are produced by stacking tubes or cubes. Nevertheless, to offer modularity the cube-shape remained inherent in both cases. *Scutoids* (Fig. 6) moves away from this human idea of efficient construction and rectangular building blocks, mimicking marine structures and thereby creating fissures and surfaces that resemble naturally occurring rock formations, while it still consists of basic building blocks. *FishLego* and *Scutoids* are both parts of ongoing biological and artistic research trying to reveal structural preferences of Mediterranean *C.chromis*. We consider individual choice, which spot does a male chose, but also group-level dynamics. In the case of the *C.chromis* a group of males will decide on an



Figure 5: *FishLego: Chromis chromis on FishLego in Corsica, Mediterranean Sea. Photo: Anja Wegner.*

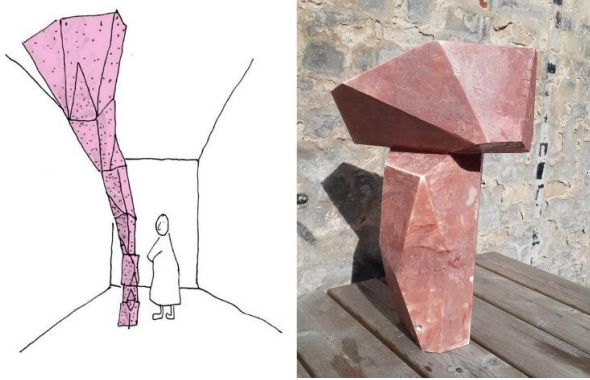


Figure 6: *Scutoids: Sketch of Scutoids installation for humans (left). Scutoids installation for C.Chromis in the Mediterranean Sea. Photo: Zeno Riz A Porta (right).*

area in which the individuals will establish their territories, a commitment to a temporal site-attached coexistence. To acknowledge the group level dynamics, individual characteristics and site-specific qualities the quantitative analysis comprises methods from social network analysis (SNA). Due to the above explained network-like theoretical framework we apply quantitative methods which follow this principle. Through social network and multi-layer network analysis, we can account for the inter-dependence of the system both in the spatial but also temporal domain.

As a result of the different “Deep/Them” explorations and experiments, we propose the following three theses:

- (iii) Magic Materialism: We propose to clash two opposing views that material durable over time is of high quality and material that changes over time is weak. Rather future materials might have several concepts of time embedded with transformation as an intrinsic value. Buildings should mutate and transform over time.
- (iv) Surfaces are Interfaces: A surface might appear like a boundary between two phases. However, on the microscopic scale, they may exhibit thickness but on the atomic scale, these surfaces are porous, holding free space, negative spaces

between atoms or molecules. Once a structure is in the ocean there is not inside or outside of the ocean. Marine life demands the possibility of penetrating all surfaces through holes and alleys where they can hide, nest and play. The focus of Architecture has always been the definition of spaces. We are aiming to flip this way of thinking Architecture. The negative space has the same value as the space itself. The space that is not of value for us, will be of value for someone else.

- (v) The Right Angle is the Wrong Angle: We consider the right angle as one among many occurring in the environment of animals. But in human culture, this angle provides the most efficient way of fractionating the main space into sub-spaces, thus serving the concept of private property. We object to the idea of subversively passing on the concept of private property to other species by only using “the right angle”.

2.1.3. Surface/We

The last element of Fish Architecture is the transition to Interspecies Architecture at the “Surface/We”, a narrow layer, also ecotone, where one ecosystem transitions into the other and species can come together. Such ecotones can have sharp boundaries or gradually transition into each other, we consider the land-water interface as a layer of continuous transition, a boundary without boundaries where land and water can engage in collective practice. The different architectural elements discovered during “Land/We” and “Deep/Them” and the concepts linked to them should help to develop spaces that are not only defined by physical structures but the idea of coexistence to develop together a shared Umwelt.

The experience of the *Superpier* is an example of a structure, which is developed for both worlds, land and water, to allow similar physical experience but from different perspectives (Fig.7). Another step toward a collective interspecies practice is the *Interspecies Assembly*, an assembly for all species affected by the climate crisis, not only the human species. The other two stages of Fish Architecture

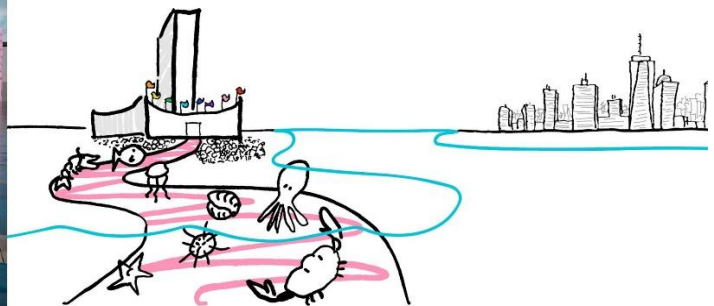


Figure 7: *Superpier – nakskow: rendering of interspecies pier (left). Interspecies Assembly (right).*

are different approaches to understand but also to create different perspectives, whereby “Surface/We” rather offers an opportunity for imagination and action. Coexistence is at the very core of this phase and does not need any further explanation, but it structures behaviours and experiences of all involved species.

The final elements to create Fish Architecture:

- (vi) Maximise the Surface: Research points to the hard surfaces of the wrecks as enhancers of biodiversity in degraded marine ecosystems (Lengkeek *et al.*, 2013). Consequently, design must maximise the extent of hard surfaces to help proliferate marine life from the first moment, while offering humans the possibility of closely witnessing the phenomenon.
- (vii) Aquacoustics: Darwin would play his tuba to Earthworms. He wanted to understand if sonic stimuli would distract them. The tuba did not distract them (but vibration and light did). Noise pollution of the subsurface world is rarely a topic. But we do need to consider aquatic acoustics.
- (viii) Expand Collective Practice: Through our imaginative power, we should aim at integrating other non-human beings when considering both clients as well as practitioners of architecture. The practice of shaping our environment should integrate elements beyond the human sphere on an equal scale.

3. THE SYMBIOCENE

Fish Architecture is a proposition to engage in an interspecies existence but depicts only one of many possible processes to get there. Nature and civilisation are constantly changing objects and do not adhere to the human narratives they are often given. Rather we propose to think in terms of ecosystems, which comprise non-human animals and other organisms, and are finely tuned by all their inhabitants. But this tuning is a dynamic, a never-ending process that brings continuous evolution rather than pristine and virgin stagnancy. We cannot say how or if other animals consciously commit to this process, but as humans we can decide to do so and become ecological agents. Through an anthropo-zoo-genetic approach, we can even empathise with alien species such as fish in an ecological manner and thereby together create spaces, taking the biological needs and behaviours of multiple agents into account. Evolution is a design process, and every involved organism can become a designer, an architect or a creator. In an interspecies endeavour, we can together create ecological

niches to coexist and enter the Symbiocene, the ecological era. Because to exist is to coexist.

4. REFERENCES

- Darwin, C., 1996. *The Origin of Species*, ed. Gillian Beer. Oxford: Oxford University Press, Volume 175, p. 177.
- Day, R. L., Laland, K. N. & Odling-Smee, J. F., 2003. Rethinking adaptation: the niche-construction perspective. *Perspectives in biology and medicine*, Volume 46, pp. 80--95.
- Derrida, J., 1995. *Points...: Interviews, 1974-1994*. Stanford University Press.
- Derrida, J., 2008. *The Animal That Therefore I am*. Fordham University Press.
- Despret, V., 2004. The body we care for: Figures of anthropo-zoo-genesis. *Body & Society*, Volume 10, pp. 111--134.
- Doney, S. C. et al., 2012. Climate change impacts on marine ecosystems. *Annual review of marine science*, Volume 4, pp. 11--37.
- Halpern, B. S. et al., 2008. A global map of human impact on marine ecosystems. *Science*, 319(5865), pp. 948--952.
- Haraway, D., 2006. A cyborg manifesto: Science, technology, and socialist-feminism in the late 20th century. In: *The international handbook of virtual learning environments*. Springer, pp. 117--158.
- Haraway, D., 2013. *When species meet*. University of Minnesota Press.
- Heart of a dog. 2016. [Film] Directed by Laurie Anderson. United States.
- Ingraham, C. T., 2006. *Architecture, animal, human: the asymmetrical condition*. Routledge.
- Kaminski, J. et al., 2019. Evolution of facial muscle anatomy in dogs. *National Acad Sciences*, 116(29), pp. 14677--14681.
- Lengkeek, W., Coolen, J., Gittenberger, A. & Schrieken, N., 2013. Ecological relevance of shipwrecks in the North Sea. *Nederlandse Faunistische Mededelingen*, Volume 41, pp. 49--57.
- Mason, B., Beard, M. & Miller, M. W., 2011. Coral larvae settle at a higher frequency on red surfaces. *Coral Reefs*, Volume 30, pp. 667--676.
- Morton, T., 2010. The Dark Ecology of Elegy. In: *The Oxford Handbook of the Elegy*.
- Morton, T., 2010. *The ecological thought*. Harvard University Press.

- Riley, D. R. et al., 2013. Bacteria-human somatic cell lateral gene transfer is enriched in cancer samples. *PLoS computational biology*, 9(6), p. e1003107.
- Sender, R., Fuchs, S. & Milo, R., 2016. Revised estimates for the number of human and bacteria cells in the body. *PLoS biology*, 14(8), p. e1002533.
- Shildrick, M., 2002. *Embodying the monster: Encounters with the vulnerable self*. Sage.
- Singer, P., 1973. *Animal Liberation*. Springer.