

# Home Habitat Habitus: Design for cross-species cohabitation

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**Abstract:** Our urban built environments are artificially constructed and designed for us, large numbers of people. But ever since urban spaces were formed humans have shared these places with others. Magpies fly between street trees, dogs pull on the leash, cats peer through windows, possums moonlight on roof tops, ants fossick for crumbs. Urban dwellers cohabit with many other species both domestic, native and introduced. If these urban others have been largely absent from our design intent what place do we think they have living in our urban environments; are they trespassing, making a mess, doing a job? Alternatively, what would happen if we designed our built environments to enhance this cross-species cohabitation? Rather than the others living on the periphery of our consciousness, we humans and other species could be encouraged to cohabit through design.

There are emerging interests in the design field and some real world examples, however quirky, which have significant potential to enhance human wellbeing and urban biodiversity. Natalie Jeremijenko's Ooz sites where animals and humans interact, Lenskjold and Jönsson's design experiments with urban animals as significant others, Ned Dodington's animal architecture, Margaret Grose's collaboration of design and ecological science on constructed ecologies, among others are capturing new visions of how we design our urban environments. This paper will explore the potential of design for cross-species cohabitation, how this potential could be developed and why it is of significant value to our urban environments and wellbeing.

## 1. Introduction

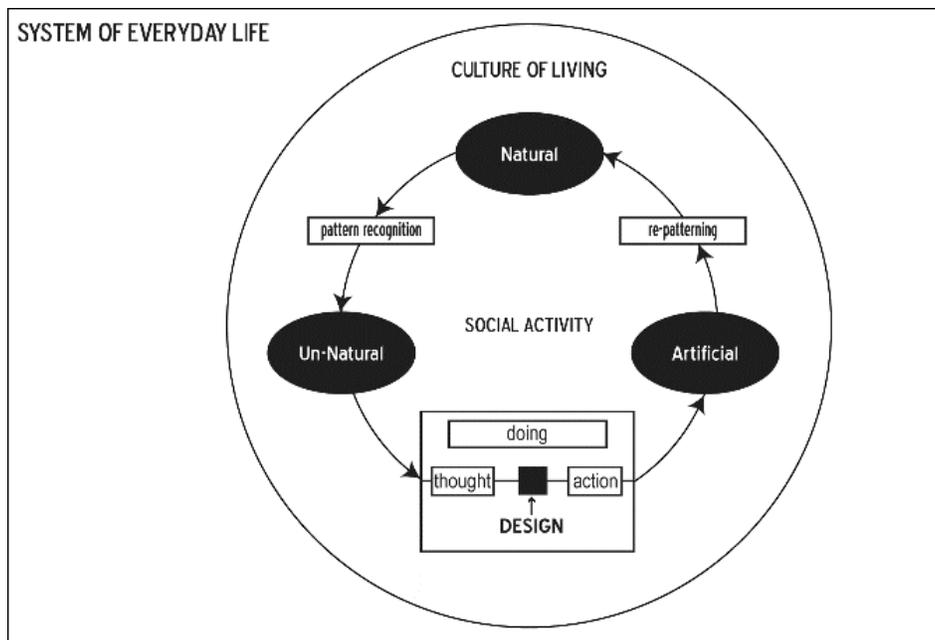
Emerging innovations in cross-species design have the potential to change the built environment by expanding the context of design. Traditionally, more-than-human considerations have not generally been embedded in the practice of design across the sub-disciplines. Although as Grose (2014) highlights, landscape architecture is to some extent the exception. As one of the sub-disciplines of design, landscape architecture does consider both other species and constructed ecologies in its practice. However, most of the existing products of design and artifacts of the built environment to do with other species and in particular other animals – either wild, domestic or companion – have had primarily human considerations. In contrast, there are a number of emerging design initiatives, outlined in this paper, that start to explore a range of cross-species considerations. These kinds of projects expand the notion of 'others' in our practice of everyday life and start to open up how we think about and design for our urban environments.

Why is design for cross-species cohabitation significant? Our collective health and wellbeing are at stake - mental, physical and environmental. The importance of other animals for our personal wellbeing is well documented through studies on the effects of pets (for example Serpell 1991; Charnetski and Riggers 2004; Nagasawa et. al. 2015) to animal therapy (Altschiller 2011). Hence enhancing design for cohabitation improves this cross-species engagement and the potential for personal wellbeing. There are also benefits for environmental wellbeing through designs like cat containment, which allow humans and cats to cohabit in their homes as they have done for generations. Still utilising their mouse catching qualities within the home without the risk to biodiversity from predation on birds, small mammals and marsupials (Denny and Dickman 2010). We can also be more purposeful about our constructed ecologies - like for the voles in England who may be doing better in urban waterways than in the countryside (Hinchliffe and Whatmore 2006) - by intentionally creating cities for other animals, not as trespassing pests or novel distractions but part of a collective notion of everyday life.

The purpose of this paper is to start to open up discussion into how design for cross-species cohabitation might expand the context of design and the potential this might have for our urban environments as home, habitat and habitus. In order to expand the context of design, I propose, the design discipline needs to consider alternate perspectives both cross-species and cross-disciplinary and in doing so further

engage in an interdisciplinary approach. That is, such a proposition would require the interpretation of data and theory between disciplines, across 'divided cultures' (Snow 1964, p.16), particularly from the natural sciences through to social science, design and creative practice – with very different languages and approaches. For example, interpreting sensory perception into aesthetic perspectives and incorporating scientific data into an iterative design process. This paper intends both to talk to designers as well as the environmental sciences and social sciences. To promote an open conversation that plays with language, approaches and information to imagine and design a post-anthropocentric built environment.

To open up a discussion on cross-species design, there is not only a need to understand the different ways of knowing (Brown and Harris 2014) but also to understand one's own expertise, the expertise of others and the need to engage in cross disciplinary conversations and collaborations. To initiate such introductions, I am a designer and my work focuses on how design constructs knowledge. Design knowledge is propositional, it is fictional knowledge about what could, should or ought to be, it follows an iterative conversation-like process of imagining change. My original 'sketch-model' of design (see Figure 1) situated this process in a very anthropocentric context.



**Figure 1:** Culture of living sketch-model, an anthropocentric context of design from 2011 SOAC Paper (Hocking 2011a)

This diagram depicted in Figure 1 (Hocking 2011a; 2011b) lays out a thought experiment kind of sketch-model for the context of design, where 'culture of living' is used as an analogy for that context. It is a sketch based on circular cycles driven by social activity, an anthropocentric momentum that drives the processes in one direction; that is, to construct and reconstruct our human world by design. Design is set up as a three body problem, the natural, artificial and un-natural or virtual (Hocking 2011a; 2011b). The natural exists despite us - biosphere, lithosphere etc. The artificial is a product of our industriousness - everything humans make including all those aspects of our designed built environment. The un-natural or virtual is all our thoughts, theories and ideas - everything in our heads, books, internet, etc. To design we combine all three in the construction and reconstruction of the culture of living. We humans are biologically part of the natural world, we recognise patterns which form our understanding within our un-natural or virtual world. Thought and action is then combined through design to create our artificial world, which then in turn re-patterns our natural world. The process then keeps on going round, the re-patterning of the natural world gets re-recognised influencing how we understand, design and re-create our culture of living. This is a very anthropocentric model, where the natural is passive with other species not directly considered in the design intent and not depicted as acting on or reacting to design of the artificial. Despite

these limitations this Culture of Living Sketch-Model fits within a design discourse expanding the context of design.

Hence, it is from a design discourse that I open up the conversation into a more-than-human connection between home, habitat and habitus.

## 2. Design and the Built Environment

The modern western design context has largely existed in an anthropocentric bubble. A design discipline born out of modernity, the industrial revolution and the Bauhaus drive to mass produce culture formed a highly anthropocentric system of artifacts - but what happened to the others? Modernist design brought us the aesthetic purity of the machine, cult of the new, focus on infrastructure systems and ultimately lost focus of both humans as well as non-humans from their design considerations. The trajectory of this modernist project could be described as the totally artificial world - visions of Fritz Lang's 1927 silent film *Metropolis* to Japanese animation from 1988 *Akira* and 1995 the *Ghost in the Shell* set in highly urban and constructed future worlds where the built environment and machines dominate the landscape – a design trajectory that focused more on the objects than the people or contexts those objects were designed for. From this origin design is most often thought of in terms of the outcome, the physical 2D, 3D or 4D object, structure or graphic or what the design discipline calls the *artifact*.

Since the modernist preoccupation on the artifact, designers like Gehl (1987; 2010), Rittel (1972) and Alexander (1977; 2002) have highlighted the context of design by considering the importance of people, human scale and community engagement. Relatively recently we have seen an influx of design about people, practices of everyday life (Manzini 1992), engaging people in the design process, co-design, co-creation (Fuad-Luke 2009) and design for social innovation towards sustainability (Walker and Giard 2013). These have been important initiatives that have focused the design disciplines' attention on the context of design, or expanded it at least. Now design for cross-species cohabitation, like 'Expanded Environments' (Dodington) and 'Eco-Mindshift' (Jeremijenko), follows the same trajectory, to further expand the design context, not just to consider the person and community of people and the practice of everyday life but moves beyond the anthropocentric to consider the ecological practice of everyday life and how we can design to facilitate the culture of living together in a complex system linked by alternate perspectives.

### 2.1 Urban Conviviality

As design and other fields break down boundaries between disciplines through inter-, cross- and trans-disciplinary pursuits this has also opened up our urban anthropocentric bubble to comforting notions of conviviality, that we are not alone. The growth in *Urban Ecology*, first considered a 'contradiction in terms' (Hinchliffe and Whatmore 2006, p.123) is now part of growing conversations and discourse in the sciences and social sciences. Through an exploration of 'living cities', Hinchliffe and Whatmore (2006, p.124) engage in urban political ecology where politics is 'a more-than-human affaire' to look at the 'politics of conviviality', that is 'the kind of conviviality gathering force in the name of 'posthumanism'.

*In other words, it is a political project that is concerned with a more broadly conceived accommodation of difference, better attuned to the comings and goings of the multiplicity of more-than-human inhabitants that make themselves at home in the city than conventional political accounts.* (Hinchliffe and Whatmore, 2006, p.124)

Grose (2014) compliments this growing interest in urban ecologies with the purposeful and unintended design of *constructed ecologies*, which has engaged landscape architecture in cross-disciplinary conversations for some time but is now being newly explored by the ecological sciences through academic discourse. Grose (2014, p.70) describes *constructed ecologies* as existing in two types: the unintentional 'as accidental or haphazard by-products of human exigency' such as urban infrastructure that might inadvertently provide opportunities or difficulties to other species and the purposeful 'the deliberately planted and designed landscapes, perhaps with nominated species' such as in a public park or wetland. In the context of design for cross-species cohabitation the built environment of the everyday could be seen as a constructed ecology. This design context is also supported by cross-disciplinary explorations including notions of biophilia (Wilson 1984), biosensitivity (Boyden 2011), and urban wildscapes (Jorgensen and Licka 2012). Growing interdisciplinary approaches and cross-disciplinary conversations has provided a platform for the emergence of some innovative cross-species design.

## 2.2 Emerging Cross-Species Design

There are innovative design initiatives emerging that explore a gradient of cross-species engagement. From initiatives that are designed to highlight our relationships with other inhabiting urban spaces, to examples of actively designing homes for other species in the urban habitat, exploring alternate animal perspectives as well as cross-species design experiments and co-creation. This emerging cross-species design use post-anthropocentric perspectives to open up the possibilities for creativity and in so doing broaden the design context.

Jerimijenko's project Ooz emphasises existing cohabitation such as with the New York pigeons or fish. A model of the interdisciplinary arena outlined earlier, Jerimijenko is described as a 'critical interventionist', a prolific and eccentric political and environmental activist or conceptual artist whose work is informed by neuroscience, computer science and electrical engineering (Badke and Walker 2013). Project Ooz, a title derived from the word Zoo spelt backwards, explores design-led interventions for cross-species interactions between urban dwellers 'which test human animal cohabitation of city spaces and set up novel kinds of instruments and infrastructure for urban and feral animals' (Fuller 2010, p.24). Jerimijenko describes project Ooz as reimagining our relationship with the natural system through animals with whom we cohabit (see [http://www.ted.com/talks/natalie\\_jerimijenko\\_the\\_art\\_of\\_the\\_eco\\_mindshift](http://www.ted.com/talks/natalie_jerimijenko_the_art_of_the_eco_mindshift)). A project made up of a series of technological interfaces, like *Communication Technologies for Birds*. An interactive installation at the Whitney Museum in New York designed for the average urban pigeon. Consisting of six perches strung from the eaves of the building that housed a sound file. The birds could jump from one perch to the other, each perch triggering a different argument like:

*here's what you need to do, go down there and buy some of that health food bars, the ones you call bird food, and bring it here and scatter it around, there is a good person'.*

The intention, Jerimijenko says, was for the birds to 'test which argument elicited the most cooperative behaviour from the people below'. She tells us that 'about 100 to 1 decided that this was the argument that worked best on us':

*Tic, tic, tic, that's the sound of genetic mutations, of the avian flu becoming a deadly human flu. Do you know what slows it down? Healthy subpopulations of birds, increasing biodiversity generally. It is in your interest that I am healthy, happy, well fed. Hence you could share some of your nutritional resources instead of monopolising them; that is, share your lunch.*

Another Ooz project, *Amphibious Architecture*, Jerimijenko teamed up with the young experimental Architecture firm *The Living*. This installation consisted of a series of cylindrical buoys with sensors and lights placed in the East and Bronx river, which Jerimijenko describes as 'a fish sensing, water quality displaying, textable interface to the aquatic ecosystem of New York city' (see *Amphibious Architecture* <http://vimeo.com/8508425>). The buoys light up when fish swim by and the light changes colour from warm reds to cool blues depending on the levels of dissolved oxygen. This project aimed to spark curiosity through observable patterns of fish presence and water quality depicted by the buoy lights, colour signature and 'connects the fish to human onlookers via an SMS interface' (Geiger 2010). Passes by could text the buoys, which respond by flashing and text back about the water quality. Projects like Ooz have captured designer's imagination to consider biodiversity within the context of the built environment.

Ned Dodington's website initiative, originally called Animal Architecture now Expanded Environments, show examples from actively designing cohabitate in the built environment to alternate animal perspectives from immersive design. Dodington describes Animal Architecture as bridges the humanist divide between us and them through biologically inclusive art, architecture and design practices that invites other animals to this practice (see TedX Houston, 2013, <http://tedxtalks.ted.com/video/Ned-Dodington-at-TEDxHouston-20>). With the rebranding to *Expanded Environments*, this organisation orients itself as a non-profit 'devoted to demonstrating alternate ways of responsibly and synthetically integrating biological and ecological agents into the built world' (see <http://www.expandedenvironment.org>). The website features projects from around the world, international competitions, articles and resources. Some of these projects have included *Bat Cloud* by Hwang and Co., an installation designed to encourage bats to inhabit a part of the park in Buffalo New York. The website describes *Bat Cloud* as 'a hanging canopy of vessels that is designed and constructed to support bat habitation' and improve the bat's public profile as an integral part of the ecosystem (see <http://www.expandedenvironment.org/bat-cloud-2>). Small project entries like *Insect Homes* document DIY initiatives from 'a reader, fan and family member living in

Germany' aimed at helping the plight of the insect cohabiting with humans (see <http://www.expandedenvironment.org/insect-homes/>), which demonstrate the growing interest around the world in post-anthropocentric design. The site also promotes projects that facilitate alternate animal perspectives, like *Theriomorphous Cyborg* by artist Simone Ferracina who uses immersive technology of virtual reality goggles to create an augmented reality game that give participants an alternate animal perspective of the world around them 'inspired by migratory birds and their ability to perceive the Earth's magnetism' (see <http://simoneferracina.com/Theriomorphous-Cyborg>). Similarly, *Animal Superpowers* by Wuebken and Okada is designed for kids to experience alternate senses of a giraffe, bird or an ant (see <http://www.expandedenvironment.org/animal-superpowers>). A bird friendly architectural design, *Ornilux Bird Protection Glass* by Arnold Glas, uses these alternate perspectives for designing windows that look transparent to us humans but display visible patterns for birds, alerting our avian others to the barrier we have erected (see <http://www.expandedenvironment.org/bird-safe-design>). The Expanded Environment website demonstrates the breadth of initiatives, quantity of different instances and growing interest from both professional and DIY designers.

In the area of design research the project *Urban Animals and Us* are 'forays' into design experiments between people and other animals. Lenskjold and Jönsson's (2013) research project explores design experiments with urban animals as significant others. This project explored three experiments at a retirement home that brought residents into contact with wild urban animals like magpies and gulls 'to explore what new practices can arise between, otherwise, unconnected life-worlds.' (Lenskjold and Jönsson 2013, p.1). These three experiments explored varying degrees of reciprocity. A *Birds View Perspective*, used a 'BirdCam' a video camera attached to bird food to elicit a bird's view of the surrounding landscape. *Talk-in-to*, used a 'BirdFlute' device that produced bird calls from magpie, crow or blackbird, so residents could talk to the birds. *InterFed*, used a dual device 'PhotoTwin' as a kind of camera trap that captures both animal and human in their everyday practices 'simultaneously, two different photos are taken, one photo of the birds' outdoor practices and one of the seniors' indoor practices' (Lenskjold and Jönsson 2013, p.7) displayed side by side. Lenskjold and Jönsson (2013, p.1) argue 'that a foray into interspecies relations, can inform the practical research agenda, and, help to re-articulate the dominant anthropocentricity of design research'. These design-led forays investigate the potential of a pluralisation of perspectives from human and non-human actors in design research.

*Publish Perish Publish Perish* is a project that started to explore cross-species co-creation. My colleague, Andrew MacKenzie, and I embraced the interactive potential of other species in an experimental design-led installation we constructed in 2014. This project displaced 'deselected' library books into the landscape in a process of exploring the afterlife of the book. Installed to make explicit the deconstruction process and to provoke reflection on the notion of 'undertaker of the überobjekt' as the books 'returned to the earth'. The books were installed outside my goose shed (Figure 2) in the semi-rural setting of Berridale in southern NSW. The books were arranged to maximise deteriorating agents, of the weather and the destructive tendencies of the resident geese, by installing them spine down in a trench firmly packed into position (Figure 3). The effects of weathering on the books – rain, frost, wind – made the pages swell and crinkle. The books started to open up, fan out and bloom like strange paper flowers (Figure 4).



**Figure 2:** Deselected books installed outside goose shed, in Berridale NSW. [Photo by Richard Hocking]



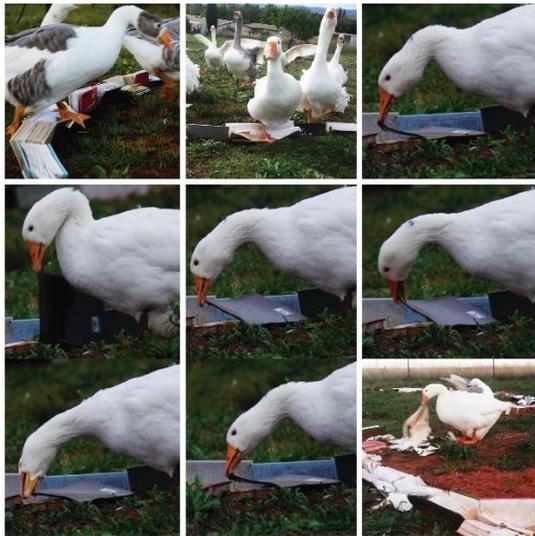
**Figure 3:** Books installed spine down in the landscape [Photo by Richard Hocking]



**Figure 4:** Effects of weathering on the book installation [Photo by Richard Hocking]

The geese were enticed to engage with these books in their habitat and thus formed an integral part of this interactive installation – as cross-species collaborators. Their big webbed feet stepped on the pages

further warping and unfolding the books. A very curious, playful and destructive creature, the geese did what geese do – tearing, pulling, nibbling, shredding and dragging – aiding the decomposition process (Figure 5). The weather and the geese worked on the book installation and the formation started to lose its structure, degrade and decompose (Figure 6) - *publish perish publish perish*. The books as landscape installations become part of a critical design approach that allowed MacKenzie and Hocking to go back to the University of Canberra librarians and engage them in a conversation about the practices, languages and processes of deselection adopted by the library and the 'afterlife' of these books.



**Figure 5:** Book installation decomposing [Photos by Richard Hocking].



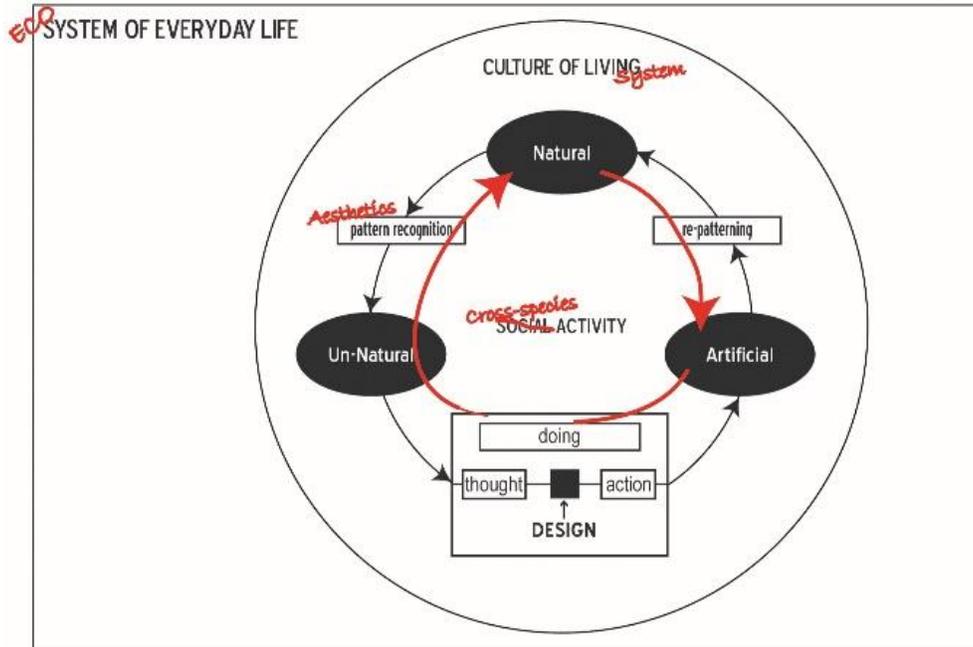
**Figure 6:** Effect of geese on the book installation [Photos by Richard Hocking]

All these examples explore a gradient of more-than-human engagement that incorporates both cross-disciplinary as well as cross-species perspectives. Pulling these initiatives together starts to inform a reframing of design. That is, to design for cross-species cohabitation requires expanding the context of design to purposefully include a broader aesthetic conversation (ie. non-lingual) with alternate animal perspectives both human and non-human.

### 3. Alternate Perspectives

Cross-species design requires engaging with an array of alternate perspectives not only from access to multi-disciplinary discourses but also from an understanding of animal sensory perception. Consequently these perspectives could enable an expanding out from the anthropocentric design context defining a broader approach for how we design the built environment.

By considering these alternate perspectives starts to help alter the context of design set out in my original design sketch-model, depicted in Figure 1. Firstly, a post-anthropocentric perspective suggest that this circular model moves in both clockwise and anti-clockwise directions (see Figure 7). That is, the natural also influence the creation and re-creation of our culture of living. Other species and the environment act on our artifacts and undo our design intentions or amend them. In addition, humans are not the only ones traveling around this circle in a purposeful direction. Pattern recognition is common to all sentient beings who act and react based on their sensory responses to form an aesthetic understanding of the world around them. Non-human species, also act in the world and change the environment due to their presence and their actions, such as described by Ecology.



**Figure 7:** Post-anthropocentric amendment to the culture of living sketch-model

Although, humans are usually distinguished by our purposefulness, by considering alternate animal perspectives start to show that whether by instinct or intent (such as the bowerbird example below) other animals do have a part to play in this design context. Such aesthetic perspectives highlight that these others are active participants in the design context, which to date have largely been overlooked. However, there is value in expanding the design context to include a broader notion of everyday life and how this influences a more integrated understanding of a dynamic and diverse culture of living across species, time and space.

### 3.1 Animal Aesthetics

Reframing the context for design starts with aesthetics. Often understood in very western terms of art and beauty (Eco 2004) the study of aesthetics has expanded to include a broader interpretation of sensory perception where beauty, desire and admiration are only a part of a larger whole. In the field of design, aesthetics is seen as a complex visual language where we combine the parts through elements and principles into an intuitive whole (Findeli 1994) to evoke something - maybe beauty or intimacy, playfulness, the repulsion of the grotesque or the effervescence of spring - usually beyond words. This suggests the idea of 'aesthetic literacy' where there is a 'reading' and a 'writing' aspect of interpreting and creating through this language of the senses. Across this scope of understanding, aesthetics is defined as both culturally specific and understood as human specific. However, rather than considering aesthetics as part of what makes us human perhaps it could be better thought of as what makes us animal.

Animal aesthetics perhaps could be in danger of anthropomorphism, a well-established taboo, especially in the sciences. That is, when we talk about animals as if they were humans 'interpreting animal behaviour in terms of Human experience' (Price 2008, p.7). It is a taboo because it can be dangerous to animals and humans if we assume other animals respond like humans do - like the story of someone thinking a lion needed a pillow for its airplane flight, the lion ate the pillow and died (Grandin and Johnson 2006). Also because it can be hard to prove or often we cannot assume to know - like the story of the dog who's owner assumed he felt ashamed of getting into the garbage and spreading it everywhere, when rather than indicating shame the dog's expression proved to be a mild fear response from knowing that garbage on the floor meant trouble even when someone else did it (Grandin and Johnson, 2006). However, there are also examples of the anthropomorphic taboo being taken so far as to not acknowledge any similarities between human and non-human animals. There is a fine distinction between

assuming animals are responding like humans and trying to see something from an animal's perspective – the latter being the advantage of animal aesthetics.

The Aesthetics of art and beauty is something people tend to hold up as making us human and distinguishing us from other species. Beauty is an abstract ideal, as Eco (2004) explains, for Ancient Greece it was an ideal of perfection, symmetry, ratios in harmony and the human body; for modernity the machine was beauty. Today we have a 'polytheism of beauty' (Eco 2004, p. 428) meaning we now have many ideals and everything in between. Beauty is the aesthetic ideal not aesthetics and as such, as designers, we understand aesthetics in poetic terms of engaging the senses (generally visual) to evoke not just delight but any kind of response, understanding or emotion. In this way, we can use aesthetics to design the built environment to elicit a response, interaction and engagement from humans and other animals, just not necessarily the same response. There are aesthetics that humans do not notice that some animals will balk at – like a yellow raincoat on a fence, an alerting high contrast for cattle but will melt into the background for human handlers (Grandin and Johnson 2006). All animals have emotional responses to their environment, fear, caution, curiosity and so on. If something moves suddenly a predatory animal like a cat might pounce where as a prey animal like a horse might flee. An example of this is the work of Temple Grandin who is an agricultural scientist working with animal aesthetics to design agricultural infrastructure (it should be noted that although her popular science books and television appearances focus on how her autism helped her develop this unique visual perspective, she is also a well published agricultural scientist in her own right). As an example of her use of animal aesthetics in agricultural design, Grandin and Johnson (2006) describe one ranch that was having trouble with balking cattle when funnelling them from a bright open holding yard into a dark passageway through to the barn. Grandin (1997; 1980; Grandin and Johnson 2006) tells us cattle are cautious about moving into spaces where their senses will be momentarily incapacitated such as going from bright to dark where the eye will take some time to readjust to the reduced light levels. The ranchers opened a door near the passageway changing the aesthetics of the space to be more 'inviting' and the cattle flowed through. To understand animal aesthetics requires an interdisciplinary approach accessing such animal perspectives as part of a design process informed from the agricultural, biological and neurological sciences in order to design built environments.

A post-anthropocentric understanding of aesthetics (Chatterjee 2014; Rothenberg 2011) starts with the animal that conceives patterns - sensing, perceiving, conceiving and reacting in its own way according to its ability and way of knowing - and includes the animal that create patterns not just instinctually but purposefully of which the Bowerbird might be the most obvious example (Rothenberg 2011). Bowerbirds, Ptilonorhynchidae, are a family of 20 species of birds endemic to Australia and New Guinea who display a striking sense of aesthetic literacy that goes beyond instinct. The male constructs a 'bower' in what seems a purely aesthetic intent for the purposes of impressing a potential mate to procreate. A learned aesthetic judgment that has species specific designs and population specific variations. Each species constructs a different kind of 'bower' such as a court, mat, avenue or maypole like construction of sticks, grasses or other plant stems (Rowland 2008). Placed on or close to the ground, the bowers are decorated with natural or artificial objects of a particular type or colour (Frith and Frith 2004) depending on the species or even population preference. Different Bowerbird populations, of the same species in different locations, exhibit bower design variations, such as the Vogelkop's Bowerbird where 'red, blue, black and orange coloured items dominate, but the colours vary between different populations' (Rowland 2008, 124). The immature bowerbird needs to develop their aesthetic literacy and 'learn to create by watching their elders at work', without this, a male bird raised in isolation will 'not be able to build a substantial bower' (Rothenberg 2011, 20). Even in the wild, the immature male does not make as impressive or successful bower for the female as older more experienced birds. Bowders are installations to accompany the male bowerbird's song and dance performance, staged in and around the structure once the female arrives. These are very purposeful constructions, objects are selectively removed and placed with intent. In addition, many bowerbirds 'paint' their structures with pigment made from chewing vegetable matter (eg. fruit pulp) and applying with bill or twig (Rowland 2008). Females make aesthetic judgements on the most impressive bower for their mating choice based on the preferences not only of the species but also on population aesthetic variations. These birds not only demonstrate a keen perception of aesthetics but also an ability to create with purposeful aesthetic intent according to a 'cultural-like' preference of population 'taste' - *in which style shall we build*. The purpose here is not to

anthropomorphise the Bowerbirds but as an example to open up the aesthetic conversation beyond the human. Bowerbirds are a very intricate example of aesthetic practice but aesthetics, as a complex form of pattern recognition, are a large part of the way other animals perceive and react to the world, regardless of constructional intent.

Human sensory perception is dominated by the visual, naturally, this is not the case for all animals but this perceptive preference does dominate design perspectives for the built environment. As designers we work with people's aesthetic literacy in order to construct understandable objects, structures or spaces that people can interact, engage and respond to in relatively predictable ways. Rectangular frames along a wall, rising from the floor are instantaneously recognised as doorways and places to move through. Similarly presenting a guinea pig with a gourd shaped vessel is immediately recognised as a place to hide (see Figure 8).



**Figure 8:** Forms that appeal to the guinea pig aesthetic perception of a safe place to hide [photos by Richard Hocking]

As designers we understand people's aesthetics less because we can ask them, more from tradition, precedent, convention but also from a non-lingual conversational style of trial and error and, of course, because we can act as our own examples of humans perspectives. Language is not necessarily the limiting factor in understanding a more-than-human aesthetics because much of our aesthetic literacy is well documented as being beyond words (eg. Grow 1994; Murphy, 2009). That is, designers do not need to talk to the person to see how they interact with a building and a person does not need to articulate an analysis to be able to understand the building's aesthetics. Like the National Art Gallery in Australia's capital that famously confused the visitors' aesthetic sensibilities in being able to intuitively find the front entrance (for other examples see Norman 1988). That is, we understand how to engage and interact with our urban environment through visual cues aesthetically designed for this purpose. Similarly, a study by Murdoch University PhD student, Catherine Hall, considered animal aesthetics to fashion accessories for cats that could alert birds to their presence (Daizell 2015). Hall used brightly coloured Elizabethan or Scrunchy-like collars, based on an understanding of song bird colour perceptions, to reduce cat kills. Hence by integrating information from across the disciplines can provide alternate perspectives for the design process to incorporate more-than-human aesthetics into the construction of our urban habitat.

Agricultural, biological and neurological sciences provide us with a plethora of information and data on perception and behavioural patterns, however, the challenge for design is interpreting this information into what it might mean aesthetically. A well researched western pet and South American traditional culinary household delicacy, the guinea pig (*Cavia porcellus*, shown in Figure 8) is one small example of a species the biological sciences can provide us with a range of information about their sensory perceptions (see Box 1).

A conservative little animal, the guinea pig takes quite a while to feel comfortable in a new environment (Wagner and Manning 1976, p.47). Visually, guinea pigs are able to discriminate between brightness and 'like many other mammals, the guinea pig is a dichromate' ( Jacobs and Deegan 1994, p.1002) with a blue cone short-wavelength sensitive of about 430 nm (Jacobs and Deegan 1994, p.1003) and a green cone mid-wavelength sensitive of about 530 nm . That is, unlike humans who have tricolour from blue, green and red cones which allows us to see our series of colours and unlike the dog who has two cones of blue and red making it hard for dogs to distinguish between greens, yellows and oranges (Price 2008) the guinea pig has blue and green cones which makes them able to distinguish blue, green and yellow but not red. However, visual cues are only a part of the guinea pig's aesthetic interpretation of the environment with, for example, olfactory stimulation playing 'an important role in the guinea pig's response to a setting' (Wagner and Manning 1976, p.47).

**Box 1:** Sense perception of the guinea pig, *Cavia porcellus*

But how does the description in Box 1 inform design? In order to design for cohabitation, in this case between humans and guinea pigs, the biological information represented in Box 1 would need to be interpreted into aesthetic language and incorporated with other contextual considerations from design and the social sciences. For example, a setting for cross-species design for humans and guinea pigs in a contemporary western urban scenario such as an Australian household might include were the guinea pig is a popular children's pet or perhaps a household were we breed long-haired guinea pigs for show as well as for spinning their hair and helping to mow the lawn. This kind of cross-species design scenario requires not only asking what the sense perception information means for considering this animal's aesthetics but also asking about the co-habitation of this animal with humans, to enhance the cross-species engagement and maximise wellbeing across different scales – from individual to environmental. All of which and more can provide the basis for an iterative design process towards constructed urban ecologies.

#### **4. Conclusion**

Expanding the context of design beyond the human can innovate our approaches to the built environment and re-engage us with our world, our animal selves and the other. Through a design-led aesthetic conversation designers can engage with alternate animal perspectives to create built environments that enhance a gradient of engagement possibilities from cross-species cohabitation to co-creation. The projects and initiatives emerging in the area of design for cross-species cohabitation have the potential to broaden the design context to consider that human design initiatives do not just act on the environment and other species but these others also act on the design initiatives. Multi-disciplinary perspectives form a vital part of enabling us to design for alternate animal perspectives and developing cross-species design for constructed urban ecologies. In considering this proposition, this paper has intended to go some way into opening up the conversation into a more-than-human connection between home, habitat and habitus.

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