

ALINTA KRAUTH¹

MORE-THAN- HUMAN AESTHETICS

Lessons from Enrichment

ABSTRACT

This interdisciplinary research investigates the potentials of animal enrichment as it pertains to the conceptualisation of more-than-human aesthetics. This occurs by analysing the creation of a series of digitally interactive sculptures called the *Quantum Enrichment Entanglers* (2021-2022), designed with and for flying foxes in rehabilitation care. In doing so, I argue for a multispecies future for arts practices in which the human perceiver is decentred, and the needs, wants, and practices of other species are considered within the interactive arts. While we cannot yet know the phenomenal experiences of other species, I contend that through knowledges from the fields of animal enrichment design, we are

better able to create cultural artefacts and artistic outcomes that cultivate joy or interest beyond our own species. This research is situated within a practice-based research approach, informed by animal enrichment design. I develop processes of approaching animal participants with interactive stimuli in order to reflect on engagements between animals and artefacts. This develops its own aesthetic register based on what I call *sensory affordances*.

KEY WORDS: more-than-human, affordance theory, aesthetics studies, interactive art

¹ Dr Alinta Krauth is an Australian creative practitioner, and Associate Professor of Digital Culture at the University of Bergen, Norway.

INTRODUCTION

Vinciane Despret, a philosopher of science, suggests that other animal species (hereafter: animals) can have opinions,² and has studied what animals would say if asked the right questions.³ Coming up with some possible *right* questions for other species requires considering what is important to them, as well as how we may interpret their responses or reactions as replies. I am interested in asking animals a highly subjective question: Can objects (material or immaterial) of artistic practice generate aesthetic experiences that may be enriching for other species? While this is a speculative subject, it is not outside the realm of scientific research, since certain species engage with the world in ways that we can recognise, evaluate, interpret, or reflect on.⁴

There is a growing community of scholar-artists engaging with the question of more-than-human aesthetics, such as Madeleine Boyd⁵ and Tina Stephanou⁶ who deal with interactive objects and experiences with/for horses, Brittany Ransom⁷ and Dominic Wilcox⁸ who are interested in enrichment objects and experiences with/for dogs, or Fiona French et al.⁹ and their interaction designs for elephants. What would appear to link their work is an underlying interest in animal sensory enrichment (hereafter, enrichment): the development of species-specific environments and exploratory objects, with the aim of engaging or otherwise modifying the behaviour of animals in captivity. Uncovering and addressing potential connections between the design of enrichment objects and the aesthetic considerations of artists whose practices directly involve other species suggests a gap in knowledge that this article addresses within broader discussions on aesthetics and more-than-human studies. I assert that diffracting enrichment into creative practices may reveal new approaches for more-than-human aesthetics that artistic practitioners can employ. And moreover, I argue that enrichment objects have the potential to hold value that reaches beyond the anthropocentric.

I use artistic practice methods combined with animal behaviour observation to

² Vinciane Despret, "Sheep do have Opinions," in *Making Things Public. Atmospheres of Democracy*, ed. Bruno Latour and Peter Weibel (Cambridge: MIT Press, 2006).

³ Vinciane Despret, *What Would Animals Say if we Asked them the Right Questions?* (Minnesota: University of Minnesota Press, 2016).

⁴ Despret, *What Would Animals Say*.

⁵ Madeleine Boyd, "Towards a Performative Multispecies Aesthetics," *Antennae: The Journal of Nature in Visual Culture*, 31 (2015).

⁶ Tina Stefanou, *Horse Power*, 2019, accessed August 31, 2023, <http://www.tinastefanou.com/#/horse-power/>.

⁷ Brittany Ransom, *Jabblrs*, 2016, accessed April 10, 2023, <https://www.brittanyransom.com/jabblrs>.

⁸ Dominic Wilcox, "World's first art exhibition for dogs," 2016, accessed February 15, 2021, <https://dominicwilcox.com/?portfolio=worlds-first-art-exhibition-for-dogs>.

⁹ Fiona French, Clara Mancini and Helen Sharp, "More than Human Aesthetics: Interactive Enrichment for Elephants," in *Proceedings of the 2020 ACM Designing Interactive Systems Conference (DIS '20)* (New York: Association for Computing Machinery, 2020), 1661–1672, <https://doi.org/10.1145/3357236.3395445>.

find connections between my art and the design of enrichment that improves animal well-being. I conduct this work within an institution that rehabilitates injured or orphaned flying foxes, where I also serve as a long-term volunteer flying fox rehabilitator. These methods include working with soft or mouldable materials, materials edible to flying foxes, and physical computing/electronics. I focus on flying fox reactions to sensory stimuli and object prototypes as a type of participant feedback that iteratively causes me to change and update these objects, resulting in works that may be seen as more-than-human co-creations. This is showcased through the *Quantum Enrichment Entanglers* (2021-2022) (Figure 1), a series of interactive enrichment sculptures shown in aviary-based ‘exhibitions’ for flying foxes. This interactive scope, focusing on tactile, edible, sensory-based objects, and digital sound produced through interaction, has been developed in order to move away from the ocular-centric nature of aesthetic practices for humans, wherein questions of aesthetics often involve acts of looking. Instead, I move towards sensory experiences that seem to appeal to flying foxes specifically, and towards stimuli that appear as positive affordances in a rehabilitation environment.



Figure 1. A *QEE* sculpture in studio. Image © Alinta Krauth.

Introducing Flying Foxes

Flying foxes (hereafter also referred to as bats) are the participants and animal familiars of my practice. They represent a range of bat species, specifically megabats, large-winged mammals of the family Pteropodidae and order Chiroptera, also referred to as fruit bats as their diet consists mainly of fruit juice and nectar. Unlike microbats, most megabats do not navigate using echolocation. Instead, they rely largely on vision, olfactory senses, and tactile exploration. These highly social species live in large roosts that can consist of hundreds of individuals who sleep together in trees during the day and spend nights foraging for food. Their intelligence and social nature are visible in their inquisitive and communicative behaviour. This makes them

an intriguing “oddkin”¹⁰ with whom to consider aesthetics, artefacts, and sensory interactions for non-domesticated animals.

My practice engages specifically with grey-headed flying foxes (*Pteropus poliocephalus*) and black flying foxes (*Pteropus alecto*) who are undergoing rehabilitation at the Bats QLD rehabilitation and release facility in Australia. My practice with these species has developed alongside other active caregiving duties I perform as a volunteer, such as feeding, performing health-checks, or cleaning (Figure 2). The grey-headed flying fox is Australia’s only endemic flying fox and is a threatened keystone¹¹ species. The black flying fox is native to Australia, Papua New Guinea and Indonesia, and is a non-threatened keystone species in Australia. Both play incredibly important roles in the creation and maintenance of rainforests and their dependent species.



Figure 2. Alinta Krauth at Bats QLD aviary. Image © Alinta Krauth.

BACKGROUND

Approaching a More-than-human Aesthetic Register through *Sensory Affordances*

Exploring aesthetic registers for other species is initially complicated by the already widely varied scholarship on aesthetics across philosophy and the arts.¹² Aesthetics are considered predominantly from the perspective of human subjective sensibilities, examining such concepts as the perceptual, sensory, or affective.¹³ There have been many conversations surrounding the potentials of ‘nature’ as having aesthetic

¹⁰ To use Donna Haraway’s term for non-blood and animal family in *Staying with the Trouble* (Durham, NC: Duke University Press, 2016), 2.

¹¹ A keystone species is a crucial organism within an ecosystem. In the case of this species, this means their pollination is crucial to the continuation of rainforests, and directly affects the availability of food for other species.

¹² Kendall Walton, “Aesthetics—What? Why? and Wherefore?,” *The Journal of Aesthetics and Art Criticism* 65, no. 2 (2007), 147–61, <https://doi.org/10.1111/j.1540-594X.2007.00246.x>

¹³ For example: Peter Kivy, “Differences,” *The Journal of Aesthetics and Art Criticism* 51 (1993): 123–32; David Hume, “Of the Standard of Taste,” in *Essays Moral, Political and Literary*, ed. Eugene Miller (Indianapolis: Liberty Classics, 1986), 229.

qualities,¹⁴ however these discussions nonetheless characterise the aesthetic object as that which is observed by a human subject. Opening this conversation to encounter other species' sensibilities invites receptivity to subjectivities we may not be able to evaluate or, potentially, even imagine.¹⁵ Assessing objects or stimuli for their ability to enrich animal well-being is often viewed as effective and purposeful,¹⁶ rather than affective or meaningful. This metrics-based approach to animal sciences scholarship further complicates studies of aesthetics for other species, as quantifiable outcomes are pursued as a source of knowledge and animal subjectivities tend to be avoided. By contrast, evaluating aesthetics can be highly subjective and rely on embodied phenomenological experiences, wherein experiences of pleasure are often fundamental to how humans describe aesthetic appreciation. For example, Kendall Walton's explanation of aesthetics as a value theory that asks "what to like"¹⁶ appears to sit in direct contrast to how reactions are evaluated in animal behaviour research. Questioning what objects or experiences animals *like*, what they specifically *like* about those stimuli, and why, would arguably require human interpretation of their behavioural reactions and has the potential to be misconstrued.¹⁷

How do we recognise the incompatibilities of evaluating animal behaviour versus exploring subjective aesthetic appreciation, while being receptive to the potentiality of animals' own subjective and phenomenological experiences? I suggest one approach is to view more-than-human aesthetics as the creation of *sensory affordances*¹⁸ for other species. I use this term to describe the potentiality of sensory stimulations afforded by an object, the actuality of which may not always be observable or measurable. To understand sensory affordances, it is appropriate to first view animal sensory perceptions and affordances separately, and to then envision how these ideas may relate to the aesthetics of sensory experience.¹⁹

¹⁴ See: Emily Brady, "Imagination and the Aesthetic Appreciation of Nature," *The Journal of Aesthetics and Art Criticism* 56, no. 2 (1998): 139–47; Patricia Matthews, "Scientific Knowledge and the Aesthetic Appreciation of Nature," *The Journal of Aesthetics and Art Criticism* 60, no. 1 (2002): 37–48.

¹⁵ Thomas Nagel reminds us that the subjective experiences of others are inaccessible. He uses echolocating microbats as an example in "What Is It Like To Be a Bat?," *The Philosophical Review* 83, no. 4 (1974): 435–50.

¹⁶ Walton, "Aesthetics—What? Why? and Wherefore?," 147.

¹⁷ Sarah Ritvo and Robert Allison, "Challenges Related to Nonhuman Animal-Computer Interaction: Usability and Liking," *Proceedings of the 2014 Workshops on Advances in Computer Entertainment Conference—ACE'14*, Funchal, Portugal, November 11–14, 2014, 1–7. Also see: Lynda Birke, "Listening to Voices: On the Pleasures and Problems of Studying Human-Animal Relationships," in *The Rise of Critical Animal Studies*, ed. Nick Taylor and Richard Twine (London: Routledge, 2014).

¹⁸ This term has been used previously to describe stimulating a user's sensory perceptions. See: Rhee On Jeong and Seungho Park, "Affordance in Interactive Media Art Exhibition," *International Journal of Asia Digital Art and Design Association* 17, no. 3 (2013): 93–99.

¹⁹ Historically, judging something for its aesthetic value has been closely aligned with positive sensory experiences. From the Greek etymology, the term from which we derive aesthetics is *aisthetikos*, explained as: "of or for perception by the senses, perceptive," of things, "perceptible," from *aisthanesthai* "to perceive (by the senses or by the mind), to feel." Online Etymology Dictionary, s.v. "aesthetic," last modified September 16, 2022,

Jakob von Uexküll's theory of *umwelt*²⁰ describes the perceptual environment as always specific to the physiology and sensory receptors of the individual in question. Any living creatures' subjective experience of, and existence within, their environment (that is, their *umwelt*) is inherently shaped by their embodied perception, allowing them to build understandings of encountered stimuli.²¹ James Gibson's²² theory of affordances²³ further suggests that reception towards stimuli will be based on what opportunities for action that stimuli bring. Gibson initially defines affordances as "facts of the environment, not appearances,"²⁴ and not as subjective qualities.²⁵ Instead, the affordances of an object include all the potentialities of understanding or engaging with that object. He does, however, explain that affordances cut "across the dichotomy of subjective-objective"²⁶ in that an animal may choose which affordances to take advantage of and which to avoid, suggesting the value of affordances emerge through lived experience and semiotic understanding.²⁷

If affordances can be judged on the grounds of advantage or avoidance, sensory pleasure is inherently encompassed by affordance theory. For example, while certain foods are edible, to some consumers some foods may also be tasty. While certain objects may be useful, they may also be fun to use, or offer physical stimulation and comfort, such as a brush that brings relief from itching. Following these examples, this may cause the perceiver to view taste, fun, or comfort as positive affordances for how they make them feel. So, while it may be seen in some academic circles as impossible to observe what nonhuman animals *like* or subjectively *feel*, we can instead look at the ways in which objects hold potential for positive affordances, and how positive sensory and body-led experiences with objects have value in that they guide an animal's decision-making in whether to engage with them further.

Enrichment

Human-made objects that attempt to instil this potential for positive sensory

<https://www.etymonline.com/word/aesthetic>. Also see: Deborah Wells, "Sensory stimulation as environmental enrichment for captive animals," *Applied Animal Behaviour Science* 118 (2009): 1–11.

²⁰ Jakob Von Uexküll, *Theoretical Biology* (New York: Harcourt, Brace & Co, 1926).

²¹ Jakob Von Uexküll, *Streifzüge durch die Umwelten von Tieren und Menschen Ein Bilderbuch unsichtbarer Welten* (Springer: Berlin, 1934).

²² James Gibson, *The Senses Considered as Perceptual Systems* (Boston: Houghton Mifflin, 1966).

²³ James Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979), 127.

²⁴ James Gibson, "The Theory of Affordances," in *Perceiving, Acting and Knowing: Toward an Ecological Psychology*, ed. Robert Shaw and John Bransford (Hillsdale, NJ: Lawrence Erlbaum Associates, 1977), 70.

²⁵ Gibson, "The Theory of Affordances," 69.

²⁶ Gibson, "The Theory of Affordances," 70.

²⁷ Tim Ingold, "Back to the future with the theory of affordances," *Journal of Ethnographic Theory* 8, no. 1-2 (2018): 39.

affordances are those which move towards a more-than-human aesthetic register. Creating such objects requires applying knowledge from enrichment design in order to garner an understanding of what affordances an object might bring to an animal. Enrichment design aims to mimic an animal's natural environment while in captivity, domestic living, or rehabilitation, and to build their species-specific skills, such as foraging, problem-solving, or cognitive abilities.²⁸ Some objects of enrichment are human-made, and may refer broadly to food, play, entertainment, bonding, and other activities that aim to promote perceived benefits through enhancing feelings of calmness, excitement, joy, or safety.²⁹

We may never be able to entirely overcome anthropocentric perception. However, the philosophical and creative processes involved in enrichment's design and dissemination guide us towards more-than-human perceptual pluralism, through which one could arguably evaluate aesthetic qualities according to the needs and wants of other species. This is backed up by Phillip von Gall and Mickey Gjerris,³⁰ who suggest that the benefits that enrichment objects provide bring about their aesthetic qualities, since enrichment objects do not aim to be appealing to humans. There is thus a speculative element of enrichment design that involves creating artefacts from an always-already more-than-human perspective. The human creator of enrichment objects must forgo anthropocentric design principles, and instead attempt to consider the aesthetics, functions, and affordances of their creation from the perspective of their target nonhuman species and individuals.

One could think of enrichment design as the gifting of positive sensory affordances to another species.³¹ It accounts not just for biological/physiological/social needs but also the potential for inquisitive experiences. Through enrichment creation the designer is not just saying *I hope this improves your life*, they are also saying, *please enjoy this taste, this smell, this sound, this texture, this experience. Or if you do not enjoy it, at least be inquisitive. Let it remind you of who you are and where you are from. Let it teach you about yourself and your kin. Let it remind you of another location.* Based on my practice, I argue that we do not need to know what it is like to be a bat³² in order to create the potential of sensory affordance

²⁸ See examples: Ruth Newberry, "Environmental enrichment," *Applied Animal Behaviour Science* 44, no. 2 (1995): 229-43; Gail Laule and Tim Desmond, "Purposeful enrichment," (presentation, 3rd International Conference on Environmental Enrichment, Sea World, Orlando, Florida, 1997).

²⁹ K. Livingstone, "The potential for utilizing acoustic communication as a form of behavioral enrichment" (presentation, 3rd International Conference on Environmental Enrichment, Sea World, Orlando, Florida, 1997).

³⁰ Phillip von Gall and Mickey Gjerris, "Role of Joy in Farm Animal Welfare Legislation," *Society & Animals* 25, no. 2 (2017): 163-79.

³¹ Enrichment is an unavoidably broad concept as it covers almost everything that aims to increase an animal's well-being. My point here is not to say that all enrichment aims towards sensory stimulation; my point is to highlight a philosophy of enrichment making as gifting, from the perspective of enrichment designers. This is brought up by animal interaction designer Michelle Westerlaken in "Imagining Multispecies Worlds" (doctoral dissertation, Malmö University, 2020).

³² See: Thomas Nagel, "What Is It Like To Be a Bat?," *The Philosophical Review* 83, no. 4 (1974): 435-50.

through enrichment design.

Combining Enrichment and Interactive Artforms to promote Sensory Affordances

The above explanation raises questions about what happens when sensory enrichment design is cross-pollinated with the fine arts. Previous examples of enrichment in an artistic context can be found among works presented at *Art Exhibition for Dogs* (2016),³³ which included objects made by artist/curator Dominic Wilcox. The exhibition included large-scale interactive works that attempted to appeal to dogs' experience of *umwelt*. This resulted in an aesthetic arguably caught in-between artistic understandings of sensory affordances targeting dogs, and a desire for human audience and institutional approval.³⁴ For example, Wilcox's *Cruising Canines* (2016) invited dogs to sit in a cardboard cut-out car, feeling the breeze of a fan through the window. The concept is clear—many dogs seem to enjoy this kind of sensory stimulation. However, his object also makes dogs a part of the artwork itself and creates an enjoyable scene recognisable by human audiences. *Cruising Canines* would have been incomplete without a dog gazed upon by human viewers.

This reveals the cultural aesthetic expectations placed upon the work, which arguably limits Wilcox from going 'full dog.' If *Art Exhibition for Dogs* was a room full of food and chewable items, without the human-centric cues such as smellable *paintings* and food on *plinths*, it is possible that it may have been more appealing to dogs, but more likely to be labelled artistically or aesthetically invalid by human viewers. This in-betweenness reveals the institutional struggle between enrichment and human aesthetic interpretation, and how artists may feel required to juggle both. But importantly, it offers a chance to recognise the current cultural complexities of revealing more-than-human sensory affordances within predominantly human-specific cultural scenarios, and raises intriguing questions regarding future possibilities for interspecies cultural spaces.

DEVELOPING AN ENRICHMENT-CENTRED METHODOLOGY FOR AESTHETIC PRACTICES

The artworks discussed below aim to practically implement this ideation on the

³³ Dominic Wilcox, "World's first art exhibition for dogs," 2016, accessed February 15, 2021, <https://dominicwilcox.com/?portfolio=worlds-first-art-exhibition-for-dogs>.

³⁴ Being caught 'in-between' enrichment and human cultural approval is something that seems difficult for artists to escape. This is not limited to this particular exhibition, and the same could also be argued for works such as Maja Smrekar's *!brute_force* (2022) (https://www.majasmrekar.org/brute_force), Brittany Ransom's *jabblrs* (2016) (<https://www.brittanyransom.com/jabblrs>), or Blast Theory's *Cat Royale* (2023) (<https://www.blasttheory.co.uk/projects/cat-royale/>).

connection between enrichment, interactive art, and sensory affordance. I follow the approach of artistic practice-based research (PBR), supplemented by an enrichment design framework, wherein I can observe and reflect on interactions between flying foxes and objects that I create. PBR has the potential to reveal moments of enrichment through experiential interactions.³⁵ Further, PBR approaches can borrow methods from other disciplines—in this case, enrichment design—since traditional PBR methods are still being established.³⁶ This allows me to be receptive to the ways in which making or working with other species requires interdisciplinary overlap.

My creative practice focuses on interactive art as multisensory experience. I move beyond ocular-centric gazing, towards experiences involving a range of modalities and sensibilities,³⁷ often entangled with practices of undoing normative relations between users and artworks.³⁸ Using this definition, one can arguably carve out some conceptual parallels between the human user experience of interactive art and the animal user's experience of enrichment artefacts: both engage sensory apparatuses that move beyond the visual, both aim to prioritise or indeed empower the user, both may be changed or adapted by the user in ways not initially expected by the artist, and thus both may destabilise notions of authorship.³⁹

Within this approach, I incorporate what Jill Mellen and Marty MacPhee call the 'SPIDER framework,' a set of guidelines developed for enrichment design. This includes the following stages: Setting goals, Planning, Implementation, Documentation, Evaluation, and Re-adjustment of enrichment artefacts.⁴⁰ In order to reimagine this framework for my creative practice, I have developed a four-stage iterative process which includes: (1) performing volunteer duties for participants (flying foxes) in a rehabilitation aviary;⁴¹ (2) supplying initial enrichment stimuli options to participants based on current flying fox enrichment literature and practices, and assessing which stimuli were engaged with most commonly; (3)

³⁵ Rebecca Lyle Skains, "Creative Practice as Research: Discourse on Methodology," *Media Practice and Education* 19, no. 1 (2018): 82.

³⁶ Brydie-Leigh Bartleet, "Artful and Embodied Methods, Modes of Inquiry, and Forms of Representation," in *Handbook of Autoethnography*, ed. Tony Adams, Stacy Jones and Carolyn Ellis (London: Routledge, 2013).

³⁷ See: Kristina Höök, Phoebe Sengers, and Gerd Andersson, "Sense and sensibility: evaluation and interactive art," *CHI '03: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York: Association for Computing Machinery, 2003), 241–48.

³⁸ See: Crista Sommerer and Laurent Mignonneau, *Interactive Art* (Vienna: Springer, 2009); Jennifer Seevinck, *Emergence in Interactive Art* (Switzerland: Springer, 2017); Brigid Costello et al., "Understanding the experience of interactive art," (presentation, The Second Australasian Conference on Interactive Entertainment, Sydney, Australia, November 23–25, 2005).

³⁹ Ryszard Kluszczyński, "Strategies of interactive art," *Journal of Aesthetics & Culture* 2, no. 1 (2010); Ernest Edmonds, "Interactive Art," in *Interacting: Art, Research and the Creative Practitioner*, ed. Linda Candy and Ernest Edmonds (Oxfordshire: Libri Publishing Ltd, 2018).

⁴⁰ Marty MacPhee and Jill Mellen, "THE S.P.I.D.E.R. Framework," *Animal Enrichment*, accessed May 3, 2020, <http://www.animalenrichment.org/spider>.

⁴¹ Acts of rehabilitating required in the Bats QLD institution outside of any creative or research goals. This might involve feeding, cleaning, evaluating health, etc.

introducing prototype objects to participants that include commonly engaged stimuli, and assessing which prototypes are engaged with most commonly; (4) finally, introducing the final creative practice outcomes to participants, as fully formed works. Each process involves observing and interpreting bat reactions, and reflecting on these reactions for how they may inform, or lead me to improve, my creative outcomes. Discerning what is engaged with *most commonly* requires interpretation of both quantitative details (e.g., how many bats engage with an item, and for how long) as well as speculation on qualitative details (e.g., what sensorial perceptions bats can be observed using, why they appear to be doing so).

The result of this approach is that bats are invited to interact with final artwork outcomes, and act as integral feedback-givers across all stages of creation, that is, they also interact with raw materials and prototypes. I saw this as a chance to interpret their interactions as apparent choices regarding materials. Because ‘liking’ can be difficult to evaluate,⁴² what is left is the ability to evaluate through interpreting bat sensory curiosity: did my participants seek out, ignore, engage with, or get frightened by certain artefacts? For how long? What sensory perceptions appeared to be used most strongly? Did they try to claim or scent-mark artefacts as a sign of appropriating the object? Could other effects be perceived: calming, excitement? The answers to these questions, offered by bat participants through their body language, signals, and interpretable choices in reaction to stimuli, were integral to devising the final aesthetic properties of my artworks. Throughout this process ideas were changed based on observing positive or negative reactions. Thus, we negotiated solutions to each presented problem. As an example, having studied the use of thick ropes as positive affordance swing-toys in the aviaries of *Lubee Bat Conservancy*,⁴³ I introduced a swingable rope-based sculpture as a stimuli option, which was rejected by my bat participants for many hours.⁴⁴ Based on this, I discontinued experiments with rope. Whereas items that eventually received a lot of close-range attention from multiple bats became the sources of dominant sensory registers of my artistic practice.

Flying Foxes as co-creators and muses

I approach this project as an experienced bat-carer with professional training and years of inhabiting with bats. I see my personal experiences with bats as tacit knowledge embedded in my artistic practice, informing ‘stage one’ of the process outlined above. In bat rehabilitation, the aviary is their last stop before release back

⁴² I refer back to Ritvo and Allison, “Challenges Related to Nonhuman Animal-Computer Interaction” as well as Christina Alligood and Katherine Leighty, “Putting the “E” in SPIDER”, *Animal Behavior and Cognition* 2, no. 3 (2015): 200-17.

⁴³ “Lubee Bat Conservancy,” accessed September 10, 2023, <https://www.lubee.org/>.

⁴⁴ They avoided the object for longer than other presented stimuli, and some used their ‘big wings’ display to signify dominance/mistrust. This is not uncommon for novel stimuli, and it is indeed a positive sign if bats have a healthy mistrust of novel stimuli, however this lasted for around an hour longer than other stimuli introduced around the same time. My assumption is the ropes appeared snake-like to them, so ultimately, I am very glad they avoided this option.

into the wild: the space in which they begin to detach from their human caregivers. In the aviary, they are no longer sick or injured, but are regaining full strength, and learning social norms and what it takes to survive beyond the aviary. One must take this into account and understand that objects introduced to the aviary should not attune them to anthropogenic environments and interactions with humans; rather, they should aim at rewilding through exposure to stimuli, challenges, and situations that simulate their potential future encounters.

Current literature on enrichment specific to flying foxes in aviaries⁴⁵ encourages the use of fruit, native flowers, hanging and swingable objects, natural branches/shapes, ropes, social interaction, cooling devices, touchable toys, cognitive puzzles, and sound enrichment including recordings of bat colonies, bell sounds, and white noise.⁴⁶ These are some of the stimuli introduced in ‘stage two’ of my process. The stimuli engaged with most often constitute the basis for ‘stage three,’ where prototype objects are developed.

Assessing qualities that make these objects enriching to bats is, as aforementioned, rarely discussed in terms of their likeability. However, it has been suggested that objects of food enrichment involve potentially pleasurable experiences of taste, variety and novelty.⁴⁷ Sound enrichment may also be pleasurable, since it aims at introducing an imagined social soundscape for lonely bats and overshadows human-made environmental noise, which may be comforting or calming.⁴⁸ Finally, touchable or puzzle enrichment can further cognitive development through interaction.⁴⁹ As such, some of the main qualities of flying fox rehabilitation enrichment include *sensory variety*, *novel experiences*, *play*, and social or environmental *comfort*.

⁴⁵ See examples such as: Amanda Guy and Peter Banks, “A survey of current rehabilitation practices for native mammals in eastern Australia,” *Australian Mammalogy* 34, no. 1 (2011): 108-18; Dana LeBlanc, “Enrichment ideas- Nectar feeders, fruit kabobs, shower curtain rings,” in *AAZK Enrichment Notebook* (Topeka, Kansas: American Association of Zoo Keepers, 1996); Dana LeBlanc, “Bat enrichment survey,” *Animal Keepers’ Forum* 26, no. 7 (1999): 267-85.; Dana LeBlanc, “Fruit Bat Enrichment at The Lubee Foundation, Inc,” Batworld Organisation (Gainesville, Florida: The Lubee Foundation, Inc., 2011), http://batworld.org/wp-content/uploads/2011/03/Fruit_Bat_Enrich1.pdf; John Seyjagat, “Principal Aspects of Enclosure Design for the Flying Fox” (presentation, AZA Regional Conference Proceedings, 1994), 158-59.

⁴⁶ K. Livingstone, “The potential for utilizing acoustic communication as a form of behavioral enrichment”; and see: Dana LeBlanc, “Suggested Guidelines for Bat Enrichment,” The Lubee Foundation Inc, <https://www.aazk.org/wp-content/uploads/Suggested-Guidelines-for-Bat-Enrichment.pdf>.

⁴⁷ Cf. Dana LeBlanc, “Nectar feeding as an enrichment technique with island flying foxes (*Pteropus hypomelanus*),” *Animal Keepers’ Forum* 249, no. 1 (1997), 18-26; John Seyjagat, “Enrichment ideas—Pollination Poles,” *AAZK Enrichment Notebook* (Topeka, Kansas: American Association of Zoo Keepers, 1996); Betsy Stevens, Dana LeBlanc, and Rick Gutman, “The Nose Knows: Olfactory enrichment for fruit bats,” *The Shape of Enrichment* 5, no. 2 (1996).

⁴⁸ Cf. K. Livingstone, “The potential for utilizing acoustic communication as a form of behavioral enrichment.”

⁴⁹ Cf. Mark Chag, “Give your bats grenades,” *The Shape of Enrichment* 5, no. 4 (1996).

ENGAGING IN MORE-THAN-HUMAN AESTHETICS



Figures 3, 4, 5. Views of *QEE* sculptures, studio and aviary. Images © Alinta Krauth.

One possible outcome of the aforementioned approach is the *Quantum Enrichment Entanglers (QEEs)* interactive sculpture series. The purpose of the *QEEs* is to offer to flying foxes in rehabilitation a range of potential positive sensory affordances. Their molded asymmetric shapes resemble natural forms and are covered in a rubbery non-toxic texture capable of receiving rough tactile engagement without causing harm to teeth or claws. Each *QEE* also includes a range of puzzle hollows, allowing the insertion of food treats or branches, with ‘apple kebob wires’ running the length of each sculpture that allow further items of interest to be attached (see figures 3, 4, 5). The *QEEs* use an accelerometer to incorporate sound and interaction as further positive sensory affordances: direct interaction with each sculpture, such as moving or swinging the sculpture, causes sound to emanate from surrounding sculptures, including bat colony noises, bell sounds, and white noise. Bats often began their interactions with *QEEs* from a distance, through looking, smelling, and listening, which was most likely part of an initial decision-making process. If interested, they would then engage in close range interaction that included touching, swinging,

mouthings, tasting, smelling, exploring, holding, and sometimes becoming territorial. This appeared to highlight the importance of sensory interaction in their decision-making regarding the positive or negative affordances of the *QEEs* (See figure 6).

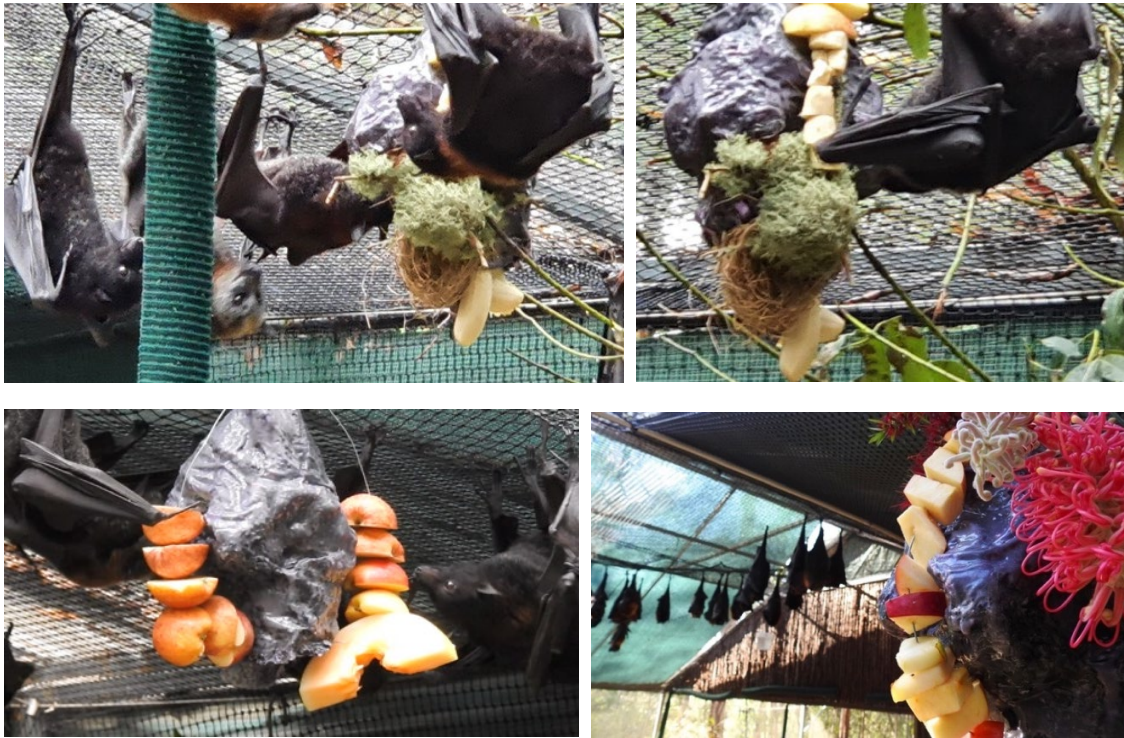


Figure 6. *QEEs* in aviary; montage from video documentation.

Images © Alinta Krauth.

Throughout the process of creating and implementing the *QEEs*, I wondered whether I had fallen *in-between*. As seen in Wilcox's exhibition for dogs, sometimes artists' attempts to engage with enrichment become wedged between sensory affordances and human-centric aesthetics. I found that creating art for bats raised similar insecurities about the cultural and institutional worth of what I had produced. In order to go 'full bat,' I needed to ignore my internal hesitance regarding the potential aesthetic judgements of humans.

Attempting to ignore insecurities associated with more-than-human aesthetics also required letting go of certain genre-based aims. As an interactive artist, I often create with specific sensory engagements in mind—be they tactile, auditory, visual experiences, or a combination of these. *QEEs*, on the other hand, needed to be designed and presented in ways that were open to all the potentially unexpected, unobservable, and unquantifiable sensory interactions they may receive. For example, stimuli made to engage olfactory or auditory senses were just as likely to be explored through mouthing or roughly grabbing, and vice versa. This resulted in a wide range of different affordance opportunities available on each *QEE*, such as those based on sound, mobility, smelly or edible attachments, or tactility. It is within this

exciting chaos⁵⁰ of bat-directed multisensory interactivity that the more-than-human aesthetic of these objects was revealed. Sensory variety, and openness to a range of potential sensory interactions, emerged as the characteristics that reflected whether I had made something bats desired to engage with, and dare I say, *liked*.



Figure 7. Flying foxes engaging a QEE as a group; montage. Images © Alinta Krauth.

FUTURE AVENUES FOR MORE-THAN-HUMAN AESTHETICS

This article analyses sensory enrichment in aesthetic objects from a more-than-human perspective, based on my practice-based research. It suggests that sensory affordances within animal enrichment should be seen as a more-than-human approach to aesthetics, as evaluated through research that incorporates other species as active feedback-givers. This does not prove that animals have opinions on aesthetics or art, nor does it enable direct understandings of other-than-human subjectivities; instead, it offers a methodology for creative processes open to other species' ways of exploring sensory-based opportunities.

I hope for a future in which artists and researchers take the potential for animals to perceive, judge, and value aesthetics seriously, despite the dilemma of how we recognise and evaluate this. This is a future where other species are embraced as cultural equals in our artistic practices, and a future where we see more artistic objects designed to be valuable to other species.⁵¹ Discussions of enrichment and sensory affordances are essential for practitioners who wish to move towards this future. However, I acknowledge that the enrichment-giving artist can fall into an in-

⁵⁰ 'Exciting chaos' refers to the scene from my vantage point as the human observer. As flying foxes are such a social species living in very large groups, interaction like those seen in Fig. 7 were most likely not unusual or chaotic to them.

⁵¹ I have been careful throughout this article not to attempt to speak for the bats. So rather than suggest an object is liked, enjoyed, or cared about, even though I believe that bats do indeed register, understand, and display these feelings, I use terms such as value and affordance to encapsulate unprovable knowledges and feelings that bats may have about objects. I have also tried to acknowledge the ways in which some potentials for positive sensory affordance are directly observable, whereas others may be unobservable but not unimaginable. I firmly believe that unless unquestionably proven otherwise, an intelligent and inquisitive species such as the flying fox has a mind with many, many more potential thoughts, feelings, and understandings than are currently recognisable by science.

between gap between human and animal aesthetic considerations. Being difficult to avoid, this simultaneity is an important part of the conversation on more-than-human aesthetics as it moves forward. My solution here was to avoid human audiences entirely, however this may not be possible for all creative practitioners engaging with other species.

Many aspects of my practice have been left out of the scope of this article, notably the ethical implications of creating interactive art for other species. It is essential to consider consent, which in the case of my work entailed refraining from coercing flying foxes to move towards or away from objects, and avoiding training them to react to objects in predetermined ways, among many other considerations.⁵² On this point, there are still open questions of how creative practitioners approach the ethics of more-than-human aesthetics, as creative practitioners are not necessarily animal experts. As my approach aims to show, centring creative practices around animal well-being through enrichment, rehabilitation, and sensory affordances may help artists to construct their own ethics-led pathway. ◻

⁵² These are further outlined in Alinta Krauth, “More-than-human Creative Practice: Approaches to making interactive and digital art as enrichment for wild flying foxes and domesticated dogs” (doctoral dissertation, Queensland University of Technology, 2022).

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