ANIMAL PRIVACY: Historical and Conceptual approaches

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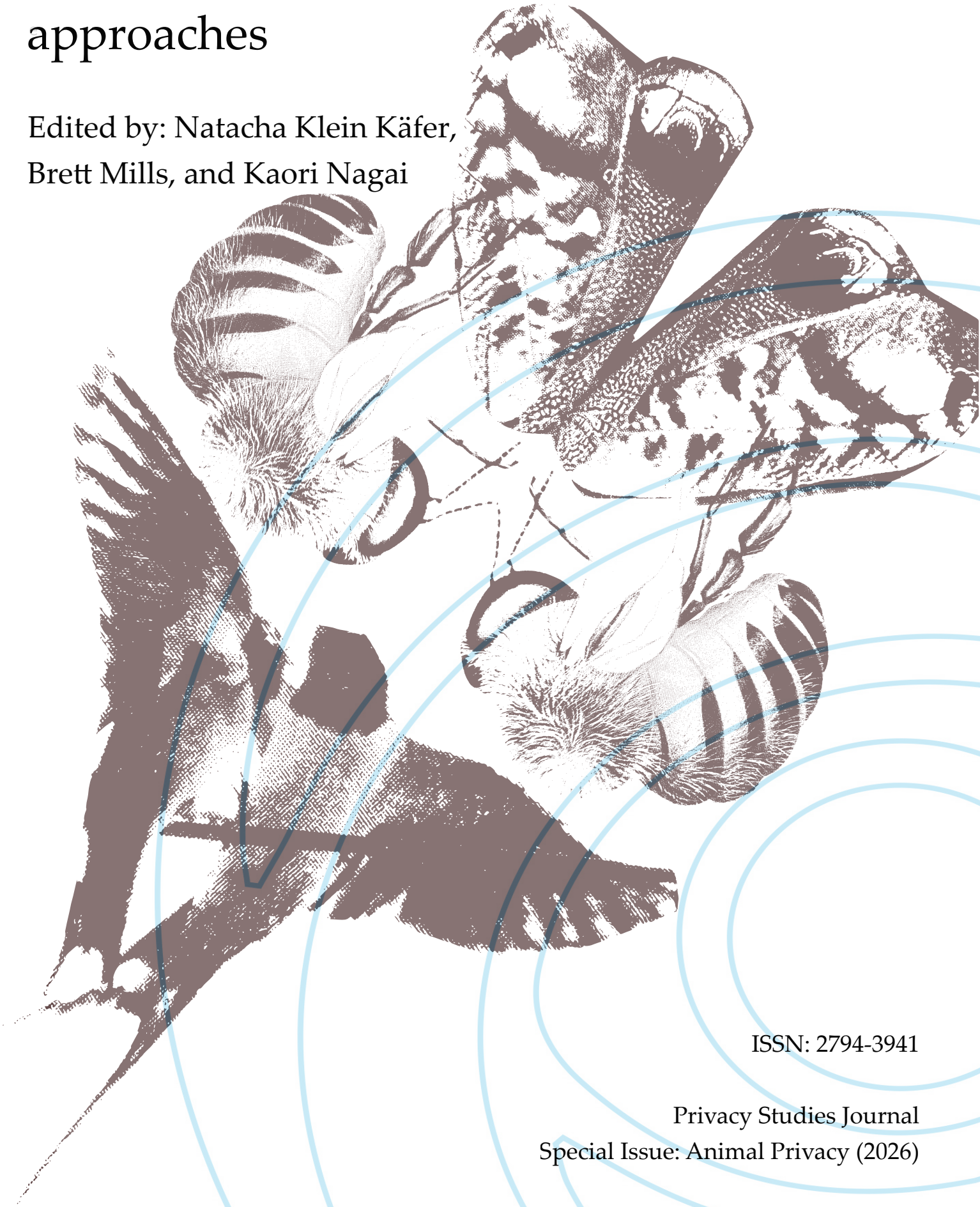

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Here's Looking at You, Kid: Nonhuman and Human Privacy Entanglements in the Surveillant Assemblage

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Abstract
This paper explores the routine collection of data from animals and the ramifications of privacy for human and nonhuman animals. There is an unprecedented incursion into the lives of nonhuman animals that have never been more "visible" as new "smart" surveillance technologies are pushed by the impetus of surveillance capitalism. There are various biometric technologies such as Facial Recognition AI, neural networks looking for emotions in "abnormal" goats, happy cows, and grimacing pigs, pet microchips, activity trackers for dogs, animal identification tracking in the food chain, and myriad technologies for observing and tracking wildlife. Surveillance implies unequal power relations since it is "embedded into asymmetric social relationships,"[1] a postulation which is especially true when it involves nonhuman animals, adding particular issues to an examination of privacy. Critical privacy debates tend to be human-centred, however, this examination argues for a multisensorial notion of privacy when it applies to animals, drawing on Solove's ideas to reconfigure the notion of privacy for animals. It is taken from a wider study of animal surveillance drawing on empirical case studies examining the implications for human and nonhuman animals of some of the latest technologies for scrutiny that are an emerging dynamic in the Surveillant Assemblage.

Keywords
Animals – biometric technology – surveillant assemblage – privacy

1 Christian Fuchs, "How Can Surveillance Be Defined? Remarks on Theoretical Foundations," in *The Internet & Surveillance - Research Paper Series*, edited by the Unified Theory of Information Research Group, 2010, 9.

Introduction

This paper explores the routine collection of data from nonhuman animals (henceforth referred to as "animals") and the privacy ramifications of this for both humans and animals. It provides an overview of some of the issues raised by the surveillance of animals and the ideas they raise about privacy. In the theorizing of surveillance, animal interests have lacked prominence as research has focused mainly on epidemiological studies or applied papers about animal surveillance technologies – such as studies focused on food production in times of food insecurity and threats of global warming. There is, however, gradually more focus on the research and development of animal tracking technologies, the prominence of animals on social media, animal biometrics, and intelligent farming systems that are capable of spotting abnormalities in farmed animals (such as the goats referred to in my title and discussed below), or any number of algorithmically surveyed animals and animal behaviours.

Animal surveillance and human surveillance can be linked, and the development of technology, with its ease of use and accessibility, intensifies the interaction between humans and animals. As surveillance has become more intensive and more diffused throughout many parts of society, it has become increasingly intrusive to humans and animals. Questions of surveillance and their privacy implications are more than just human; indeed, they might be referred to as "posthuman" in the sense of being both multi-species, implicated in power inequalities, and bound up with technology in the combining of human/animal/technology.[1] Examining the surveillance of animals and humans, both separately and together, is essential to a full understanding of surveillance. This article discusses the complex relationship of surveillance to animals who, it seems, can be characterized as subjects, objects, and sometimes agents of surveillance. This paper does not seek to offer a posthumanist definition of privacy; instead, it accepts that privacy offers complex problems that are contingent on circumstance. By using Solove's typology of privacy and taxonomy of invasions of privacy, this paper offers a way of conceptualizing and responding to the issue of animal privacy in the light of the rapid developments in animal surveillance technologies. It argues that approaches that exclude animals are anthropocentric and provide an incomplete picture of the scope of surveillance and privacy. It also argues for a multisensorial notion of privacy and provides an opportunity to consider invasions of privacy in ways such as by smell or sound rather than limited to sight.

Contemporary surveillance and surveillance capitalism

To think about animals and surveillance, we should first understand what is meant by surveillance. Often, this is understood to be something enacted by an authority figure, such as the police monitoring suspects. In addition, we frequently envisage using technology such as Closed-Circuit Television Cameras (CCTV). However, surveillance functions in myriad ways. Modern technology enables the gathering of information from a wide variety of sources, including all types of biometric data, DNA collection, and genomic

1 Erika Cudworth and Steve Hobden, "The Posthuman Way of War," *Security Dialogue* 46, no. 6 (2015): 513–29.

analysis. The Fourth Industrial Revolution facilitated ground-breaking innovations in areas as diverse as gene sequencing, nanotechnology, and quantum computing. These technologies diffuse and converge "across the physical, digital, and biological spheres,"[2] thus creating powerful and hitherto unimagined technological capabilities that have revolutionized and disrupted industries, taking us to a posthuman turn in the theorizing of surveillance. Braidotti's critical posthumanist stance on knowledge production states that subjectivity can "be re-defined as an expanded self, whose relational capacity is not confined within the human species but includes non-anthropomorphic elements."[3] She distinguishes a neo-materialist stance of knowledge production that "resists the over-coding by the capitalist profit principle."[4] However, despite the posthuman direction of travel in the use of surveillance technologies, research has rarely considered the surveilling of animals. This paper seeks to extend Braidotti's observation of the importance of including relations beyond the human by suggesting that we need to move away from a human-centred self (however expanded) and take animal subjectivity in the Surveillant Assemblage seriously.

Contemporary surveillance, mediated by digital technologies, pervades most of our lives. It has enabled individuals, those we live and work with, and our environments more widely to be logged, examined, and analyzed. Amongst the many drivers of these developments are the familiar ones of capitalism and technological capability, which have led to "surveillance capitalism", that is, the automated collection of data and its commodification.[5] Lyon defines surveillance as the "operations and experiences of gathering and analyzing personal data for influence, entitlement or management."[6] However, even Lyon admits that this is not sufficiently encompassing to describe and capture the range of modern surveillance that employs "risk management techniques that have increasingly turned towards attempts to predict and pre-empt future developments."[7] In the light of rapid technological advances and the growth of the Internet of Things (IoT), human-centred definitions of surveillance start to appear inadequate and outdated.[8]

Contemporary surveillance now consists of various structures and processes that are no longer only grounded in space or place but diffused through a network of digitally mediated nodes of information gathering. This enables state and non-state institutions to share information via a Surveillance Industrial Complex and various systems converge to surveil us by various means for many objectives including platform policing and the marketing of goods and services.[9] This notion of the Surveillance Industrial Complex implies that we are surveilled by interlinked institutional practices. What scholars in cri-

2 Klaus Schwab, *The Fourth Industrial Revolution* (Currency, 2017), 14.
3 Rosi Braidotti, "A Theoretical Framework for the Critical Posthumanities," *Theory, Culture & Society* 36, no. 6 (2019): 42.
4 Braidotti, "Theoretical Framework," 42.
5 Shoshana Zuboff, *The Age of Surveillance Capitalism* (Profile books, 2019).
6 David Lyon, *The Culture of Surveillance: Watching as a Way of Life* (John Wiley & Sons, 2018), 6.
7 David Lyon, "Surveillance, Snowden, and Big Data: Capacities, Consequences, Critique," *Big Data & Society* 1, no. 2 (2014): 7.
8 Ana Delicado et al., "Privacy in the Age of the Internet of Things: Perceptions and Practices in Households," *Privacy Studies Journal* 4 (2025): 31–58.
9 Ben Hayes, "The Surveillance-Industrial Complex," in *Routledge Handbook of Surveillance Studies*, eds. David Lyon, Kevin D Haggerty, and Kirstie Ball. (Routledge, 2012), 167–75; Oscar H Gandy Jr., "Coming

tical animal studies have referred to as the Animal Industrial Complex can be seen to be co-constituted with the Surveillance Industrial Complex, for example, through biotechnologies in modern farming practices and food production.[10] Another approach to conceptualizing contemporary surveillance comes from Haggerty and Ericson, who draw on the writings of Deleuze and Guattari in developing their concept of the "Surveillant Assemblage."[11] Key to this is the expansion of pervasive intermeshing of networks and nodes within state and commercial systems of surveillance to capture diverse data, for example, harvesting personal data from social networks. These understandings of contemporary surveillance can be usefully applied to animals, yet animals are absent from both Hayes' and Haggerty and Ericson's accounts. Descriptions of surveillance are still focused on humans and technology, irrespective of the burgeoning industry of animal surveillance.

Haggerty and Trottier have written about the lack of attention paid to nonhuman phenomena when it comes to surveillance. They discuss the surveillance of nature, including animals, and offer a deliberately broad, non-anthropocentric definition of surveillance as "collecting and analyzing information about populations and places for governance."[12] Haggerty and Trottier draw attention to "how nature has been configured by surveillance, and how nature is now positioned as a target, agent, resource, and model for surveillance."[13] There are many instances of biomimetics, where nature has been mimicked to benefit from its unique properties, for example, compound eyes leading to the development of 360-degree surveillance devices.[14]

They are, however, at pains to point out that they reject any suggestions that there is a natural surveillance-free world somewhere in existence since life is "increasingly permeated by surveillance – populated by film crews, tagged trees, animals implanted with sensors and overhead satellites among many things."[15] This emphasis on socially constructed networks of things and relations bears similarities with the hybrid constitution of society emphasized by Bruno Latour and Actor Network Theory.[16] This could be a useful approach to the analysis of hybrid networks of humans, animals, nature, and technologies in the Surveillant Assemblage, as it does not privilege people above 'things' and there is no hierarchy, implied or otherwise, in the analysis of the synthesis between 'actor' and phenomena, 'things'. While Actor Network Theory has tended to focus on technolo-

to Terms with the Panoptic Sort Oscar H. Gandy Jr.," in *Computers, Surveillance, and Privacy* (1996), 132; Susanne Lace, *The Glass Consumer: Life in a Surveillance Society* (Policy Press, 2005).

10 Barbara Noske, *Humans and Other Animals: Beyond the Boundaries of Anthropology* (Pluto Press, 1989); Richard Twine, "Revealing the 'Animal-Industrial Complex': A Concept and Method for Critical Animal Studies," *Journal for Critical Animal Studies* 10, no. 1 (2012): 12–39.

11 Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Bloomsbury, 1988); Kevin D. Haggerty and Richard V. Ericson, "The Surveillant Assemblage," *The British Journal of Sociology* 51, no. 4 (2000): 610.

12 Kevin D. Haggerty and Daniel Trottier, "Surveillance and/of Nature: Monitoring beyond the Human", *Society & Animals* 23, no. 4 (2015): 16.

13 Haggerty and Trottier, "Surveillance and/of Nature," 2.

14 Haggerty and Trottier, "Surveillance and/of Nature," 13.

15 Haggerty and Trottier, "Surveillance and/of Nature," 1–2.

16 Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford University Press, 2005).

gies, it has recently been utilized to involve animals in socio-technical discussions, including reflecting on how animals feature in various modes of capitalist production.[17] If animals are embedded in the Surveillant Assemblage, what are the implications of this for the privacy of animals?

Privacy

A key issue when it comes to the surveillance of people is the implications for their privacy. But what does privacy mean, and how might this extend to understanding the effects of surveillance on animals? Privacy is understood as "human privacy" and is an ill-defined, vague, and often misunderstood concept. It is little wonder, then, that the idea of nonhuman animals and privacy poses such a challenge in terms of conceptualizing it and understanding its significance.[18]

Explanations and understandings of privacy are human-centred and vague. Privacy "is a normative concept deeply rooted in philosophical, legal, sociological, political and economic traditions."[19] The term "privacy" has a multitude of conceptualizations that have developed over time, some of which may be helpful in considering animal privacy. For example, Margulis sees privacy from a psychosocial perspective, centred on social relations, of not just individuals, but of groups and organizations, imbued with learnt cultural practices.[20] Another approach to privacy is as a human right but not, as Hughes states, by drawing on exhaustive lists of what is "private" or relying on legal definitions but by examining how it is experienced by humans in social settings and normative processes.[21]

It appears that, aside from strict legal definitions, there is still no uniform definition of privacy. Descriptions of privacy are dependent on context, continuously evolving, and contingent on both social and technical factors. As Solove puts it, privacy "is a concept in disarray."[22] Solove asks, in the absence of a decisive definition, how we can tell when there is an invasion of privacy? He offers us a useful way of approaching the concept, writing that "privacy concerns and protections do not exist for their own sake; they exist because they have been provoked by particular problems" and that it "is protection from a cluster of related problems that impinge upon our activities in related ways."[23] Solove suggests that we should "focus on the specific types of disruption and the specific activity disrupted rather than look for the common denominator that links all of them."[24]

17 T. Hugh Crawford, "Actor-Network Theory," in *Oxford Research Encyclopedia of Literature*, September 28, 2020, last accessed February 13, 2025.
18 Brett Mills, "Television wildlife documentaries and animals' right to privacy," *Continuum* 24, no. 2 (2010): 193–202.
19 Kobbi Nissim and Alexandra Wood, "Is Privacy Privacy?," *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 376, no. 2128 (2018): 3.
20 Stephen T. Margulis, "Privacy as a Social Issue and Behavioral Concept," *Journal of Social Issues* 59, no. 2 (2003): 243–61.
21 Kirsty Hughes, "A Behavioural Understanding of Privacy and Its Implications for Privacy Law," *The Modern Law Review* 75, no. 5 (2012): 808–10.
22 Solove, *Understanding Privacy*, 12–13; Solove, "A Taxonomy of Privacy," 477.
23 Solove, *Understanding Privacy*, 76.
24 Solove, *Understanding Privacy*, 77.

Only then can we identify the specific problem and determine how it might be resolved, thereby clearly defining what privacy entails in that context. Therefore, we do not need to decide what privacy *is* to define it; we can simply see it as a response to a particular set of problems prompted by their disruption. That is why we do not really notice privacy unless it is compromised, making it noticeable by its disruption or absence. According to Solove, it is these compromises that are crucial for understanding what privacy is.

Solove has a typology of privacy comprising six elements:

1. The right to be left alone.

2. Limited access to the self – the ability to shield oneself from unwanted access.

3. Secrecy – hiding of some things from others.

4. Control over personal information.

5. Personhood – protection of one's personality, individuality, and dignity.

6. Intimacy – control/limitation to intimate relationships or aspects of life.[25]

While Solove himself admits that some of the elements of this list may be rather vague, he points out that there is a clear need to be able to distinguish between different modes of privacy. He states that "the attempt to locate the "essential" or "core" characteristics of privacy has led to failure"[26] because privacy is so contingent and multifaceted. Some of the concepts involved in Solove's typology are interchangeable, without definite boundaries they can feed into one another, and some are underdeveloped, such as "personhood" or the "self". Nonetheless, they provide a useful starting point for understanding privacy and recognizing when it is disrupted.

Solove's categories of privacy provide a valuable framework for understanding privacy and the handling of data in relation to animals. It offers a starting point of analysis that does not demand to be rooted in existing human-centred and asymmetric positions of power. Instead of making analogies to human experiences of the disruption of privacy, it could allow consideration of other perceptions and experiences that could even be based on differing senses, such as smell and sound. In terms of privacy issues, as we will see below, "traditional" animal surveillance is less likely to suffer from function creep[27] and is unlikely to pose severe privacy issues. Therefore, it is mainly 'new' surveillance technologies where more problematic issues start to arise.

25 Solove, *Understanding Privacy*, 12–13.
26 Solove, *Understanding Privacy*, 8.
27 The expansion of surveillance technologies and practices beyond their original purpose leading to considerable privacy, ethical and security concerns.

Animalizing the surveillance/privacy nexus

As this paper has indicated, surveillance and privacy are intimately linked. However, for clarity, this section will discuss issues of traditional and contemporary animal surveillance before examining the implications for privacy using Solove's typology and taxonomy.

Animal surveillance old and new

The surveillance of animals is nothing new. Donaldson states that "the surveillance of non-human life is a routine and everyday feature of contemporary societies that goes unnoticed or unrecognized."[28] He points out that relatively little is written about the surveillance of animals, although they are routinely surveilled, it is hard to regard them as "subjects" in the same way we do human subjects of surveillance.[29] This is because scrutiny is largely focused on animals as "material resources or health threats" being confined to "disease, veterinary or food chain surveillance."[30] However, surveillance still often results in intervention that impacts animals, specifically when they do not fit into our expectations of them. We impose ideas of "normal" behaviour that posit "a human agency behind the animal's interaction with the environment," which relies on human interpretation and description in "human terms."[31] Interventions rarely translate into extensive rights. Donaldson observes that:

> In direct interactions, people seem to have little problem in imagining animals as sentient others, with individual subjectivities full of personality, desires and intrinsic rights. However, these notions do not carry through comfortably into the scientific, economic, legal, and political institutions of the modern state.[32]

Animals are not commonly understood as 'agents' of surveillance. Instead, we find that writing on animal behaviour uses terms such as 'territorial' in relation to diverse species of insects, fish, reptiles, and mammals. Animals establish and protect territories by various means, including scent, smell, and taste, showy visual displays, or sounds, such as birdsong.[33] Territorial 'signposts' deliver information about the animals and deter other animals from that area so that a territory does not need to be aggressively defended, and many are often shared. Territorial and lookout behaviour is often regarded as fascinating and occasionally endearing, as in the case of meerkats, and it is the subject of much wri-

28 Andrew Donaldson, "Surveillance and Non-Humans," in *The Routledge Handbook of Surveillance Studies*, eds. David Lyon, Kevin D Haggerty, and Kirstie Ball (Routledge, 2012), 217.
29 Donaldson, "Surveillance and Non-Humans," 217.
30 Donaldson, "Surveillance and Non-Humans," 217.
31 Donaldson, "Surveillance and Non-Humans," 219–20.
32 Donaldson, "Surveillance and Non-Humans," 219.
33 Tristam D. Wyatt, *Pheromones and Animal Behaviour*, vol. 626 (Cambridge University Press, 2003); Claire M.V. Nelson and Terry J. Ord, "Identifying Potential Cues of Species Identity in Complex Animal Signals", *Animal Behaviour* 186 (2022): 121–36; Marc Naguib, Valentin Amrhein, and Hansjoerg P. Kunc, "Effects of Territorial Intrusions on Eavesdropping Neighbors: Communication Networks in Nightingales," *Behavioral Ecology* 15, no. 6 (2004): 1011–15.

ting and many documentaries.[34] This territoriality can be harnessed for our own use. For example, we have long used the territorial instincts of geese and dogs to alert and protect us, as well as those of other animals such as llamas, described as "elite fox chasers" to protect our flocks.[35]

Watching animals: Animal surveillance and commercial and domestic technologies

Petersen highlights four categories of animals and surveillance: as indicators by behaviour; as research subjects; as indicators by how they are treated, for example, in the profiling of criminals, and as assistants for surveillance tasks.[36] In terms of 'traditional' surveillance, animals have been used by humans as tools of surveillance, to surveil in domestic and commercial settings, guarding humans and other animals on our behalf, such as sheepdogs. Dogs have also been used in criminal detection and search and rescue. Tales about monkeys being mistakenly hanged as French spies in eighteenth-century Hartlepool and beyond, for example, can be discounted here.[37] However, there are some decidedly strange claims made for animals as surveillance tools, such as spying lizards, vultures, squirrels, and a case involving Chinese yaks.[38] There are examples of animals in war, such as protection dogs, "spy-pigeons", and animals working in state security, such as military dolphins.[39] Detection has been undertaken by the military with dogs, and, most recently, with giant pouched rats.[40]

Anecdotes about animals presaging environmental disasters have long been told, the earliest reference dating back to 373 BCE.[41] Even now, there are examples of such research on animals being used to predict Etna's eruptions or earthquake activity in Peru.[42] It is

34 Simon Usborne, "Kool for Kats: How Meerkats Conquered the World," *The Independent*, October 15, 2009, https://www.independent.co.uk/climate-change/news/kool-for-kats-how-meerkats-conquered-the-world-1802721.html.

35 Farming UK Team, "Alpacas Guard the Flock and Keep the Foxes Away!," *Farming UK*, January 16, 2011, https://www.farminguk.com/news/alpacas-guard-the-flock-and-keep-the-foxes-away-_19638.html; Gavin Lindhorst, "Alpacas as Herdguards," *Merino Science*, 2017. Accessed February 13, 2025, https://merinosa.co.za/wp-content/uploads/2014/09/alpacas.pdf

36 Julie Peterson, *Handbook of Surveillance Technologies* (Taylor and Francis, 2012), 769.

37 Kevin Hobbs, "Hanging the Monkey," *Letters to Ambrose Merton* (blog), September 1, 2011, https://ambrosemerton.org/?p=298.

38 Shiv Aroor, "Yaks Stray across Indo-China Border: A Look at Use of Animals as Spies across World," - News Analysis News', India Today, September 9, 2020, https://www.indiatoday.in/news-analysis/story/yaks-stray-across-indo-china-border-a-look-at-use-of-animals-as-spies-across-world-1719995-2020-09-09.

39 Erika Cudworth and Steve Hobden, "The Posthuman Way of War", *Security Dialogue* 46, no. 6 (2015): 513–29; Anthony J Nocella, Colin Salter, and Judy KC Bentley, eds., *Animals and War: Confronting the Military-Animal Industrial Complex* (Rowman & Littlefield, 2013).

40 Håvard Bach, Ian G. McLean, C. Akerblom, and Rebecca Sargisson, "Improving Mine Detection Dogs: An Overview of the GICHD Dog Program," *Proceedings of EUDEM2-SCOT* 1 (2003): 149 – 155; Darcie DeAngelo, "Demilitarizing Disarmament with Mine Detection Rats," *Culture and Organization* 24, no. 4 (2018): 285–302.

41 Norman Miller, "The Animals That Detect Disasters;" Helmut Tributsch, "The Bionic Anticipation of Natural Disasters," *Journal of Bionic Engineering* 2, no. 3 (2005): 123–44.

42 Miller, "The Animals That Detect Disasters;" Rachel A. Grant, Jean Pierre Raulin, and Friedemann T. Freund, "Changes in Animal Activity Prior to a Major (M= 7) Earthquake in the Peruvian Andes," *Physics and Chemistry of the Earth*, Parts A/B/C 85 (2015): 69–77.

not unusual for old surveillance techniques to overlap with new forms, such that we can find animals still being used alongside new digital technologies to guard and protect, or search and rescue dogs wearing smart collars.[43] There has been recent research into dogs detecting cancers and providing medical alerts and responses.[44]

Sentinel animals are put in a location to indicate something harmful, such as environmental hazards, pathogens, and toxic substances, which include alerts for bioterrorism and threats to our food chain.[45] Examples include canaries being used in coal mines to indicate the presence of gas, something which was only phased out as late as 1986 when they were made redundant by electronic 'noses.'[46] Animals are used to indicate pollutants such as plastics in oceans and other contaminants, and albatrosses have also been used to indicate the extent of the presence of plastics.[47] In laboratories, animals such as immunodeficient, genetically modified phenotypes, such as nude mice and rats, are used for oncology research.[48] It is hard to imagine that the use of laboratory animals as a form of surveillance; however, we should keep in mind definitions of surveillance that are sufficiently nuanced to encompass its multiple meanings.[49] It is important to recognize that in many of these examples, there is an interplay between the observation of animals and their control, the ways in which they are subjects of surveillance, and the ways in which they can be used as surveillance tools.

The surveillance of animals in various kinds of settings can be seen to form part of the "Surveillant Assemblage" with information about them becoming part of decision-making processes about animal conservation and urban planning, where spaces for humans and animals overlap. People share information about them on blogs and fora and share advice, they can be fitted with transponders, photographed, filmed, and mapped, the information from which can be used to include or exclude animals in everyday human life. In the use of such invasive technologies, issues of animal privacy are raised.

43 Fang-Lin Chao, Wei Zhong Feng, and Kaiquan Shi, "Smart Collar and Chest Strap Design for Rescue Dog through Multidisciplinary Approach", *Advances in Science, Technology and Engineering Systems Journal* 6, no. 1 (2021): 386–92.

44 Heather Junqueira et al., "Accuracy of Canine Scent Detection of Non–Small Cell Lung Cancer in Blood Serum", *Journal of Osteopathic Medicine* 119, no. 7 (2019): 413–18; Catherine Reeve, Clara Wilson, Donncha Hanna, and Simon Gadbois, "Dog Owners' Survey Reveals Medical Alert Dogs Can Alert to Multiple Conditions and Multiple People," *PloS One* 16, no. 4 (2021).): e0249191.

45 Jacqueline Pei Shan Neo and Boon Huan Tan, "The Use of Animals as a Surveillance Tool for Monitoring Environmental Health Hazards, Human Health Hazards and Bioterrorism," *Veterinary Microbiology* 203 (2017): 40–48.

46 Kat Eschner, "The Story of the Real Canary in the Coal Mine," *Smithsonian Magazine*, December 30, 2016, https://www.smithsonianmag.com/smart-news/story-real-canary-coal-mine-180961570/.

47 Elena Baralla et al., "Bisphenols' Occurrence in Bivalves as Sentinel of Environmental Contamination," *Science of The Total Environment* 785 (2021): 147263; Richard A. Phillips and Claire M. Waluda, "Albatrosses and Petrels at South Georgia as Sentinels of Marine Debris Input from Vessels in the Southwest Atlantic Ocean," *Environment International* 136 (2020): 105443.

48 Qing Lan et al., "Novel Enhanced GFP-positive Congenic Inbred Strain Establishment and Application of Tumor-bearing Nude Mouse Model," *Cancer Science* 111, no. 10 (2020): 3626–38.

49 Francesca Menichelli, "Theories of Surveillance," in *The SAGE Encyclopedia of Surveillance, Security, and Privacy* (SAGE Publications, 2018), 985.

The implications of surveillance for animal privacy

Here, Solove's notion of privacy will be invoked to discuss the ways in which the surveillance of animals impacts their privacy. In terms of the key element of traditional notions of privacy, and the first of Solove's types, animals rarely have the right to be left alone. Specific laws forbidding access to, for example, badger setts, bird nests at certain times of the year, and various protected species are limited in application and scope. They give some right to prevent some types of unwarranted intrusion. However, they are in themselves part of more extensive surveillance networks.

As part of the Surveillant Assemblage, there are various systems of watching animals, and contemporary surveillance methods make animals visible while new, digitally mediated technologies are purposed and repurposed by commercial organizations for use on animals. In relation to Solove's typology, such technologies of monitoring mean animals have limited "access to the self" or ability to shield themselves, and others of their species (such as offspring) from unwanted access. Leaver coined the phrase "intimate surveillance" when he wrote about surveillance of young people, which seems appropriate here, as animals also have no choice. It "involves the purposeful and routinely well-intentioned surveillance of young people by parents, guardians, friends, and so forth. The surveyed have little or no agency to resist."[50]

Lupton writes about "quantified" humans, referring to the metrics produced with the proliferation of self-tracking technologies such as Apple Watches and ovulation and menstrual cycle monitors flooding the market.[51] Similarly, there are quantified cows and other animals whose bodies are sources of biometric data.[52] There are Radio Frequency Identification (RFID) tags, similar to pet microchips, monitoring animals in the food chain, biothermal bolus implants also containing transponders for surveillance purposes, sweat and odour sensors, and activity sensors for chickens and cows. There are animal facial recognition systems, AI neural networks looking for happy cows and pensive pigs; as well as real-time tracking systems for "perceiving health and detecting abnormal behaviour" and searching for emotions in "abnormal goats."[53]

In the UK people are increasingly exposed to the daily lives of 'wild' animals through shows such as *Springwatch* and *Spy in the Wild*.[54] They are two of many documentary pro-

50 Tama Leaver, "Born Digital? Presence, Privacy, and Intimate Surveillance" in *Re-Orientation: Translingual Transcultural Transmedia. Studies in narrative, language, identity, and knowledge*, eds. Hartley, John & W. Qu (Fudan University Press, 2015), 149–60.

51 Deborah Lupton, *The Quantified Self* (Polity Press, 2016); Gina Neff and Dawn Nafus, *Self-Tracking* (MIT Press, 2016).

52 Mickey Vallee, "Animal, Body, Data: Starling Murmurations and the Dynamic of Becoming In-Formation", *Body & Society* 27, no. 2 (2021): 83–106.

53 Suresh Neethirajan, "The Role of Sensors, Big Data and Machine Learning in Modern Animal Farming," *Sensing and Bio-Sensing Research* 29 (2020): 100367; Min Jiang et al., "Automatic Behavior Recognition of Group-Housed Goats Using Deep Learning," *Computers and Electronics in Agriculture* 177 (2020): 9.

54 "BBC Two – Springwatch", *BBC*, accessed 29 May 2022, https://www.bbc.co.uk/programmes/b007qgm3; "BBC One - Spy in the Wild", *BBC*, accessed 29 May 2022, https://www.bbc.co.uk/programmes/m000dlxj.

grammes that stream films of various animals going about their natural activities in their native environments, and it may be the only exposure some people get to wildlife. Animals are additionally increasingly surveilled through "Citizen Science" where people contribute to various mass observations about animals, such as live sightings or roadkill. Means of data collection can be varied, such as observation, film, recording, camera traps, GPS coordinates reporting back via online apps or forms.[55] Given the level of observation of farmed, wild, and companion animals, the possibility of animals accessing Solove's third element of privacy, the right to secrecy, is highly unlikely. Rather, if any animal is secretive, it is usually a prompt for us to delve further into their lives.

Personal information, with respect to different kinds of animals, is largely managed and controlled by humans and often functions to the detriment of animals. In the case of captive animals, Braverman draws on Foucault to understand how extensive bureaucracy and essential cataloguing and management of the animals in zoos are hidden parts of the care that is afforded to them to enable them to thrive and breed.[56] In terms of companion animals, dogs in the UK are compulsorily microchipped in a bid to promote responsible dog ownership and eradicate dangerous dogs.[57] We see relentless marketing of home surveillance technologies for pets, a push to sell animal DNA analysis, and animals proliferating on "Social Petworks" that are monetized by individuals and countless companies. The global pet accessory market is expected to rise to US$42.3 billion by 2026.[58] There are activity trackers for dogs and strong marketing pushes for home surveillance technologies playing on our fear of not being a "good owner."[59] There are implications for shielding and secrecy, too, with the use of cameras that not only watch, but are interactive with treat dispensers, two-way speakers, activity logs, motion detection, night vision, smart notification, and audio alerts. The *RelaxoPet* animal relaxation trainer for cats or dogs has a noise and motion sensor that detects when an animal is stressed and administers calming audible and inaudible sound sequences.[60]

Animal DNA analysis is now big business with a growing trend for consumer genetics, used to trace breeds and health issues.[61] There are adverts that invite you to "[d]iscover your dog's breed, health and relatives," allowing you to share the results via a portal which is "vital for social-media-obsessed pet owners."[62]

55 Fraser Shilling et al., "Designing Wildlife-Vehicle Conflict Observation Systems to Inform Ecology and Transportation Studies", *Biological Conservation* 251 (2020): 108797.

56 Irus Braverman, "Zooland", in *Zooland* (Stanford University Press, 2012).

57 Christie Siettou, "Evaluating the Recently Imposed English Compulsory Dog Microchipping Policy: Evidence from an English Local Authority," *Preventive Veterinary Medicine* 163 (2019): 31–36.

58 "Pet Accessories World Market Report," StrategyR, Global Industry Analysts Inc., 2022, https://www.strategyr.com/market-report-pet-accessories-forecasts-global-industry-analysts-inc.asp.

59 "How to Ensure Your Dog Is Safe While You're Away", Warren London, November 7, 2018, https://www.warrenlondon.com/blogs/warren-london-blog/how-to-ensure-your-dog-is-safe-while-you-re-away.

60 "Pets at Home," RelaxoPet Cat Relaxation Trainer", June 13, 2022, https://www.petsathome.com/shop/en/pets/relaxopet-cat-relaxation-trainer-pro.

61 James P Evans, "Recreational Genomics; What's in It for You?", *Genetics in Medicine* 10, no. 10 (2008): 709–10.

62 "World's Most Accurate Dog DNA Test Service," *Wisdom Panel*, June 12, 2022, https://www.wisdompanel.com/en-gb; "The Best Dog DNA Test," *The New York Times*, July 27, 2021, https://www.nytimes.com/wirecutter/reviews/best-dog-dna-test/.

Animal companions are extremely prominent on "Social Petworks" that are a source of entertainment but also used to earn money by individuals and to benefit the countless companies that host them. There are many people who use pets as a way of expressing their identities, and there are pet social influencers in their own right.[63] Such online activities generate income benefiting the large organizations that have monetized them.[64] There is also canine DNA analysis to establish databases both of those who do and those who do not clean up after their dogs, in most instances, starting as voluntary and ending up as mandatory. Such systems are extremely prone to function creep, enabling social sorting as the databases are profiling both dogs and owners, and can be used for law enforcement, tenancy agreements, and marketing purposes.[65]

Solove's fifth element of privacy is the protection of one's personality, dignity, and individuality. However, the concept of "personhood" attached to rights to privacy is highly problematic and requires radical reframing to accommodate animals. Deckha's consideration of the legal status of animals is helpful here. Deckha argues that "property as a legal status for animals must be eliminated"[66] if any advances supportive of animals are to be made. However, she argues against "personhood" as a replacement, rejecting it as being too "imprinted with its anthropocentric and colonial origins" to be of any use to animals, that do not meet the exacting "expectations for threshold levels of cognition, autonomy or independence."[67] Instead, Deckha proposes that animals be afforded "beingness": "animals as legal beings (as opposed to legal persons) can thus still acquire rights that work to shield them from oppressive power-relations where they are instrumentalized, commodified and violated."[68] Animals do possess personality and are individuals with emotional lives,[69] but as Deckha suggests, "personhood" is a problematic route to ensuring their dignity is properly considered.

Finally, companion and farmed animals do not have privacy when it comes to intimate relationships. Levy writes about the rise of "intimate surveillance", which tracks "our most intimate relationships and behaviours — those relating to love, romance, and sexual activity."[70] Domesticated animals have little choice about how and where to express intimacy, and often privacy or autonomy in this regard is impossible. Digital technologies are developed and marketed from an animal welfare perspective,[71] but the impetus is from a commercial point of view, where the benefits for meat and milk production are

63 Katie Canales, "A Famous Dog Stole the Show at Facebook's F8 Developer Conference: Here's Everything You Need to Know about Instagram Star Jiff Pom, Who Has 26 Million Fans," *Business Insider*, May 1, 2018, https://www.businessinsider.com/instagram-dog-star-jiff-pom-facebook-f8-2018-5.

64 Delia Langstone, "'Well, That's It! I Might as Well Just Die Now': Animals and the Reinforcement of Stereotyped Gender Representation on Social Media," in *Feminist Animal Studies* (Routledge, 2022).

65 Delia Langstone, "'No Shit Sherlock'! Canine DNA and Policing Public Space," *International Journal of Sociology and Social Policy*, no. 3/4 (2020): 458.

66 Maneesha Deckha, "(Feminist) Animal Rights without Animal Personhood?" in *Feminist Animal Studies: Theories, Practices, Politics*, eds. Erika Cudworth, Ruth E. McKie, and Di Turgoose (Routledge, 2023), 19.

67 Deckha, "(Feminist) Animal Rights without Animal Personhood?" 9.

68 Deckha, "(Feminist) Animal Rights without Animal Personhood?" 32.

69 Marc Bekoff, *Minding Animals: Awareness, Emotions, and Heart* (Oxford University Press, 2002).

70 Karen EC Levy, "Intimate Surveillance," *Idaho L. Rev.* 51 (2014): 686.

71 Suresh Neethirajan, "The Role of Sensors, Big Data and Machine Learning in Modern Animal Farming," *Sensing and Bio-Sensing Research* 29 (2020).

paramount. Precision farming and "smart livestock health management" claim that it "helps utilize animals for the benefit of humankind through production, for example (…) higher estrus detection resulting in a shorter calving interval, consequently leading to increased milk production."[72]

It is hard to see the benefit to the overburdened cow that is pushed to keep producing offspring that are taken away from her while she endures the physical toll of maximum milk yields. These new systems are promoted as being impartial: "An automatic behaviour recognition system, independent from human subjectivity"[73] and free of moralizing judgement; however, databases that underpin any system are always loaded with subjective decisions. The argument is often made that unhappy animals are less productive, and it is the case that these systems could potentially add to scientific knowledge about animal husbandry and wellbeing, where development allows the integration of subjective knowledge derived from relationships between humans and animals that "stabilizes such subjectivity as meaningful in the context of established science and animal husbandry."[74] There are many examples that contradict the "happy meat" thesis, but "happy meat" discourses are powerfully established, and surveillance tools are seen as part of its production.[75] With respect to animal companions, intimacy and reproduction are reduced to breeding to satisfy human desires and markets, without consideration for animal preferences.[76]

In summary, Solove's typology of privacy provides a useful starting point for considering the inclusion of animals as subjects of surveillance in discussions of privacy. In addressing the problems of a lack of animal privacy, the final section will address issues of the power of looking and how Solove's taxonomy can be extended to include animals with a view to affording them some protections.

Beyond human power and perspective in animal privacy

Pick cites John Berger's seminal work "Why Look at Animals?"[77] and asks, "Why not look at animals?" Pick opines that "thinking about animal ethics and politics in an age of mass surveillance orients us toward privacy. The question of privacy arises not in a vacuum that sees humans, animals, and technology as mutually exclusive."[78]

72 Suresh Neethirajan, "Recent Advances in Wearable Sensors for Animal Health Management," *Sensing and Bio-Sensing Research* 12 (2017): 19.

73 Shanis Barnard et al., "Quick, Accurate, Smart: 3D Computer Vision Technology Helps Assessing Confined Animals' Behaviour," *PloS One* 11, no. 7 (2016).

74 Donaldson, "Surveillance and Non-Humans", 220.

75 Karen Morgan and Matthew Cole, "The Discursive Representation of Nonhuman Animals in a Culture of Denial," in *Human and Other Animals*, eds. Bob Carter and Nicki Charles (Springer, 2011), 112–32.

76 Sue Donaldson and Will Kymlicka, *Zoopolis: A Political Theory of Animal Rights* (Oxford University Press, USA, 2011).

77 John Berger, *Why Look at Animals?* (Penguin, 2009).

78 Anat Pick, "Why Not Look at Animals?" *NECSUS. European Journal of Media Studies* 4, no. 1 (2015): 107–25.

Even nature commentator, documentary filmmaker, and campaigner, David Attenborough, has asked for more privacy at zoos, and is quoted as saying that gorillas "guard their privacy."[79] In an interview in Wired, Brett Mills considers that "[t]he act of looking is itself an enactment of power, irrespective of whether who/what is being looked at is bothered about being viewed."[80] He suggests that we ought to question why we gaze at creatures and what the effects of such gazing are, asking: "What power do I enact when I insist on the right to look?" This is particularly important, given that "for many species, sight is not the primary sense. To worry about privacy only in terms of looking is to understand human-animal relations in an anthropocentric manner that normalizes sight."[81]

Mills points out that although we associate lack of privacy in the first instance with being seen, looking at it from other perspectives suggests that some animals may prefer that we do not smell them or would perhaps prefer not to hear us, since sight may not be the primary consideration for that species. It is not surprising that animal privacy poses such a challenging issue. Pepper argues that animals should have a right to privacy even in instances where the animal is unaware of the fact that it is being surveilled. She argues that our right to privacy reinforces our autonomy over how we shape relationships and gives us "control over how we present ourselves and our things to others."[82] This gives us other perspectives on "visibility" and, as I have discussed in this paper, I would add that ways of "looking" now can be hidden, not just by camouflage but in virtual environments, as part of the Surveillant Assemblage, in ways that can be intrusive on a deeper level than just being disturbing, scary, or inconvenient. Ways that can have repercussions on both animals and humans. In moving beyond the power of human surveillance and a lack of animal privacy, Solove's taxonomy also has something to offer.

Alongside his typology of privacy, Solove also developed a taxonomy to understand the different harms resultant from an infringement of privacy, with four sets of activities focused on information collection, processing, dissemination, and finally invasion of privacy as a result of any disruption in any of the former three activities.[83] I would suggest that these can be developed not only to include animals but to frame the prevention of animal harm resulting from a lack of privacy or privacy violations. Animals clearly cannot consent to the collection of their information or have any input about how this should be carried out. As far as possible, this may be addressed through the application of data protection principles, for example, by collecting only necessary data, safeguarding sharing and access, and ensuring the information is correct and up to date. Any information gathered on animals may be used or misused and result in breaches of privacy. Animals should be given the right to anonymity as a default in information processing. Any animal identified should be disassociated from its location. There should be the right not to have decisions made by automated processing only, including profiling.

79 Rose Eveleth, "Animals Need Digital Privacy Too," *Wired*, January 31, 2020, https://www.wired.com/story/animals-need-digital-privacy-too/.
80 Eveleth, "Animals Need Digital Privacy Too."
81 Eveleth, "Animals Need Digital Privacy Too."
82 Angie Pepper, "Glass Panels and Peepholes: Nonhuman Animals and the Right to Privacy," *Pacific Philosophical Quarterly* 101, no. 4 (2020): 628–50.
83 Solove, *Understanding Privacy*, 10.

Clearly, animals have no say in the dissemination of information about them, however harmful. A risk assessment should be carried out. An understanding of animals as emotional individuals with personalities, deserving of dignity, is a necessary prerequisite to understanding them as potential victims of invasions of privacy. Animals should be protected from any invasion of privacy that undermines their well-being; they should be able to be secretive, and the default position should not be knowing everything about them without justification. They should not be subjected to intrusive surveillance that undermines their well-being in the service of human interests, primarily related to profit. The extent of curtailment of natural behaviour should be a factor in decisions made about them.

Conclusion

This paper has argued for a more encompassing understanding of privacy and what it means to be private for animals. Until now, privacy debates have been human-centric. An element of the exclusion of animals is that, despite evidence of privacy as a multisensorial experience for people in the past, contemporary understandings tend to be visually focused and rarely cognizant of different senses/sensibilities. A multisensorial approach would be essential to even begin to think about privacy from the perspectives and experiences of other animals. A new perspective should also consider what happens to the data that is collected and held on animals, for example, coming from trackers, microchips, cameras, and databases. We should imagine repercussions from the standpoint of the animals surveilled. That does not mean ignoring humans. Rather, intrusive animal surveillance can turn on humans as animals, or more specifically, the routine information gathering associated with animals, is another node of the Surveillant Assemblage. Thus, any data breaches in relation to our companion animals could adversely affect us.

Animal surveillance can impinge on animal privacy and is clearly yet another harmful manifestation of our dominion over animals and, as such, should be subject to controls, if not for legal reasons, for moral ones. This paper has suggested that a good starting point would be to consider expanding Solove's types of privacy to allow us to identify and gauge the incursions that privacy has on animals' lives. However, we should also recognize the myriad methods of surveilling animals and the subtle ways they are affected by invasions of privacy from being watched. This recognition should include the repercussions from the careless handling of data, for example, when digital information kept on wild animals such as elephants may fall into the hands of poachers.[84] Solove's taxonomy of harms can also be adapted to include animals. Such an approach would encompass moral, ethical, and philosophical arguments as to why invasions of animal privacy should be a matter of concern. It would also mean that the 'typology' and 'taxonomy' of privacy could avoid being human-centric. An inclusive conceptualization of privacy that better captures the impact of forms of surveillance and data gathering would better serve all kinds of humans and animals.

84 Yashaswi Shrestha and Renaud Lapeyre, "Modern Wildlife Monitoring Technologies: Conservationists versus Communities? A Case Study: The Terai-Arc Landscape, Nepal," *Conservation and Society* 16, no. 1 (2018): 93.

References

Aroor, Shiv. "Yaks Stray across Indo-China Border: A Look at Use of Animals as Spies across World - News Analysis News". India Today, September 9, 2020. https://www.indiatoday.in/news-analysis/story/yaks-stray-across-indo-china-border-a-look-at-use-of-animals-as-spies-across-world-1719995-2020-09-09.

Bach, Håvard, Ian G McLean, C Akerblom, and Rebecca Sargisson. "Improving Mine Detection Dogs: An Overview of the GICHD Dog Program". Proceedings of the EUDEM2-SCOT conference on requirements and technologies for the detection, removal and neutralization of landmines and UXO, Citeseer, 2003, 15–18.

Baralla, Elena, Valeria Pasciu, Maria Vittoria Varoni, Maria Nieddu, Roberto Demuro, and Maria Piera Demontis. "Bisphenols' Occurrence in Bivalves as Sentinel of Environmental Contamination," *Science of The Total Environment* 785 (2021): 147263.

Barnard, Shanis, Simone Calderara, Simone Pistocchi, Rita Cucchiara, Michele Podaliri-Vulpiani, Stefano Messori, and Nicola Ferri. "Quick, Accurate, Smart: 3D Computer Vision Technology Helps Assessing Confined Animals' Behaviour". *PloS One* 11, no. 7 (2016): e0158748.

BBC. "BBC One - Spy in the Wild." Accessed May 29, 2022. https://www.bbc.co.uk/programmes/m000dlxj.

BBC. "BBC Two – Springwatch". BBC. Accessed May 29, 2022. https://www.bbc.co.uk/programmes/b007qgm3.

Bekoff, Marc. *Minding Animals: Awareness, Emotions, and Heart*. Oxford University Press, 2002.

Berger, John. *Why Look at Animals?* Penguin, 2009.

Braidotti, Rosi. "A Theoretical Framework for the Critical Posthumanities". *Theory, Culture & Society* 36, no. 6 (2019): 31–61.

Braverman, Irus. "Zooland". In *Zooland*. Stanford University Press, 2012.

Canales, Katie. "A Famous Dog Stole the Show at Facebook's F8 Developer Conference — Here's Everything You Need to Know about Instagram Star Jiff Pom, Who Has 26 Million Fans". *Business Insider*, May 1 2018. https://www.businessinsider.com/instagram-dog-star-jiff-pom-facebook-f8-2018-5.

Chao, Fang-Lin, Wei Zhong Feng, and Kaiquan Shi. "Smart Collar and Chest Strap Design for Rescue Dog through Multidisciplinary Approach", *Advances in Science, Technology and Engineering Systems Journal* 6, no. 1 (2021): 386-392.

Crawford, T. Hugh. "Actor-Network Theory." *Oxford Research Encyclopedia of Literature.* September 28, 2020; Accessed February 13 2025.

Cudworth, Erika, and Steve Hobden. "The Posthuman Way of War". *Security Dialogue* 46, no. 6 (2015): 513–29.

_____. "The Posthuman Way of War". *Security Dialogue* 46, no. 6 (2015): 513–29.

DeAngelo, Darcie. "Demilitarizing Disarmament with Mine Detection Rats". *Culture and Organization* 24, no. 4 (2018): 285–302.

Deckha, Maneesha. "(Feminist) Animal Rights without Animal Personhood?" in *Feminist Animal Studies: Theories, Practices, Politics*, edited by Erika Cudworth, Ruth E. McKie, Di Turgoose. Routledge, 2023, 19–34.

Deleuze, Gilles, and Félix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia*. Bloomsbury Publishing, 1988.

Donaldson, Andrew. "Surveillance and Non-Humans" in *Routledge Handbook of Surveillance Studies*, edited by David Lyon, Kevin D Haggerty, and Kirstie Ball. 1st ed. Routledge International Handbooks. Routledge, 2012, 217–24.

Donaldson, Sue, and Will Kymlicka. *Zoopolis: A Political Theory of Animal Rights*. Oxford University Press, 2011.

Delicado, Ana, Marta Vilar Rosales, Monica Truninger, Jussara Rowland, and Ana Viseu. "Privacy in the Age of the Internet of Things: Perceptions and Practices in Households." *Privacy Studies Journal* 4 (2025): 31–58.

Eschner, Kat. "The Story of the Real Canary in the Coal Mine | Smart News| Smithsonian Magazine". *Smithsonian Magazine*, December 30 2016. https://www.smithsonianmag.com/smart-news/story-real-canary-coal-mine-180961570/.

Evans, James P. "Recreational Genomics; What's in It for You?" *Genetics in Medicine* 10, no. 10 (2008): 709–10.

Eveleth, Rose. "Animals Need Digital Privacy Too". *Wired*, January 31, 2020. https://www.wired.com/story/animals-need-digital-privacy-too/.

Farming UK Team. "Alpacas Guard the Flock and Keep the Foxes Away!" Farming UK, January 31 2011. https://www.farminguk.com/news/alpacas-guard-the-flock-and-keep-the-foxes-away-_19638.html.

Fuchs, Christian. "How Can Surveillance Be Defined? Remarks on Theoretical Foundations" in *The Internet & Surveillance - Research Paper Series.* Edited by the Unified Theory of Information Research Group, 2010.

Gandy Jr, Oscar H. "Coming to Terms with the Panoptic Sort." In *Computers, Surveillance, and Privacy*. 1996, 132.

Global Industry Analysts, Inc. "Pet Accessories World Market Report", 2022. https://www.strategyr.com/market-report-pet-accessories-forecasts-global-industry-analysts-inc.asp.

Grant, Rachel A, Jean Pierre Raulin, and Friedemann T Freund. "Changes in Animal Activity Prior to a Major (M= 7) Earthquake in the Peruvian Andes." *Physics and Chemistry of the Earth*, Parts A/B/C 85 (2015): 69–77.

Haggerty, Kevin D, and Richard V Ericson. "The Surveillant Assemblage." *The British Journal of Sociology* 51, no. 4 (2000): 605–22.

Haggerty, Kevin D, and Daniel Trottier. "Surveillance and/of Nature: Monitoring beyond the Human." *Society & Animals* 23, no. 4 (2015): 400–420.

Hayes, Ben. "The Surveillance-Industrial Complex" in *Routledge Handbook of Surveillance Studies*, edited by David Lyon, Kevin D Haggerty, and Kirstie Ball . 1st ed. Routledge, 2012, 167–75.

Hobbs, Kevin. "Hanging the Monkey | Letters to Ambrose Merton." Hanging the Monkey (blog). September 1, 2011. https://ambrosemerton.org/?p=298.

Hughes, Kirsty. "A Behavioural Understanding of Privacy and Its Implications for Privacy Law." *The Modern Law Review* 75, no. 5 (2012): 806–36.

Jiang, Min, Yuan Rao, Jingyao Zhang, and Yiming Shen. "Automatic Behavior Recognition of Group-Housed Goats Using Deep Learning." *Computers and Electronics in Agriculture* 177 (2020): 105706.

Junqueira, Heather, Thomas A Quinn, Roger Biringer, Mohamed Hussein, Courtney Smeriglio, Luisa Barrueto, Jordan Finizio, and Xi Ying. "Accuracy of Canine Scent

Detection of Non–Small Cell Lung Cancer in Blood Serum." *Journal of Osteopathic Medicine* 119, no. 7 (2019): 413–18.

Lace, Susanne. *The Glass Consumer: Life in a Surveillance Society*. Policy Press, 2005.

Lan, Qing, Yanming Chen, Chungang Dai, Shenggang Li, Xifeng Fei, Jun Dong, Yanhua Shen, Xingliang Dai, Zhaohui Lu, and Bing Liu. "Novel Enhanced GFP-positive Congenic Inbred Strain Establishment and Application of Tumor-bearing Nude Mouse Model." *Cancer Science* 111, no. 10 (2020): 3626–38.

Langstone, Delia. "No Shit Sherlock! Canine DNA and Policing Public Space". *International Journal of Sociology and Social Policy* no. 3/4 (2020): 455-474.

Langstone, Delia. "Well, That's It! I Might as Well Just Die Now': Animals and the Reinforcement of Stereotyped Gender Representation on Social Media." In *Feminist Animal Studies*. Routledge, 2022.

Menichelli, Francesca. "Theories of Surveillance." In *The SAGE Encyclopedia of Surveillance, Security, and Privacy*. SAGE Publications, 2018.

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press, 2005.

Leaver, Tama. "Born Digital? Presence, Privacy, and Intimate Surveillance" in *Re-Orientation: Translingual Transcultural Transmedia. Studies in narrative, language, identity, and knowledge*, edited by John Hartley and W. Qu . Fudan University Press, 2015, 149–160.

Levy, Karen EC. Intimate Surveillance." *Idaho L. Rev.* 51 (2015): 679-693.

Lindhorst, Gavin. "Alpacas as Herdguards," *Merino Science*, 2017. Accessed February 13, 2025. https://merinosa.co.za/wp-content/uploads/2014/09/alpacas.pdf

Lupton, Deborah. *The Quantified Self*. Polity Press, 2016.

Lyon, David. "Surveillance, Snowden, and Big Data: Capacities, Consequences, Critique." *Big Data & Society* 1, no. 2 (2014): 2053951714541861.

_____. *The Culture of Surveillance: Watching as a Way of Life*. John Wiley & Sons, 2018.

Margulis, Stephen T. "Privacy as a Social Issue and Behavioral Concept." *Journal of Social Issues* 59, no. 2 (2003): 243–61.

Miller, Norman. "The Animals That Detect Disasters," February 15 2022. https://www.bbc.com/future/article/20220211-the-animals-that-predict-disasters.

Mills, Brett. "Television Wildlife Documentaries and Animals' Right to Privacy." *Continuum* 24, no. 2 (2010): 193–202.

Morgan, Karen, and Matthew Cole. "The Discursive Representation of Nonhuman Animals in a Culture of Denial" in *Human and Other Animals*, edited by Bob Carter and Nicki Charles. Springer, 2011, 112–32.

Naguib, Marc, Valentin Amrhein, and Hansjoerg P Kunc. "Effects of Territorial Intrusions on Eavesdropping Neighbors: Communication Networks in Nightingales." *Behavioral Ecology* 15, no. 6 (2004): 1011–15.

Neethirajan, Suresh. "Recent Advances in Wearable Sensors for Animal Health Management." *Sensing and Bio-Sensing Research* 12 (2017): 15–29.

_____. "The Role of Sensors, Big Data and Machine Learning in Modern Animal Farming." *Sensing and Bio-Sensing Research* 29 (2020): 100367.

Neff, Gina, and Dawn Nafus. *Self-Tracking*. MIT Press, 2016.

Nelson, Claire MV, and Terry J Ord. "Identifying Potential Cues of Species Identity in Complex Animal Signals." *Animal Behaviour* 186 (2022): 121–36.

Neo, Jacqueline Pei Shan, and Boon Huan Tan. "The Use of Animals as a Surveillance Tool for Monitoring Environmental Health Hazards, Human Health Hazards and Bioterrorism." *Veterinary Microbiology* 203 (2017): 40–48.

Nissim, Kobbi, and Alexandra Wood. "Is Privacy Privacy?" *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 376, no. 2128 (2018): 20170358.

Nocella, Anthony J, Colin Salter, and Judy KC Bentley, eds. *Animals and War: Confronting the Military-Animal Industrial Complex*. Rowman & Littlefield, 2013.

Noske, Barbara. *Humans and Other Animals: Beyond the Boundaries of Anthropology*. Pluto Press, 1989.

Pepper, Angie. "Glass Panels and Peepholes: Nonhuman Animals and the Right to Privacy." *Pacific Philosophical Quarterly* 101, no. 4 (2020): 628–50.

Petersen, Julie. *Handbook of Surveillance Technologies*. 3rd ed. Taylor and Francis, 2012.

Phillips, Richard A, and Claire M Waluda. "Albatrosses and Petrels at South Georgia as Sentinels of Marine Debris Input from Vessels in the Southwest Atlantic Ocean." *Environment International* 136 (2020): 105443.

Pick, Anat. "Why Not Look at Animals?" *NECSUS. European Journal of Media Studies* 4, no. 1 (2015): 107–25.

Reeve, Catherine, Clara Wilson, Donncha Hanna, and Simon Gadbois. "Dog Owners' Survey Reveals Medical Alert Dogs Can Alert to Multiple Conditions and Multiple People." *PloS One* 16, no. 4 (2021): e0249191.

RelaxoPet Cat Relaxation Trainer. "Pets at Home," June 13, 2022. https://www.petsathome.com/shop/en/pets/relaxopet-cat-relaxation-trainer-pro.

Schwab, Klaus. *The Fourth Industrial Revolution*. Currency, 2017.

Shilling, Fraser, Wendy Collinson, Michal Bil, Diemer Vercayie, Florian Heigl, Sarah E Perkins, and Sandra MacDougall. "Designing Wildlife-Vehicle Conflict Observation Systems to Inform Ecology and Transportation Studies." *Biological Conservation* 251 (2020): 108797.

Shrestha, Yashaswi, and Renaud Lapeyre. "Modern Wildlife Monitoring Technologies: Conservationists versus Communities? A Case Study: The Terai-Arc Landscape, Nepal." *Conservation and Society* 16, no. 1 (2018): 91–101.

Siettou, Christie. "Evaluating the Recently Imposed English Compulsory Dog Microchipping Policy. Evidence from an English Local Authority." *Preventive Veterinary Medicine* 163 (2019): 31–36.

Solove, Daniel J. "A Taxonomy of Privacy." *University of Pennsylvania Law Review* 154 (2005): 477.

_____. *Understanding Privacy*. Harvard University Press, 2008.

The New York Times. "The Best Dog DNA Test." July 27 2021. https://www.nytimes.com/wirecutter/reviews/best-dog-dna-test/.

Tributsch, Helmut. "The Bionic Anticipation of Natural Disasters." *Journal of Bionic Engineering* 2, no. 3 (2005): 123–44.

Twine, Richard. "Revealing the 'Animal-Industrial Complex—A Concept and Method for Critical Animal Studies." *Journal for Critical Animal Studies* 10, no. 1 (2012): 12–39.

Usborne, Simon. "Kool for Kats: How Meerkats Conquered the World | The Independent | The Independent." *The Independent*, October 15, 2009. https://www.

independent.co.uk/climate-change/news/kool-for-kats-how-meerkats-conquered-the-world-1802721.html.

Vallee, Mickey. "Animal, Body, Data: Starling Murmurations and the Dynamic of Becoming In-Formation." *Body & Society* 27, no. 2 (2021): 83–106.

Warren London. "How to Ensure Your Dog Is Safe While You're Away," November 7, 2018. https://www.warrenlondon.com/blogs/warren-london-blog/how-to-ensure-your-dog-is-safe-while-you-re-away.

Wisdom PanelTM. "World's Most Accurate Dog DNA Test Service," June 12, 2022. https://www.wisdompanel.com/en-gb.

Wyatt, Tristam D. *Pheromones and Animal Behaviour*. Vol. 626. Cambridge University Press, 2003.

Zuboff, Shoshana. *The Age of Surveillance Capitalism*. Profile Books, 2019.