

Animal Centered Research beyond ACI: Exploring the Applicability of Animal Centered Principles to All Animal Research

Animal Centered Research beyond ACI

Exploring the Applicability of Animal Centered Principles to All Animal Research

Clara Mancini

School of Computing and Communications, The Open University, Milton Keynes, UK, clara.mancini@open.ac.uk

Eleonora Nannoni

Department of Veterinary Medical Sciences, University of Bologna, Bologna, Italy, eleonora.nannoni2@unibo.it

This workshop aims to explore the applicability of Animal-Computer Interaction (ACI) research ethics beyond the field's remit, to develop an animal-centered approach to the use of animals in research more broadly. The event is part of a longer-term project aiming to rearticulate the framework of the 3Rs (Replacement, Reduction, Refinement). The workshop is targeted at researchers from different disciplines, with expertise on animal research from different perspectives. The event will involve group work sessions during which participants will discuss diverse case studies, exploring the applicability of animal-centered ethics principles when designing research that involves animals, and plenary discussions during which participants will share challenges identified, collectively explore possible ways to address them in practice and produce policy suggestions to facilitate the implementation of scenario-specific trade-offs. The workshop will be run both in presence and virtually, to promote inclusion of participants from different geographic areas. A key outcome of the event will be the establishment of a working group to develop a framework and provide a resource for researchers and practitioners whose work involves animals and for whom the application of animal-centered technologies, methods or frameworks may be relevant.

CCS CONCEPTS • ~~Human~~ Animal-Centered Computing • Interaction Design • Interaction Design Theory, Concepts and Paradigms (medium relevance)

Additional Keywords and Phrases:

animal-computer interaction, research ethics, animal-centered research, ethical principles, animal research

1 Introduction

This workshop aims to explore the applicability of Animal-Computer Interaction (ACI) research ethics beyond the field's remit, towards developing an animal-centered framework for the involvement of animals in research more broadly, for a more nuanced and effective ethical approach to animal research.

1.1 Benefits and limitations of humane animal research principles

The involvement of animals in research procedures that can harm them and to which they are deemed unable to consent raises fundamental ethical dilemmas. Proposed over 60 years ago [16], the principles of Replacement, Reduction and Refinement (3Rs) address these dilemmas: wherever possible, animal use in research procedures should be *replaced* with alternative methods or more complex species should be replaced with species deemed less sentient; the number of

animals used in research procedures should be *reduced* as far as possible; research procedures should be *refined* to minimize any negative impact on the animals involved. The 3Rs are widely regarded as the gold standard for humane animal research [4], and the best compromise between animal welfare and research aims.

While the 3Rs framework's application has yielded significant benefits for both the welfare of research animals and the quality of animal research, by stimulating strategic and methodological innovations [17], researchers have also pointed out various limitations. For one thing, it involves difficult trade-offs, for example, because the reduction of animal numbers may mean that fewer animals are subjected to more procedures causing greater impact on the individuals involved; or because the replacement of more complex species with lower species may result in the use of more individual animals [14]. For another thing, it is still grounded in the assumption that the use of animals in research is legitimate to achieve a greater good for society [5], implying that: research procedures do not have to be relevant to the individuals involved; any costs to the animals involved can be considered acceptable based on a cost-benefit analysis that prioritizes societal interests; measures to minimize suffering and animal use are subordinated to the aims of the research; no explicit provision enables animals to consent or dissent to their involvement, or withdraw from a procedure. In other words, within the 3Rs framework animals are still fundamentally instruments of research rather than participants in research. This contrasts with frameworks regulating the involvement of participants in human-centered research, which protect their autonomy and wellbeing, and require their just treatment [2].

1.2 From humane animal research to animal-centered research

The field of Animal-Computer Interaction (ACI) aims to study the interaction between animals and technology from their perspective and, through animal-centered methods, develop technological interventions that benefit them. To this end, the field extends to nonhuman animals the human-centered ethical perspective which has informed Human-Computer Interaction and, generally, Computing research, and which requires the prioritization of individual research participants' autonomy and welfare over research aims and societal interests. Consistent with this concern, researchers have engaged with ethical issues related to the impact of ACI research on animals [15, 9, 8] and some have specifically proposed ethical guidelines for the involvement of animals in ACI research [18, 10, 11].

While some of these guidelines appeal to the 3Rs framework [18], researchers have also suggested that animal involvement in ACI research could be looked at through the lens of human research ethics [7]. Others have argued that an ACI research ethics should move beyond the process-centered 3Rs framework, since ACI's animal-centered aims require an equally animal-centered framework comprising corresponding principles [11], implying that: animals should be involved in research procedures only when these are directly relevant and beneficial to them (principle of *relevance*); all involved individuals should be equitably protected, not in virtue of their attributed capacities but of their role as research participants (principle of *impartiality*); research procedures should give priority to their biological integrity and individual autonomy (principle of *welfare*); individuals' informed consent should always be garnered, comprising mediated consent from legal guardians and welfare experts in the animals' best interests, and contingent consent from the animals themselves, as expressed by their willingness to engage and chosen modalities of engagement (principle of *consent*) [12].

1.3 Extending the application of animal-centered research principles

In 2006 Russell confessed: "*I hope I won't have to write any more long repetitive papers on the Three Rs,*" "[I] would like to hand over to people [. . .] who are still advancing the subject and can say something new" [1]. Consistent with this, we recently discussed the possible applicability of the principles of *relevance*, *impartiality*, *welfare* and *consent* to animal research beyond the remit of ACI [12]. We proposed a scoring system to help researchers and delegated authorities assess the extent to which research procedures align with these principles and determine when being involved in research is in an animal's best interests, when a procedure could be adjusted to increase its ethical standard or when the use of non-animal methods is more urgently advisable.

In some cases, the alignment of research procedures with animal-centered principles is apparent. For example, studies which investigate the effectiveness of welfare-enhancing housing conditions for farm animals and which offer such enhancements to at least some of the animals involved [13] clearly align with the principle of *relevance*. Procedures

which ensure the welfare of the animals involved during trials and which envisage their rehabilitation and rehoming instead of convenience euthanasia following trials [6] clearly align with the principle of *welfare*. Similarly aligned is research whose procedures employ technology that afford animals more control and autonomy in constraining situations, improving their welfare as a result [19]. However, in other cases, such as acute toxicity tests of substances for human use [3], there is hardly alignment with any animal-centered research principles. Here the question arises as to what extent such principles might be applicable to a diverse range of procedures involving animals and what might facilitate their widest possible application.

2 The Workshop

2.1 Aims and focus

The proposed one-day workshop aims to address this question by exploring the applicability of ACI's research ethics beyond the field's remit, with a view to developing an animal-centered approach to the use of animals in research more broadly. The event is part of a longer-term project aiming to rearticulate the framework of the 3Rs to develop an integrated ethical framework which includes animal-centered research principles and thus explicitly recognizes animals' autonomy, interests and role, for a more nuanced ethical approach and for supporting the best possible research to the benefit of animal partakers and wider society. To this end, we aim to form a working group committed to developing the envisaged integrated framework, and to exploring pathways for its application in research policy and practice through follow-up events.

2.2 Participants

On the one hand, we think that this workshop will show to stakeholders outside of the ACI community how animal-centered design can positively influence and be translated to other fields; on the other hand, we believe that such a workshop could attract participants who otherwise would not be aware of the conference, thus extending the ACI community. For these reasons, participants will be selected based on applicants' previous experience in research involving animals, with the aim to include the widest range of perspectives possible. Diversity, inclusion and equity will be also taken into account during the selection process. We will aim to have a range of competences as wide as possible, including representatives from ethical bodies, animal research, conservation, farming, welfare and other domains. The optimal number of participants would be between 15 and 20.

2.3 Activities

Before the workshop. A few weeks before the workshop, candidates will be asked to fill in a short questionnaire for us to gather information about their interests, previous experience in animal research, and expectations about the workshop. This preliminary information will be used in order to divide participants into groups for group work sessions.

During the workshop. Following a brief introduction, participants will be divided into groups and each group will engage in a moderated discussion of a case study, to explore the applicability of animal-centered ethics principles when designing research that involves animals. Subsequently, each group will report on their findings in a plenary discussion, sharing the challenges identified and collectively exploring possible ways to address them. In a second group work session, in light of the plenary discussion, participants will be invited to reconsider the applicability of animal-centered research principles to the different scenarios. A second plenary discussion will then allow participants to define the main challenges regarding the applicability of different animal-centered research principles to different scenarios, possible practical solutions to address these challenges and policy suggestions to facilitate the implementation of scenario-specific trade-offs. The detailed schedule of activities will be as follows:

- 09:00-09:30 INTRODUCTION: The organizers will propose a set of possible ethical principles to be discussed and used during the group work. However, participants will be free to adapt/integrate the ethical principles if this is suitable for their scenario.

- 09:30-09:45 SCENARIOS: Participants will be divided into four groups and case studies (one for each group) will be presented. The organizers will take care of preparing case studies that will cover a wide range of scenarios (different purposes of the research, animal species, types of procedure, degrees of suffering, etc.). Ideally, two groups will be working on site and 2 remotely. The proportion will be adapted to the number and needs of the participants. One of the two organizers will moderate the onsite groups, while the other will facilitate the online discussions.
- 09:45-10:45 GROUP WORK: Each group will analyze their case study and propose an ethical framework to be applied in the specific scenario, and how the general principles could be adapted to the specific situation. A template will be provided to guide the group work and the organizers will move between groups and be available at any time.
- 10:45-11:00 COFFEE BREAK
- 11:00-12:00 FIRST PLENARY DISCUSSION: Each group will report on their findings in a plenary discussion, sharing the challenges identified and collectively exploring possible ways to address them (time allowed: maximum 10 min for the presentation + 5 min for Q&A from the other participants).
- 12:00-12:30 REFLECTION: In light of the plenary discussion, participants will be invited to reconsider the applicability of animal-centered research principles to the different scenarios.
- 12:30-14:00 LUNCH BREAK
- 14:00-14:30 GROUP WORK: Animal species and/or scenarios will be switched between groups and participants will be invited to discuss adaptations of the framework to a completely different species/scenario.
- 14:30-15:15 SECOND PLENARY DISCUSSION: Participants will be asked to define the main challenges regarding the applicability of different animal-centered research principles to different scenarios, possible practical solutions to address these challenges and policy suggestions to facilitate the implementation of scenario-specific trade-offs.
- 15:15-15:30 WRAP-UP AND FINAL MESSAGE: Interested participants will be invited to take part in a working group that will meet periodically after the workshop to further develop the ethical framework.

After the workshop. Based on the outcomes of the discussions, after the end of the workshop interested participants will be invited to join a working group on this topic, aimed at building a solid framework and discussing it with organizations and representatives involved in animal use at different levels (ideally, policymakers in animal use) with the larger objective to produce a resource for researchers and practitioners whose work involves animals and for whom the applicability of animal-centered technologies, methods or frameworks may be relevant. To this end, we hope to run a series of additional workshops with stakeholders and interested parties from scientific fields conducting animal research.

2.4 Organizers

The organizers have diverse backgrounds and research expertise: Prof. Clara Mancini (The Open University, UK) is an expert in Animal-Computer Interaction and Prof. Eleonora Nannoni (University of Bologna, Italy) is an expert in farmed animals' welfare. Together, they have extensive experience in designing and successfully running workshops and other research group activities, and they have been active members of the ACI community for several years.

3 Draft Call for Participation

The principles of Replacement, Reduction and Refinement (3Rs) aim to address the ethical dilemmas arising from the involvement of animals in research procedures that can harm them and to which they are deemed unable to consent. Widely regarded as the gold standard for humane animal research, the 3Rs have yielded significant benefits for both the welfare of research animals and the quality of animal research. However, from an animal-centered perspective, the framework presents significant limitations. Animal-Computer Interaction (ACI) researchers have argued that ACI's animal-centered aims require an equally animal-centered research ethics framework and have proposed corresponding principles, namely Relevance, Impartiality, Welfare and Consent.

The aim of this workshop is to explore the usefulness and applicability of Animal-Computer Interaction (ACI) research ethics beyond the field's remit and develop an animal-centered approach to the use of animals in research more broadly. The workshop is targeted at researchers from different disciplines, experienced in conducting animal research from different perspectives (e.g., farming, medicine, conservation, welfare). The event will involve group work sessions during which participants will discuss diverse case studies, exploring the applicability of animal-centered ethics

principles when designing research that involves animals, and plenary discussions during which participants will share challenges identified, collectively explore possible ways to address them in practice and produce policy suggestions to facilitate the implementation of scenario-specific trade-offs. The workshop will be run both in presence and virtually, to promote inclusion of participants from different geographic areas.

Since the event is part of a longer-term project aiming to rearticulate the 3Rs framework integrating animal-centered principles, a key aim is to establish a working group to develop, with input from organizations and representatives who inform policies on the use of animals in research, a resource for researchers and practitioners whose work involves animals and for whom the application of animal-centered technologies, methods or frameworks may be relevant.

To register for the workshop, please go to: www.animalcenteredresearch.org

References

- < bib id="bib1">< number>1. </ number>Balls, M. (2015). Russell and Burch after 1959. *Altern. Lab. Anim.* 43, 59–60.</ bib>
< bib id="bib2">< number>2. </ number>Beauchamp, T. L., and Childress, J. F. (2013). *Principles of Biomedical Ethics*. Oxford University Press.</ bib>
< bib id="bib3">< number>3. </ number>Belay, Y. T. (2019). Study of the principles in the first phase of experimental pharmacology: the basic step with assumption hypothesis. *BMC Pharmacol. Toxicol.* 20, 2–12.</ bib>
< bib id="bib4">< number>4. </ number>EC (2010). Directive 2010/63/EU of the European Parliament and of the Council of 22 September 2010 on the protection of animals used for scientific purposes. *Official J. Eur. Union* 276, 33–79.</ bib>
< bib id="bib5">< number>5. </ number>Ferdowsian, H. R., and Beck, N. (2011). Ethical and scientific considerations regarding animal testing and research. *PLoS ONE.* 6, e24059.</ bib>
< bib id="bib6">< number>6. </ number>Franco, N. H. (2016). Killing of animals in science – is it always inevitable? In I. Anna, S. Olsson, S. M. Araújo, and M. F. Vieira (Eds). *Food futures: Ethics, Science and Culture*, Wageningen Academic Publishers.</ bib>
< bib id="bib7">< number>7. </ number>Freil, L., Byrne, C., Valentin, G., Zeagler, C., Roberts, D., Starner, T., Jackson, M. (2017). Canine-Centered Computing. *Foundations and Trends in Human-Computer Interaction*, 10(2), 1–82.</ bib>
< bib id="bib8">< number>8. </ number>French F, Hirskyj-Douglas I, Väättäjä H, Pons P, Karl S, Chisik Y, et al. (2021). Ethics and Power Dynamics in Playful Technology for Animals: Using Speculative Design to Provoke Reflection. *Academic Mindtrek* 2021, 91–101.</ bib>
< bib id="bib9">< number>9. </ number>Grillaert K, Camenzind S. (2016). Unleashed enthusiasm: ethical reflections on harms, benefits, and animal-centered aims of ACI. *Proc. Third International Conference on Animal-Computer Interaction, ACI2016* </ bib>
< bib id="bib10">< number>10. </ number>Hirskyj-Douglas I, Read J. (2016). The ethics of how to work with dogs in animal computer interaction. *Proc. Animal Computer Interaction Symposium, Measuring Behaviour 2016*.</ bib>
< bib id="bib11">< number>11. </ number>Mancini C. (2017). Towards an animal-centred ethics for animal– computer interaction. *Int. J. Hum. Comput. Stud.* 98:221– 33.</ bib>
< bib id="bib12">< number>12. </ number>Mancini, C., Nannoni, E. (2022). Relevance, Impartiality, Welfare and Consent: Principles of an Animal-Centered Research Ethics. *Frontiers in Animal Science* 3:800186.</ bib>
< bib id="bib13">< number>13. </ number>Nannoni, E., Martelli, G., Rubini, G., and Sardi, L. (2019). Effects of increased space allowance on animal welfare, meat and ham quality of heavy pigs slaughtered at 160Kg *PLoS ONE* 14, e0212417.</ bib>
< bib id="bib14">< number>14. </ number>Richmond, J. (2000). The 3Rs - past, present and future. *Scand. J. Lab. Anim. Sci.* 27, 84–92.</ bib>
< bib id="bib15">< number>15. </ number>Ritvo, S., and Allison, R. (2014). Challenges related to nonhuman animal computer interaction: usability and 'liking'. *Proc. First Intl. Congress on Animal Human-Computer Interaction, ACMACE'14* (New York, NY: Association for Computing Machinery).</ bib>
< bib id="bib16">< number>16. </ number>Russell, W. M. S., and Burch, R. L. (1959). *The Principles of Humane Experimental Technique*, xiv + 238pp. London: Methuen.</ bib>
< bib id="bib17">< number>17. </ number>Törnqvist, E., Annas, A., Granath, B., Jalksten, E., Cotgreave, I., and Öberg, M. (2014). Strategic focus on 3R principles reveals major reductions in the use of animals in pharmaceutical toxicity testing. *PLoS ONE* 9, e101638.</ bib>
< bib id="bib18">< number>18. </ number>Väättäjä HK, Pesonen EK. (2013). Ethical issues and guidelines when conducting HCI studies with animals. In: *CHI'13 Extended Abstracts on Human Factors in Computing Systems, Paris*.</ bib>
< bib id="bib19">< number>19. </ number>van Weeghel, E., Bram, B., Spoelstra, S., and Peter, W.G. (2016). Involving the animal as a contributor in design to overcome animal welfare related trade-offs: the dust bath unit as an example. *Biosyst. Eng.* 145, 76–92.</ bib>