



REPLY TO AUERBACH ET AL.:

How our Opinion piece invites collaboration

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We thank Auerbach et al. (1) for taking the time to formulate their thoughts on our Opinion (2).

We value this opportunity to jointly resolve an apparent misunderstanding of our Opinion piece. As the title “Toward an international definition of citizen science” suggests, our work is meant to be a call to action. The aim of our Opinion is not to present a closed definition that should be internationally accepted. Rather, we offer our context-specific catalog (3) as a basis for a discussion that may lead to a commonly recognized definition—importantly, with the involvement of the international citizen science (CS) community and driven by open, interdisciplinary deliberations.

Through our many years of work in CS, we are very much aware of the diversity, creativity, and different ways of knowledge generation in this field. We therefore realize that any definitional work must be undertaken in an open, deliberative, and collaborative fashion. As stated in our Opinion, the Austrian catalog of criteria (3) is necessarily a living document and remains open to innovations and new forms of CS. We share the opinion of our colleagues (1) that our catalog may not correspond to the consensus of the international community which we note in the text: “We are, however, aware of the challenges and possible restrictions of the catalog. Content may not be applicable everywhere because of regional differences and local practices.”

We, too, have experienced challenges when seeking a consensus in an interdisciplinary group with diverse institutional backgrounds on what constitutes CS. As we

write in our Opinion, the Austrian CS community decided to define quality criteria for CS to be able to select, transparently, which projects are listed on the national platform and which are not.

However, we disagree that our quality criteria exclude many currently existing types of CS. After applying the catalog by Austrian projects, we see a variety of different projects meeting the criteria. These include projects carried out by universities, nongovernmental organizations, or individual citizen scientists, projects that encompass a wide range of activities and motivations. Nonetheless, we are aware that the process of applying the criteria, which is accompanied by conversations with and feedback from project managers, is not mentioned in the Opinion piece. Therefore, more information can be found in the questionnaire provided to the project managers (4).

We fully agree with the authors that “citizen science also extends well beyond development and testing of research hypothesis.” From our point of view, our first criterion therefore takes into account the whole range of scientific goals that can be pursued in a CS project, whether answering a scientific question, testing a scientific hypothesis, or pursuing a scientific goal.

We also fully agree that a “collaboration among all engaged actors” should be emphasized to find an “informed consent about project design features and transparency in data collection and handling practices” (1). However, we would like to see this discussion move to a more general methodological level.

- 1 J. Auerbach et al., The problem with delineating narrow criteria for citizen science. *Proc. Natl. Acad. Sci. U.S.A.* **116**, 15336–15337 (2019).
- 2 F. Heigl, B. Kieslinger, K. T. Paul, J. Uhlík, D. Dörler, Opinion: Toward an international definition of citizen science. *Proc. Natl. Acad. Sci. U.S.A.* **116**, 8089–8092 (2019).
- 3 F. Heigl et al., “Quality criteria for citizen science projects on Österreich forscht | Version 1.1.” *Open Science Framework* (2018). <https://osf.io/48j27/>. Accessed 11 June 2019.
- 4 F. Heigl, D. Dörler, “Quality criteria catalogue for citizen science projects on Österreich forscht – Questionnaire for project managers.” *Open Science Framework* (2019). <https://osf.io/2b5qw>. Accessed 11 June 2019.

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The authors declare no conflict of interest.

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