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RECEIVED 08 March 2023

ACCEPTED 29 May 2023

PUBLISHED 08 June 2023

## CITATION

Milligan T (2023), Is there a right to  
knowledge about our origins?  
*Front. Space Technol.* 4:1182276.  
doi: 10.3389/frspt.2023.1182276

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# Is there a right to knowledge about our origins?

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Is there a right to knowledge about the origins of life and the origins of humanity? Here, I mean knowledge of a sort that astrobiology may be able to supply. And a right of the sort that might be acknowledged within international declarations, agreements, and codes of conduct. A distinguishing feature of the paper is an argument strategy that draws upon pragmatic discussions of animal rights and links a pragmatic idea of rights to interests. The background thought here is that discussions of rights in the non-human case can enrich our understanding of the rights that we should ascribe to humans as well as our understanding of what it means to ascribe a right. A right to knowledge about our origins can be supported by the classic autonomy-based approach towards rights, given that such a right would help to optimize the conditions under which autonomy is exercised. However, the case for a right to knowledge about origins strengthens when we draw upon a more interest-based approach and say that rights can also be tied to strong interests. In order to support the idea that humans have a sufficiently strong interest in the relevant kinds of knowledge, i.e., astrobiological knowledge about origins, appeal is made to the historical spread, depth and persistence of our human concern with origins, evidenced by Indigenous cosmologies and storytelling about how life began. Our history as a moral community is, in part, a history of reflection upon origins, with astrobiology functioning as a recent and productive way of engaging in such reflection.

## KEYWORDS

ethics, rights, knowledge, origins, interests, astrobiology

## Astrobiology and philosophical ethics

The aim of this paper is two-fold. First, it will make a case for a certain kind of general human entitlement: a right to knowledge of the sort that astrobiology can supply. More specifically, a right to astrobiological knowledge about the origins of life and ultimately of humanity. Second, the case for such a right will be made in a way that connects the ethics of astrobiology or “astrobioethics” (Chon Torres, 2018), with animal ethics and with one of the major lines of division within rights theory. Connections of this sort can help to bridge the gap between contemporary philosophical discussions of ethics and the ethical discussions which have emerged within astrobiology and within space ethics more generally. The gap is there, in part, because ethical deliberation about space emerged out of the space community, rather than the academy (Milligan and Schwartz, 2023). Astrobioethics, and space ethics more generally, has also tended to be strongly particularistic, i.e., focused upon ethical deliberation about specific issues in specific contexts, rather than taking the form of an extension of some well-established set of ethical principles from Kant, Mill or Aristotle. One of the best texts, so far, is the Pinkus et al. (1997) text *Engineering Ethics: Balancing Cost, Schedule, and Risks—Lessons Learned from the Space Shuttle*, a study of the Challenger disaster of 1986 (Pinkus et al., 1997). An exemplar of the point that particular cases play a

major role in the way that ethical discussions about space, and within astrobiology, have been shaped.

An advantage of this particularistic focus has been an avoidance of some of the more doctrinaire aspects of the ethics of the academy, although there has been an ongoing effort, reaching back five decades or more, to ensure that academic ethics is livable and readily available to ordinary agents, and not merely consistent, or in line with views drawn from one important classical text at the expense of others (Dancy, 2004; Williams, 2010). A disadvantage of the particularistic, case by case and problem-solving, side of space ethics is that the many tools and resources of the ethical tradition are not always drawn upon in the most effective ways. When they are drawn upon, as in the case of discussions about the “inherent value” of microbial life, places and things, it can seem that philosophical ethicists must be concerned with something mysterious rather than using a specialized set of established ways to talk about our familiar reasons for action and response (Milligan, 2021a). Sometimes, this impression is accurate, and the upshot is that problematic or even rather dated ethical approaches from academic/philosophical ethics can be reproduced, uncritically, within space ethics and astroethics where there is less of a sense of what is and is not dated in terms of ethical theory.

Over time, the trend has been for a closer connection between space ethics, astrobiology, and the academy, with a series of important texts emerging over the past two decades, beginning with the work of Jacques Arnould (2011), and continuing more recently with an introduction to Space Ethics from Brian Green (2021). Many others from authors such as Charles Cockell (Cockell, 2008; Cockell and Jones, 2009) and J. S. J. Schwartz (2020) are sandwiched in between. An assumption below will be that this closer connection between space ethics, astrobiology and the academy is, overall, a good thing. And this assumption provides both the motivation for the paper, and sheds light upon its broader philosophical significance as an example of thinking about how to make connections without mechanically shifting an idea from one context to another. Ethical discussions about space ethics and about the societal side of astrobiology can be enhanced but also constrained by making connections to animal ethics, environmental ethics and bioethics, as well as the ethics of technology. At the very least, the identification of significant points of contact may allow us to recognize similar useful moves that might be shifted across from one research area to another, and to recognize that moves which have proven problematic in other areas of ethical discourse, should be treated with caution elsewhere.

Animal ethics offers examples of both of these things: transferrable examples and cautionary tales. Elsewhere, I have drawn upon it for a cautionary example: the use of an animal rights concept of “inherent value” which may need to be demythologized, and not just scaled down, if it is to perform useful work when we talk about protecting microbial life on other worlds (Milligan, 2021b). Here, instead, I will look to a more readily transferrable example, which is also tied to a cautionary tale, by appealing to an account of rights which is grounded in interests rather than autonomy. This is a move that has proven useful in the more pragmatic formulations of animal rights set out by Feinberg (1971), Cochran (2012) and Garner (2013). I will also take it that a similar level of pragmatism is a good feature of any ethic that aspires to influence actual treaties,

declarations, international agreements, and codes of conduct. What is drawn upon here may therefore be regarded as a pragmatic approach to astrobiological ethics. And this too operates as a constraint, acceptance that a right to knowledge about origins must not be too demanding and must not entail too many other things. Otherwise, the case for such a right will no longer be pragmatic and the right itself will be beyond implementation.

An account of a right to knowledge about origins could be drawn exclusively from human-human relations, say from the work of Joseph Raz (1984) with his deliberation about non-humans removed. However, the line of thought relating rights to interests has its origins in deliberation about the special cases of the relations between individual humans and something else (i.e., animals and future generations) rather than exclusively human-human relations (Feinberg, 1971). To which we may want to add the importance of avoiding too many anthropocentric assumptions. A certain level of anthropocentrism may be structured into our ways of thinking and speaking. It might work well enough in our relations with one another, but it becomes more problematic when dealing with the non-human. And the non-human accounts for almost everything there is, everywhere. Almost everything is not us and the ethical discourses within which we have done most to come to terms with this are environmental ethics and animal ethics. Hence, the tendency to take one or other, or both, as models for thinking about the ethical dimensions of any attempt to reach beyond the human. (So, for example, animal ethics is often an acknowledged or unacknowledged model for deliberation about non-human agency and autonomy, e.g., in robotics. Just as non-human animals are themselves often a model for design.)

As astrobiology is a relatively new research field, and given the notorious difficulties involved in providing a definition of life (Clelland and Chyba, 2002; Smith, 2018), it may also be both pragmatic and wise to avoid over-restricting what is meant by the phrase “knowledge about origins.” Instead, we may think of such knowledge in more formal terms, as a set of answers to questions of the following sort: “Was the emergence of life a unique event?” “Was life’s emergence possible only during a certain period in the history of the Universe?” and “Could a transition from non-life to life be observed under realizable laboratory conditions?” Taken together, this set of questions about life and its emergence may be thought of as providing an implicit definition of knowledge about origins. On the basis of this pragmatic approach other things can already be made more explicit: the knowledge in question is propositional rather than knowhow, and it may also be less complex than the scientific and technical knowledge involved in its production. The whole point of the exercise is to make sense of a kind of knowledge that could, at least in principle, be represented in a straightforward and widely shared way, beyond the bounds of scientific communities.

As a more detailed example of knowledge about origins we might think about the question of whether or not the Universe is set up in a way that promotes the emergence of life. Is our existence the result of some unlikely sequence of accidental events? as Jacques Monod (1971) once argued, or is the Universe tendentially biogenic? as others, such as Simon Conway Morris (2003) have argued. For what it is worth, my suspicion is that Monod was wrong about this and that Conway Morris and others are probably right about it.

However, the likelihood of life's emergence remains an open question, something that future work on astrobiology might help us to resolve. While the claim that we have a right to knowledge of this sort cannot plausibly be a claim about knowledge that we do not yet possess, it can be a claim that there is a duty on the part of states or various political bodies to advance research on the question through funding, the passing of relevant legislation and public policy.

While the central theme of this paper is that we have strong reasons to embrace a right of this sort, there are nonetheless also grounds for caution. The idea of such a right also fits well within recent discussions about other sorts of rights to knowledge, and with ideas that there should be open access to certain kinds of knowledge. It would be unhelpful if the argument mirrored, or drew upon, misrepresentations of scientific communities as secretive, shut off, or dedicated to the service of some kind of elite rather than committed to the public good and to the advancement and dissemination of knowledge. But if scientific communities are generally like this, and open to dissemination of knowledge then why argue for some special right? The thought here is that political conditions can be volatile over time, and that rights ought to be acknowledged as a way to hedge against less fortunate circumstances. Just so long as the case for them is a good case. There is also a normative difference between saying that it is a good thing for knowledge to be disseminated, and that there is some overall entitlement to access scientific knowledge and saying that there is a more specific right concerning knowledge about origins. My reason for wanting to mark a distinction here is that origin narratives enter into our identity in ways that other kinds of scientific narratives do not. And so, the idea of a right to knowledge about origins is a marker for this special importance with regard to our sense of who we are. A marker which takes a form that can help to shape deliberation about public policy and spending priorities, and a marker which indicates that the pursuit of the knowledge in question should be a stable, ongoing concern, rather than something to be pursued on a more intermittent basis. So, here, I am committing to the strong view that the right to knowledge about origins does commit us to pursuit of knowledge and not only disclosure of what is already known.

Nonetheless, if the approach is to remain pragmatic, then it will be important that we do not overpopulate the world with rights. Or at least, with rights of this high-level sort, i.e., rights that concern our sense of who we are, rather than focusing upon more routine entitlements. Too many high-level rights could devalue the currency of rights talk, turning it into little more than an idealized way of picturing the world, rather than a practical guideline for the actual formation of policy. Constraining of the right in question may help to deal with this problem, by ensuring that it does not contribute to an over-proliferation, and by requiring that the right in question is not itself excessively demanding. In the present case, I will suggest that any plausible account of a right to knowledge about origins will have to satisfy three adequacy conditions.

- (1) If it makes sense to talk about a right to knowledge about origins only in some small cluster of nations or places, then there probably is no such right.
- (2) The right should not entail anything implausible or morally indefensible, e.g., that there is a right to every kind of knowledge

about our origins, including the knowledge structured into the origin stories of Indigenous peoples.

- (3) The ways in which we determine whether or not there is any particular right to know about research in astrobiology should be at least partly evidence-based rather than strictly conceptual.

The first constraint requires that the right must concern knowledge with a broad human or societal importance. It codifies the point that narratives about origins enter into our identity and so play a role of a deep sort. The second captures the point that the right must not operate as a license for cultural appropriation. Rather, it must exclusively concern the kinds of knowledge that astrobiology can supply. This does not mean that we cannot, in addition, reflect upon astrobiological knowledge about origins in the light of what we know about Indigenous origin narratives. But it is consistent with the idea that only Indigenous peoples have an actual right to Indigenous knowledge, even if it would be advantageous for others to know it. And so, the knowledge that we are entitled to must have the right kind of causal history for us to be entitled to it. Finally, the third constraint will help to make sense of an idea that will be further developed: the conception of rights which is in play should be "astrobiology-apt" rather than geared to discussions of some other sort. It should make sense to astrobiologists when they think like astrobiologists rather than making sense only to lawyers, political scientists, or those of us primarily involved in the humanities. Again, this is a pragmatic consideration, the right in question must have a certain broad acceptability to those who work in the field and may be more used to thinking about dissemination rather than rights to knowledge. The claim that there is a right to knowledge must at least make sense to those involved in the production of the knowledge in question. It should not distort their routine scientific practice or tend to override their ability to push the research forward. This is a pragmatic constraint which could also be read as a commitment to the autonomy of science as an important norm within democratic societies.

## Framing an astrobiology-apt conception of rights

As a demystifying move, I will take it that rights talk, like talk about "inherent value," primarily involves an appeal to various kinds of reasons for action and response, and nothing more. This is what might be called a "metaphysically thin" approach to rights. In line with this, when I talk about rights in the context of astrobiology and knowledge about origins, I am not suggesting that there is anything given by the sheer nature of things, and independently of our shared human practices of justification. Rights of the sort that concern me are not, then "natural rights" (Green, 2021). They would certainly not be listed in any complete inventory of the natural world along with water, oxygen and argon. When I refer to our "having rights," I mean only that there are persuasive reasons for action and response that we might cite within well-conducted practices of justification, and that suitably-placed and suitably-informed agents will also tend to recognize the genuineness of the reasons in question even if they do not always act upon them. This leaves the question of what it

takes to be a suitably-placed and informed agent open to further discussion on a context by context basis.

With this opening clarification about rights out of the way, I want to frame the idea of a right to knowledge about origins as a new right, rather than a right that we have previously overlooked or failed to appreciate. Many of the rights that we enjoy come with a history. It makes sense to talk about them from a certain point in time onwards, but not before. Rights associated with developments in science and technology are often like this. So, for example, it makes sense to say that most or all of us have a right to access the internet because it has become a pivotal arena for human communication and interaction. Yet nobody had such a right in the 1950s, or in the 19th century. And while this may tempt us to say that what underpins the right is simply the arrival of the relevant technology, I want to suggest that societal importance also needs to be in place, as it is in the case of the internet. I do not propose to define what societal importance is, beyond saying that in various cases (such as that of the internet, or response to COVID-19) we know it when we see it. The right to knowledge that astrobiology can supply would be a new right, made available by new techniques, technologies, and ways of understanding the world. It is also convenient that modern astrobiology and the internet emerged at around the same time, with the first discovery of extremophiles in 1969, the same year as the Arpanet prototype. Like the internet, astrobiology also has its predecessors but as a cohesive research field it is relatively new, as are the associated rights. My reasons for thinking that we may have a right to knowledge are of a couple of different kinds: intuitive and more philosophical. On the one hand, I will draw upon an intuitive consideration, a thought experiment that requires no philosophical theory at all. On the other hand, rights theory as it has been shaped by deliberation about special cases such as animal rights, seems particularly well placed to give reasons for accepting the right in question. The appeal to rights theory will take us into more philosophical territory, but the thought experiment is straightforward.

Imagine a circumstance of discovery. A situation in which compelling evidence for historic microbial life elsewhere has been found and disclosed to various members of the astrobiology community. For convenience, I will simply say that it has been disclosed to “us” and that “we” have acquired the knowledge. What has been discovered also gives compelling evidence for a second genesis, implying that the first was no accident and that the sheer unlikely contingency of our existence does not go all the way down. The discovery will imply that some aspects of our origins are less contingent than others. Let us also allow that the evidence for discovery is vastly more convincing than anything offered so far as proof of historic life elsewhere. More convincing, for example, than structures within the Allen Hills Meteorite, or anything else that might reasonably have been caused by abiotic processes. Let us allow that the evidence is strong enough to command a clear consensus of agreement across the relevant scientific communities. Under these circumstances it is almost inconceivable that we would withhold the knowledge in question from the general public.

Admittedly, in the scenario described, we might want to delay and multiply-check all of the relevant data, and we might want to follow some orderly set of protocols for disclosure. Both seem likely. But doing so would, in part, be a matter of helping to make the

knowledge available as knowledge rather than hearsay or interesting guesswork, and to make sure that what gets through is the real thing and not a cheap imitation. This level of precaution involves a recognition that information and disinformation seem to go together. We live in a world where misrepresentation is not a rare counterfeit currency. Rather, when we put knowledge or information into circulation, we simultaneously open up opportunities for misrepresentation and bad copies. To attempt to hold misleading information in check, the following of protocols for disclosure would be advisable. However, we would not keep the knowledge to ourselves indefinitely, even if it was wise to briefly delay. And if we were ever asked “Why did you *not* keep this to yourselves?” we might well answer “Because it was too important, because people had a right to know.”

The situation described in the thought experiment is, of course, counterfactual. It is an imagined scenario, and not at all where we are now. As matters currently stand, we do not have any knowledge of this clear-cut sort for life elsewhere. There are some outlier claims that historic life elsewhere has already been discovered, but none are convincing enough to command the kind of scientific consensus described in the thought experiment. And none seem to be the kind of outlier claims that might eventually become the consensus following some period of controversy. Also, as a qualifier, to say that we would have a duty to disclose such information if it was ready to hand is not the same as saying that there is some duty to find it out, or that there is a general human entitlement to know. And so, the thought experiment tells us something. But it can only be used to support a weaker claim than the one that I want to advance. It supports a claim about knowledge that we already have, and it is not exactly decisive about the issue of thinking about disclosure in terms of a right to knowledge about our origins. It does what thought experiments often do. It offers hints, clues, and reminders rather than anything more rigorous.

The appeal to animal rights theory will also be less than conclusive. However, it may help us to see that different sorts of considerations, and different sorts of theories seem to work well with the idea of a right to knowledge about our origins and that no practical realpolitik consideration stands in its way, just so long as it does not open the door to a multiplicity of other rights. Methodologically, I am presupposing something along the lines of what is known as broad reflective equilibrium here, i.e., if a multiplicity of otherwise competing theories point in the same direction, then this provides significant support for a claim (Rawls, 1951; Rawls, 1971), support which is in addition to the support provided by any particular theory. If the more philosophical use of animal rights theory lines up well with the thought experiment, and helps us to make sense of why we have the intuitions that the thought experiment suggests, then this will also be a good feature of the approach.

In the case of rights theory, the idea of a right to knowledge about our origins works well with both of the main ways of underpinning rights, as we can see from the special case of animal rights discourse. The dominant way of underpinning rights is by appeal to autonomous agency, or to diluted versions of the latter, such as being the subject of a life, or (in the most minimal versions) being sentient. In some way, having rights goes hand in hand with being an agent or a being of the relevant sort, and belonging to a community of such beings or agents. Some fairly

abstract moves are required in order to make the connection, but it is a connection frequently made. This is a modified version of the rights theory that has been handed down from Kant's *Groundwork*, and that has worked its way into contemporary applied ethics (Regan, 2004). The less dominant view is that rights talk is underpinned by strong interests. In a familiar formula: rights exist when some being has interests which are strong enough to ground a duty on the part of others or when some group such as the general public have such an interest (Raz, 1986). Joel Feinberg (1971) is one of the better-known pioneering advocates of this view, drawing upon consideration of non-human animals and future generations, with Jonathan Raz (1984) presenting a more extended version focused upon humans but still shaped by consideration of marginal cases where the interest is ascribed to non-humans. The interest-basing approach has tended to be secondary to autonomy-basing but has tended to shape views about how rights operate/what it is that rights ascriptions do. And it has enjoyed a revival in recent times within some of the more pragmatic forms of animal rights theory, and in light of some of the stranger implications of autonomy-basing which we can see clearly in the case of animals, but which do not arise so clearly in the human case (Cochrane, 2012; Garner, 2013).

The link to the idea of pragmatism here is that it offers a way to avoid a paradoxical divergence of animal rights and actual animal interests which can arise from the mainline autonomy approach, or from some weakened version of the latter, e.g., tying rights to sentience and only to sentience. Clearly, improvements in animal welfare are in the interests of animals even if they fall short in many ways. And this would, again intuitively, seem to indicate that they should be supported if there is no better and immediately available option. The mainline autonomy/sentience approach has however led to an opposition to improvements in animal welfare, and hostility to campaigning for such improvements, on the grounds that they are only concerned with welfare interests rather than rights (Francione, 1996). This amounts to a problematic separation of animal rights from animal interests, and a possible prioritizing of the moral rectitude of activists over the wellbeing of other creatures. A tension which may well be present in certain discussions of human rights, but the routine character of rights violations in the animals case makes the tension stand out more clearly. And even if someone wishes to dispute, or simply deny, that animals have rights, they may still be well placed to recognize that a theory of animal rights which diverged from animal interests would be a problematic theory. In point of fact, contract-based critiques of animal rights often run along these lines, by playing heavily upon the tendency of such rights theories to set aside the interests of the animals themselves (Budiansky, 1997; Pollan, 2006). Arriving at a rights theory which avoids this problem is one of the drivers for the more pragmatic approach.

I happen to be sympathetic to the interest-basing approach, partly because of the pragmatic work that it performs in the case of animals, but also because I take a disjunctive or pluralistic approach to these matters, i.e., one which allows rights claims to be underpinned in different ways in different contexts. Such an approach will also be particularistic, in a way which matches well with the particularistic or situationally sensitive way in which space ethics has developed. This sympathy for interest-basing as part of a larger and inclusive account of rights, is also in line with the above

comments about the need for an astrobiology-apt conception of rights. There are contexts in which an appeal to our rational autonomy (or to something similar but a little weaker) will be a good justification for a claim about rights, and there are contexts in which an appeal to strong interests will be a good justification. Certainly, a conception of rights that was entirely at odds with interests would be an odd sort of thing. Although the pivotal role of interests in driving accounts of rights, and motivating our commitment to rights, can easily be overlooked once an account of rights is up and running and able to appeal to some other consideration such as autonomy. What is more interesting in the present context is that both approaches (autonomy basing and interest basing) are at least consistent with a right to knowledge and are arguably supportive of it. However, I will argue that an interest-based approach goes beyond mere consistency and gives stronger support for the idea. Once interest-basing is set up, the idea of a right to knowledge about origins ties in well with the intuitions at play in the thought experiment. The two begin to converge.

## Interest-basing and autonomy-basing

If we think of rights in terms of autonomous rational agency, i.e., as entitlements that we have because of such agency, then we will have at least one obvious pathway to support the idea of a right to knowledge about our origins. However, for reasons which will now be explained, this pathway to upholding the idea of such a right is a little unsatisfactory. This is not to say that the argument fails, but simply that it does not bring the more analytic and conceptual side of the case for such a right close to our intuitions. The intuition that we have such a right then remains something apart from the argument, and this is unhelpful because many of our intuitions may be functionally useful but nonetheless false. Intuitively, it looks like the Sun moves across the sky. This would be a trivial example of a misleading but functionally useful impression that we form of things. It has been extremely useful impression for most of human history, but an impression which is nonetheless false. Ideally, the argumentative part of the case for a right to knowledge about origins should also shed light upon why the intuition set up by the thought experiment is probably well-grounded. Nonetheless, it is useful to show that an autonomy-based approach will not actually steer us towards some other and conflicting view.

It does not do so. Knowledge of various sorts will, after all, help to optimize the conditions under which agency is exercised. Or, more cautiously, knowledge will often tend to do so, even if there are curious exceptions. Generally, the more we know, the better placed we will be to make choices. Indeed, on familiar accounts of practical reason, knowledge is a precondition for the kinds of considered decision making characteristic of good agency. For example, Aristotle refers to *prohairesis* as opposed to the kind of choosing which is simply an arbitrary exercise of the will. Deliberative accounts of democracy make a similar point: it is better, and more democratic, if voters make informed choices rather than randomly choosing one candidate or party over another. This marks an important distinction. Deliberation has a better claim upon being rational when it is well informed. Consider a case which is closer to the heart of deliberation informed by astrobiology. We are currently in the early stages of an expansion beyond Earth, and

we do not know how far this expansion will go. At the same time, we are already aware of some important future options. At some point, humans may consider “seeding” other habitable planets that we could never visit in person. This might help to secure the future of life and improve the chances of the emergence of complex forms of life long after they have ceased in this part of the Universe. Such a process would come with known risks, such as the danger that what is life to us may be death to *in situ* life forms. Moreover, given the enormous distances of travel from here to there, the reliability of life-detection technologies might not be all that we would wish (Persson, 2014). Many arguments about these matters would be reshaped, and perhaps even fall away, if it was known that our own origins go back to biogenic/life-favoring processes structured into the sheer nature of things, and hence liable to be repeated without our intervention. Our agency on the question of seeding would be better exercised against a background of knowledge about how life comes about, and how we might therefore assign values to some of the variables in the Drake Equation.

As far as it goes, this line of thought is plausible. Not conclusive, but plausible. The knowledge about origins could play an important role in deliberation. But saying that a certain kind of knowledge can play an important role is not exactly the same as saying that there is a general human right to a particular kind of knowledge. Satellites play an important role, but it would be odd to suggest that there is a right to know how they work or the information that they convey. And the more technical the knowledge in question, the less plausible it sounds to say that humans in general have a right to this knowledge, whatever this knowledge may happen to be. Unless we also say that humans have a right to be equipped with a broader set of technical competences. Such a claim goes beyond anything advanced here. There are certainly some kinds of astrobiological knowledge, concerning origins and other things, that people may well not have a right to, because they will not generally have the conceptual machinery to make sense of it. None of us has, of could have, all of the conceptual machinery required to make sense of all the important kinds of knowledge. And so we have educational systems within which there are rights to some kinds of conceptual machinery but where certain kinds of technical training come as earned entitlements rather than as a matter of basic rights. Within liberal democracies, agents have a right to be taught basic numeracy, and some more advanced mathematical skills. But there is no universal right to know every useful kind of math. The problem in the case of highly technical knowledge is not, however, that secrets must be kept, but simply that the kind of knowledge in question requires a good deal of expertise that many of us have no great interest in acquiring. Practicality matters. But even if we were satisfied that some kind of knowledge is generally accessible, and important enough to have a broad societal importance, there would still be something unsatisfactory about the whole autonomy approach to saying that we have a right to the knowledge in question. After all, it justifies the right to know in a way that does not focus directly upon the knowledge itself. Instead, the justification appeals to the ways in which the knowledge might usefully shape and inform decision-making processes. And what then really seems to matter is the decision-making processes rather than the knowledge that forms a background to it.

If, instead, we think of rights in terms of strong interests, then the justification of a right to knowledge about origins will be much

more direct. It will also have the further advantage of an empirical component. The case for such a right will largely depend upon showing a continuing and deep human concern with our origins, and with the origins of life. (Which is also our origins in a more expanded sense.) This is convenient because stories about our origins seem to go all the way back to the very beginnings of recorded human history. A concern with origins is one of the few things that is culturally invariant, and stable across time. Political systems rise and fall, ethical norms shift and change, but humanity is continually concerned with its (which is to say our) origins. Another way to put the point would be to say that our origin stories play important roles in the formation of our identity, in a way that other narratives do not. Heinz Von Foerster put matters nicely when he said “Tell me how the Universe came about, and I will tell you who you are” (Von Foerster, 2003, 293). The stories that we tell about origins are varied, but the concern with origins in some sense seems more of a cultural and historic constant. This is not to say that all human societies have exactly the same “origins” concept, but rather that some manner of concern for where we come from seems inescapable. At least, this is true at a societal level while individual humans remain capable of idiosyncrasies. As a result, we have people who claim to have no interest in history. We even have people who argue, on specialized philosophical grounds, about whether or not the past is real. But we do not have any brave new worlds where history is treated as bunk.

Going down this pathway, by appealing to the interest that humans (and humanity) have in origins, rather than going down the autonomy pathway also yields the advantage of helping to bring deliberation about emerging human activities in space into connection with deliberation about rich bodies of Indigenous cosmologies and origin stories. Stories which exceed the bounds of ecologies and instead help to situate human life within a larger reality that reaches beyond the Earth. This matters if we accept the idea that Indigenous knowledge can enrich other forms of understanding, such as science (when the concept of science is itself used in the regular, familiar, sense). But even if we were skeptical about the value of this connection, there would still be the further advantage that an interest-basing approach has a strong empirical component. The empirical component of the justification is also relatively non-controversial. Whatever we think about different sorts of human origin stories, the fact of their existence, persistence and recurrence across cultures is difficult to deny. Accordingly, even if we think of modern science and astrobiology as something special and that nothing compares to it in value and truth, we can still situate the history of modern scientific enquiries into origins within a larger picture of our moral community. So, for example, when Darwin published *On the Origin of Species* in 1859 he was engaging in a specialized form of a kind of reflection that humans have engaged in for at least tens of thousands of years. Similarly, for Oparin, Haldane, Miller and Urey, when they reflected upon organic molecules, primordial soup, and the origins of life between the 1920s and the 1950s, the techniques may have been new, and many of the questions were new as well, but they still fell within the bounds of a familiar kind of human concern. Similarly for astrobiology from the 1960s onwards, although (again) its concerns are not limited to the origins of life but are somewhat broader.

Attempts to tell a story about human origins, as part of a larger set of natural processes, goes back all the way within human culture.

We can, accordingly, say that our human interests are at stake, in a strong and deep way. But our sense of this continuity of human concern with origins, and hence the depth of our human interest in knowing about origins, might be eroded if we were to think of various origin stories as an odd sort of fiction, or sheer fantasy, or as a bad anticipation of what science alone can provide. After all, when we think of deep matters, we are not ordinarily thinking of mere fantasies, even if they are believed with a burning intensity. A belief may be held intensely, yet not itself be in any sense a deep belief. Intensity and depth are not the same thing (Pugmire, 2007). Accordingly, it will be easier to acknowledge a right to knowledge about origins as something grounded in our deep human traditions of concern about origin if we recognize various different and prominent sorts of human origin storytelling as knowledge bearing in some sense. Indigenous and scientific narratives may serve as our exemplars for concern with origins as something deep, even if they are different sorts of exemplars. To say this is to endorse what is now the standard way of approaching Indigenous storytelling, as a matter of Indigenous knowledge and not mere fantasy. And it is easy to see why this route is taken. It is easy to recognize a knowledge component in what is said. E.g., Indigenous Amazonian origin stories often treat humans and other primates as having common origins, a point that we lost sight of in Europe for several hundred years. Indigenous North American tales of Skywoman falling into the waters and then living on Turtle Island (North America or Earth) (Kimmerer, 2015) involve a recognition of life's dependence upon water even at the point of origin, as well as the inclusion of more than Earthly factors in its emergence. Such observations only scratch the surface of the epistemic/knowledge content of this cluster of origin stories, much of which is embedded within forms of life and knowing how to survive in adverse circumstances.

For a slightly larger expansion of an origin narrative with clear epistemic content, we might consider the Nuosu *Book of Origins/Hnewo teyy*, from South West China, which combines an account of human origins with migration histories (Bender, 2016; Bender, 2019). All life is represented as the result of a snowfall, with six tribes of blood, and six tribes without blood. Animals and plants, respectively. Again, life is taken to have a more than Earthly story, and there are common origins between human and non-human, but this time the commonality of origins is generalized to cover all life and not only animals. Yet, in this origin story the initial conditions for life were anything but hospitable. A multiplicity of suns had to be shot down by a great hero in order to cool the Earth to a more life-friendly temperature. (A familiar narrative across the region.) The text, in multiple versions, is still recited on formal occasions as an important aspect of sustaining minority cultural identity. The importance of origin tales to humans does not seem to go away. It remains something deep, and part of its depth is that the stories about origins which endure are more than charming fantasy. They satisfy an abiding human concern and do so in ways that carry genuine knowledge from one generation to the next. What we seem to have here is also a rationalization of the intuition that we encountered in the thought experiment: it is intuitively obvious that genuine knowledge about the discovery of a second origin of life should be publicly disclosed because of

the extent to which this would be in the public interest or in the broader interests of humanity.

## Conclusion

What this leaves us is with a plausible case for treating knowledge about our origins, all the way back to the origins of life itself, as a matter of considerable importance to humans, i.e., as a matter of strong human interests. It would be odd to suggest that humans have been fascinated by these matters, and have engaged with them, for as long as there have been humans, yet they are not really a matter of deep human interests. Indeed, if we deny that status to knowledge about our origins, then it may be difficult to make sense of the idea that we have deep human interests as well as more straightforward biological interests. Which looks like the kind of approach to the human that astrobiology has moved away from by emphasizing the place of the societal and by placing the societal in the midst of its deliberations. I take this to be an indication that, as per condition (3) above, claims of this sort at least make sense to those involved in the production of the knowledge in question.

Ultimately, none of this is a proof that there is a right to knowledge of a sort that astrobiology can supply. It remains perfectly intelligible that everything above might be true, yet we may still be reluctant to embrace the idea of an actual right to knowledge about our origins. A general reticence about the language of rights could remain an obstacle, through a concern that rights talk is really a local way of putting matters that might be better expressed in any number of different ways. But this worry does not speak so much to concerns about a specific right to knowledge about origins. It speaks more to a general concern about the very idea of rights. And the value of using the language of rights on at least some occasions has been presupposed here. Nonetheless, even after everything said, we may still accept that the question of a right to knowledge about our origins remains an open question. Yet enough has been said to promote a broad sympathetic with the idea of such a right, on the assumption that we are at all ready to accept the importance of rights talk. And perhaps enough has been done to set the default option in favor of accepting such a right unless there are some unknown and overriding reasons to reject it. There are such reasons in the case of Indigenous knowledge about origins. Indigenous agents may have a right to the knowledge of their respective traditions, but those of us who are not Indigenous agents have no comparable right. And the reasons for this restriction are connected to bad histories of harm and resource extraction. There are no comparable overriding reasons to reject a standing right to astrobiological knowledge about origins, even if such a right extends to knowledge that *might* be secured using reasonable means, as well as to knowledge which is ready to hand.

At the very least, all three requirements set out above have been met: (1) the right in question is of a general sort and not restricted to some small cluster of places or people. Indeed, the more specialized or localized entitlements to knowledge of the sort embedded within practices of Indigenous storytelling have been explicitly contrasted with the more general right argued for here. And (2), the right does not entail anything implausible or morally indefensible, such as a right to every kind of knowledge about origins. There are instances of knowledge about origins which we might enjoy having, or benefit

from, but they are too technically demanding to say that there is a general right to knowledge of this granularity, and there are cases where knowledge about origins is bound to the entitlements of others (again Indigenous Knowledge is a case in point). When either of these things hold, the idea of a general right to such knowledge becomes difficult to sustain, or even unwelcome. Finally, in line with (3) there is an empirical component to determining whether or not it is a good idea to embrace the right in question: we look and see whether or not there is a deep and historically recurring human concern with the kind of knowledge in question. If there is only a local, or historically slight concern, then there is little in the way of empirical support for the claim that humans are sufficiently concerned with the knowledge for there to be a duty to supply it. Meeting these requirements does not create a compelling case, but it may do enough to keep the idea of a right to the kinds of knowledge about origins that astrobiology can supply in play. Although, again, the claim here is not about absolutely every kind of knowledge that astrobiology can supply. Nobody has all of that knowledge. By contrast, knowledge of the sort specified in the thought experiment could easily be shared across the entire astrobiology community and beyond.

We can still imagine that there might be reasons, philosophical and/or pragmatic for rejecting this right out of a caution which is not about rights *per se*, but specifically about rights concerning knowledge. There are many contexts in which enforcing a right to know would involve some kind of ethical violation. We can, for example, make sense of the withholding of information about individual origins from agents who have been born through artificial insemination, and through the use of donor eggs, sperm or embryos. For the system of donation to work, some safeguards of ongoing donor anonymity may be required. Similar considerations apply in ethnographic research where anonymization of research collaborators is a routine measure adopted for their protection. Similarly, when humans agree to participate in experimental trials, the safeguarding of identity is important. Knowledge is not always an entitlement. None of us has a right to know everything. Rights, if the language of rights is to do its job, have to be practical. And if they are to work well within contexts such as liberal democracy and related systems, some distinctions between what is public domain and private, and between what is rarefied and technical and accessible, will also be required. Again this connects rights talk to interests, and to the interests that we have as members of a shared human community. Accordingly, saying that there is a right to knowledge about origins, of the sort that astrobiology can supply, does not entail saying that there is a right to every kind of knowledge about origins, or an entitlement to some narrower range of

knowledge about our personal origins, or, in the case of knowledge about genetics, a right to the interpersonal knowledge which is unavoidably disclosed when information about one person automatically entails something about others. As indicated above, appeal to a right to knowledge about origins does not threaten to overpopulate the world with rights. Other rights to different sorts of knowledge continue to stand or fall on their own merits (Pallikkathayil, 2016).

## Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

## Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

## Funding

This article is part of a project that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant agreement No. 856543).

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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