OPINION ARTICLE

Academia’s Big Five: a normative taxonomy for the epistemic responsibilities of universities [version 1; peer review: 1 approved with reservations]

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Abstract
This paper proposes a normative taxonomy by which universities can express the extent to which they meet five core epistemic responsibilities. Epistemic responsibilities are responsibilities that have to do with the attainment of knowledge and understanding. The core epistemic responsibilities, which we call the Big Five, are to (1) foster research integrity, (2) teach for intellectual virtue, (3) address the big questions of life, (4) give humanistic inquiry and education a proper place, and (5) serve society. The paper characterizes the Big Five in some detail and explains why they are core epistemic responsibilities of universities. The paper concludes by describing the steps that should be taken in order to test, amend, and implement the taxonomy.

Keywords
Big question, epistemic responsibilities, humanities, research integrity, societal relevance, teaching, university, virtue

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1. Introduction
In this paper, we propose a normative taxonomy of what we call the ‘Big Five’ in academia: five core epistemic responsibilities of universities. Epistemic responsibilities are responsibilities that have to do with the attainment of knowledge, understanding, insight, rationality, and explanation. Thus, they are to be distinguished from moral responsibilities – that concern the well-being of humans and animals – and practical responsibilities, such as the responsibility to develop societal useful technologies and effective medical interventions. For each epistemic responsibility, we distinguish five levels describing the extent to which a university meets that responsibility or strives to do so. Our taxonomy is meant as a tool to assess the degree to which a university meets its core epistemic responsibilities. The format we use is inspired by the Transparency and Openness Promotion (TOP) guidelines that journals can use to describe the extent to which they meet the goals of Open Science.

The taxonomy proposed here is a product of two research projects funded by the Templeton World Charity Foundation: Science beyond Scientism (2013–2016) and The Epistemic Responsibilities of the University (2016–2019). The first project explored which questions science can and which ones it cannot address, as well as whether the natural sciences are the only reliable source of knowledge. The second project explored what the core epistemic responsibilities of universities are, given various contemporary challenges, such as hypercompetition, publication pressure, the marginalization of the humanities, and the commercialization of the university. In both projects, philosophers worked in close cooperation with biomedical and social scientists. We present this as work in progress, as a starting point for gaining experience with using the taxonomy and consensus building for a more mature version.

This paper is structured as follows. First, we provide the taxonomy by specifying academia’s Big Five epistemic responsibilities and detailing five levels of meeting them (Table 1). After that, we argue that these are indeed five core epistemic responsibilities of universities (section 2). Finally, we lay out which future steps we aim to take to test, amend, and implement the taxonomy (section 3).

2. A normative taxonomy
Our proposal distinguishes five epistemic responsibilities. We consider each to be of equal importance, so the order in which we present them is not hierarchical. The attainment levels I through V for each responsibility, however, are meant hierarchically: each level presents a more advanced stage of meeting the responsibility at issue.

We think of these responsibilities as attaching primarily to entire universities. So, in order to meet them, each responsibility should have systematic consequences, throughout the university and its faculties, departments, institutes, or other organizational parts. If a university strives to teach for intellectual virtue at the highest level, for example, students throughout the university should be instructed in what these virtues are and stimulated to cultivate them through virtue-building teaching activities.

This doesn’t mean that there cannot be an internal division of labour when it comes to meeting epistemic responsibilities: giving humanistic inquiry a proper place will primarily fall on humanities departments, although humanities scholars will teach in other departments and collaborate with scientists in other departments as well when a university strives for level V of this responsibility. Similarly, not all departments and research teams will have to serve society in the same way or to an equal degree. There will be significant differences between, say, the theoretical physicists and the nutrition scientists.

We will now clarify each responsibility briefly and motivate why it belongs on the list of epistemic responsibilities of universities.

1. To foster research integrity. Research integrity is fostered by getting rid of perverse incentives, stimulating good mentoring, having an open research climate, and so on. Detrimental research practices include both rare major research misbehaviours like fabrication of data and highly prevalent minor misbehaviours like selective reporting. By ‘responsible conduct of research’ we mean behavior that meets the principles and standards for good research, as laid out in major codes of conduct for research integrity. Such behavior can be stimulated at the level of individual scholars, but also that of groups, such as research teams or departments. Ideally, research integrity is promoted for both individuals and groups.

The results of scientific and scholarly research play a crucial role in modern society. Universities carry out a substantial part of this research and educate and train researchers who perform the studies and apply the results. To ensure the validity and trustworthiness of findings research needs to be performed according to the principles and standards for research integrity. In recent years it has become painfully evident that there is substantial room for improvement in the level of compliance to these

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1Some of us have made this distinction before; see, for instance, Peels R, de Ridder J, Haven T, Bouter L (2019). Value Pluralism in Research Integrity. under review.


<table>
<thead>
<tr>
<th>Level</th>
<th>Big Five epistemic responsibilities</th>
<th>Level I</th>
<th>Level II</th>
<th>Level III</th>
<th>Level IV</th>
<th>Level V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To foster research integrity</td>
<td>1. To foster research integrity</td>
<td>Issues of detrimental research practices and responsible conduct of research are neglected</td>
<td>Issues of detrimental research practices and responsible conduct of research are occasionally addressed</td>
<td>Detrimental research practices are addressed in response to breaches and problems, but there is no academic climate that actively stimulates responsible conduct of research</td>
<td>There is an academic climate that detects and acts upon detrimental research practices and actively stimulates responsible conduct of research, but only at the level of individual researchers</td>
<td>There is an academic climate that detects and acts upon detrimental research practices and actively stimulates responsible conduct of research, at both the level of individual researchers and that of teams and departments</td>
</tr>
<tr>
<td>2. To teach for intellectual virtue</td>
<td>2. To teach for intellectual virtue</td>
<td>The university teaches for knowledge and understanding, but pays no attention to intellectual virtues</td>
<td>The university teaches for knowledge and understanding, and intellectual virtues are considered important but not taught</td>
<td>The university teaches for knowledge and understanding and includes education about what the intellectual virtues are</td>
<td>The university teaches for knowledge and understanding, explicitly includes intellectual virtues in education, and explores cases that show the relevance of intellectual virtues</td>
<td>The university teaches for knowledge and understanding, includes intellectual virtues in education, and practically engages in developing intellectual virtues</td>
</tr>
<tr>
<td>3. To address the big questions of life</td>
<td>3. To address the big questions of life</td>
<td>The big questions are neglected; there is no attention for them</td>
<td>The big questions are mentioned, but discarded as meaningless or outside the scope of universities</td>
<td>The big questions are taken seriously and addressed in teaching, but in isolation, within relatively isolated departments or courses</td>
<td>The big questions are taken seriously and addressed in (interdisciplinary) research and teaching in some departments and courses</td>
<td>The big questions are taken seriously and addressed throughout the university’s (interdisciplinary) research and teaching in all programs and departments</td>
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<tr>
<td>4. To give humanistic inquiry and education a proper place</td>
<td>4. To give humanistic inquiry and education a proper place</td>
<td>The humanities are acknowledged as legitimate academic disciplines, but marginalized</td>
<td>The humanities are not marginalized, but considered legitimate yet treated as inferior to the sciences</td>
<td>The humanities have a proper place in the university, and there is cooperation with other disciplines in teaching and research</td>
<td>The humanities have a proper place in the university, and there is cooperation with some other disciplines in research and teaching</td>
<td>The humanities have a proper place in the university and there is intensive and broad cooperation across disciplines in teaching and research</td>
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<tr>
<td>5. To serve society</td>
<td>5. To serve society</td>
<td>Research and teaching are confined to what is considered relevant for purely academic challenges</td>
<td>Research and teaching are considered relevant for purely academic challenges, but the university leaves it to others to confer knowledge and understanding relevant to those challenges</td>
<td>Research and teaching that addresses societal challenges is carried out upon request, but deemed substantially less important than fundamental research and teaching</td>
<td>Research and teaching that addresses societal challenges has a fixed place in the university, but is deemed less important than fundamental research and teaching</td>
<td>Research and teaching that addresses societal challenges has a fixed place in the university, and is seen as fundamentally important for academic and societal challenges</td>
</tr>
</tbody>
</table>
principles and standards. Surveys indicate that 2% of researchers admit to having fabricated or falsified data themselves, while one third says that they have been engaged in less serious questionable research practices. Only 10 – 40% of study results turn out to be reproducible when the study is repeated. This is due to small sample sizes, selective reporting and other questionable research practices. Although these phenomena are understood, it is clear that more transparency and specifically preregistration of study protocols and data analysis plans will lead to considerable improvements. This epistemic responsibility entails not only the adoption of transparency and educating staff and students in responsible conduct of research, but also removing perverse incentives from the ways in which researchers are assessed and performing research on research to strengthen the evidence base for optimizing research integrity.

2. To teach for intellectual virtue. Among the intellectual virtues are: open-mindedness, attentiveness, charitableness, intellectual courage, creativity, curiosity, discernment, honesty, intellectual humility, objectivity, parsimony, perseverance, studiousness and wisdom. Educating for intellectual virtues is part of the traditional ideal of Bildung. Moral virtues, such as generosity, kindness, or benevolence, may well also be important and universities might have a responsibility to cultivate them, but, if so, this isn’t an epistemic responsibility. When universities choose to teach for intellectual virtues, they can do so, minimally, by merely bringing up these virtues in educational settings; or they can explore them through case studies of intellectually virtuous scientists and scholars and their contributions to epistemic progress, or, most advanced, they can actively cultivate intellectual virtues in their students by having them mimic and practise intellectually virtuous behaviour. Developing intellectual virtues requires not merely instruction about virtues or reflection on them, but training and exercise.

3. To address the big questions of life. By ‘the big questions’ we mean such questions as: What is the origin and ultimate destination of all that exists? What is the future of the earth’s ecosystem? What is consciousness? Do humans have free will? Is there (objective) good and evil? Can the human mind understand there (objective) good and evil? Can the human mind understand anything? Does science relate to religion? These are universal questions in the sense that they have been asked in most cultures and societies throughout history, up to the present; they are not restricted to local concerns or specific academic disciplines.

Addressing the big questions of life is an epistemic responsibility of the university for a number of reasons. First, these questions are too important to be left entirely to non-academics. Second, many academics themselves are greatly interested in these questions, even if their specialized science and scholarship does not or even cannot answer them. Third, clarifying and attempting to answer these questions affects how we look at ourselves and what we deem important. Fourth, several big questions are factual questions – highly abstract and large scale, but factual nonetheless. They are not questions about tastes or preferences. They seem to admit of true or false answers. So, at least in principle, they fall within the purview of scientific and humanistic inquiry. Fifth, big questions can inspire smaller and more manageable research questions. For example, asking about the fundamental nature of reality led to the hypothesis of atomism in Ancient Greece. Ideas about

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9Fanelli, D (2009). How Many Scientists Fabricate and Falsify Research? PLoS ONE 4(5); e5738. https://doi.org/10.1371/journal.pone.0005738. Note that these numbers concern scientists’ self-reporting; they go up considerably when researchers are asked whether they’re aware of colleagues having committed scientific fraud or engaged in questionable research practices.
God’s perfection and omnipotence led Galileo to assume that mathematics is our best guide to understanding the orbits of the planets and hence that heliocentrism rather than geocentrism is correct\(^{16}\). Darwin asked whether humans are unique or whether all life on earth is monogenetic, which led him to develop evolutionary theory\(^{17}\). Einstein opposed the Copenhagen interpretation of quantum mechanics on metaphysical grounds, as he didn’t believe the universe could be fundamentally probabilistic\(^{18}\). For these reasons universities cannot and should not operate as if the big questions don’t exist or cannot be taken seriously. Rather, they should take them seriously and mobilize their intelligence as well as state of the art science and scholarship to address these questions in an intellectually responsible way.

4. To give humanistic inquiry and education a proper place.
Universities ought to have room for the full range of academic disciplines, in both the sciences and the humanities. Many of today’s most urgent challenges in society cannot be solved by purely scientific or technological means; successful solutions require compelling communication, consideration of moral values and norms, and in-depth understanding of cultures and religions. All of these things, and much more, are studied in the humanities. Hence, universities ought to facilitate and embrace humanistic inquiry and teaching, and stimulate interdisciplinary collaborations between scientists and humanities scholars. Of course, some universities – technological universities, for instance – do not include humanities departments. For them, this responsibility may be either left aside, or be interpreted as follows: the responsibility to give due weight to knowledge and understanding produced by humanities departments in other universities.

Giving the humanities a proper place is a responsibility of the university for one basic reason: the humanities can deliver truth, knowledge and insight in areas where the sciences cannot\(^{19}\). The humanities have their own objects of study: they study objects that have “meaning” in a special sense, viz. meaning that derives from human conventions, from human intentions, and/or from human purposive behaviour\(^{20}\). The knowledge and understanding the humanities provide differs from the knowledge and understanding that the sciences offer, in that the former is often ‘indexical’ (that is, related to human interests and concerns), ‘perspectival’ (it specifies how things look from, say, a romantic perspective), and value-related (that is, related to social, political, moral, aesthetic, or religious values)\(^{21}\). In addition to this, the humanities are particularly suitable for educating students to become well-informed, critical citizens who can reflect on socially urgent questions about life, health, education, justice, equality, liberty, etc. and participate fully in society and politics\(^{22}\).

5. To serve society.
Universities can serve society at a number of levels: local (a city or region), national, or international, humanity worldwide. What we have in mind here is serving society epistemically, that is, to help society acquire true belief, knowledge, and understanding about important issues. So, what we have in mind are such things as press releases, expert advice, popular articles, opinion pieces, public lectures, interviews, and so on. Of course, universities sometimes also serve society in a more practical manner, e.g., by way of proposing effective policies, producing medical interventions and other technologies. Such practical interventions are often based on scientific evidence, so the epistemic and the practical are not entirely separate, but they can be distinguished for analytical purposes. We focus on the former here, as our taxonomy concerns the epistemic rather than the moral, practical, or social responsibilities of universities.

This is a responsibility for at least two reasons. First, many scientific and scholarly discoveries are so complex that if academics do not disseminate their knowledge, those discoveries will remain unknown among the larger audience. Second, it often requires extensive academic knowledge to understand the importance and ramifications of various discoveries. Knowledge and understanding are of intrinsic epistemic value. If the university does not serve society by sharing academic knowledge and understanding, then, for much academic knowledge and understanding, that value will be attained only by a very small group of academics in the relevant field. If the university takes its epistemic responsibility of knowledge dissemination seriously, then much larger groups – academics in other fields, society as a whole – will attain those epistemic values.

3. Future steps.
As indicated, we propose our normative taxonomy as a tool to assess the degree to which a university meets the Big Five epistemic responsibilities. Our proposal is a first attempt; in future work we aim to validate, test, amend, and implement the taxonomy. We envision doing this in four consecutive steps.

First, we want to fine-tune our taxonomy in a Delphi Study\(^{23,24}\) with international experts that aims in its first round at adding,

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replacing, and reformulating various epistemic responsibilities. The second and third Delphi rounds will seek consensus on the corresponding levels of meeting the responsibility at issue and explore what the best practices are for reaching higher levels of specific responsibilities.

Next, we will organize co-creation workshops25 with representatives of relevant stakeholders in order to discuss a penultimate version of the taxonomy. The focus of the workshop will be on the operationalization of the levels of meeting the different epistemic responsibilities in a way which makes application of the taxonomy feasible, transparent, and as objective as possible.

Then, we will test and qualitatively evaluate the taxonomy in a number of universities, resulting in a definitive description of the responsibilities, the levels, and a toolkit of best practices.

Finally, we will publish and disseminate the results on a dedicated website and explore whether the taxonomy is a suitable alternative for, or addition to, the currently dominant Academic Ranking of World Universities26 and the Times Higher Education World University Rankings27.

Data availability
No data is associated with this article.

Grant information
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The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.


26http://www.shanghairanking.com/

27https://www.timeshighereducation.com/world-university-rankings
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This article proposes what Peels et al. call a “normative taxonomy” of the “Big Five” epistemic responsibilities universities ought to meet: (1) fostering research integrity, (2) teaching (for) intellectual virtues, (3) addressing the big questions, (4) valuing the humanities, and (5) serving society. This normative taxonomy essentially serves as an analytical rubric designed to assess the performance of universities. One could easily imagine – and in fact, Peels et al. propose as much in §3 – refining the rubric presented in Table 1, using it to assess the performance of various universities, and then comparing their “Big Five” scores to their world university rankings. We agree that undertaking these tasks presents many enticing possibilities, especially to those of us inclined against bean counting approaches to accountability. Nevertheless, since they position themselves as aspiring university rankers, they should address the range of critiques targeting existing rankings, their methodologies, and the performativity of these rankings. They should then situate their own approach within that context, arguing especially that it is an improvement on – and escapes the criticisms levelled at – existing rankings. This is our global concern.

Below, we offer a number of other substantial concerns, followed by a shorter list of minor issues to consider:

Why these five?
Peels et al. propose five epistemic responsibilities of universities as the Big Five. The authors point out that they consider each of the Big Five equally important. They also defend each of the five as indeed responsibilities that universities ought to meet. However, they fail to argue that these five epistemic responsibilities are the most important epistemic responsibilities for universities, that these five are in fact equally important, that these five are sufficient to capture the epistemic responsibilities universities ought to meet, or that universities have no other equally worthy responsibilities that ought to be included.

Why five?
We agree that the proposed Big Five are epistemic responsibilities that universities ought to meet. Using
the proposed rubric to evaluate universities might provide valuable information about particular areas of strength and weakness at a given university. However, designing the rubric around five separate epistemic responsibilities suggests that universities could meet each of their epistemic responsibilities to varying degrees. One university might be particularly strong in terms of fostering research integrity but fail miserably at teaching for intellectual virtue. Another might excel at addressing the big questions but do a lousy job of valuing the humanities. Although these possibilities sound *prima facie* plausible, using an analytic approach to epistemic responsibilities also generates some less than desirable outcomes. Could a university that fails to teach for intellectual virtue really excel at fostering research integrity? That seems plausible only if we have a very limited procedural view of what counts as fostering research integrity. Without valuing the humanities, how could a university excel at addressing the big questions? Unless we adopt scientism, the answer seems to be that it could not. Similar problems arise when we consider the relations between the other proposed epistemic responsibilities. The use of a taxonomical vocabulary further strengthens this worry. Taxonomies should display not only differences, but also relationships and similarities. The current form of representation is not, in that sense, a taxonomy, but (for the most part) a normative *list*. Only when the ties binding the elements together are conceptualised convincingly can we convincingly speak of a taxonomy. For this reason, we suggest that the authors consider enriching their list to raise it to the level of a taxonomy or abandon talk of a ‘taxonomy’ altogether. The authors could adopt the vocabulary of an analytical rubric, instead.

Even if the authors decide to use the language of rubrics rather than taxonomies, we suggest that the authors consider a more holistic approach along with an analytic one, just as virtue ethics appeals not only to the individual virtues, but also to the question of character. Rather than describing teaching for intellectual virtue as part of *Bildung*, perhaps the authors could consider fostering the ability to pursue *Wissenschaft* while cultivating *Bildung* as analogous to a university’s character. Call it the *W-B* rubric, under which different (now, no longer separate) epistemic responsibilities could be grouped together to indicate different levels of overall achievement. In order for a university to score best on the *W-B* rubric, it would have to excel at meeting *all* of its epistemic responsibilities (for a brief discussion of the difference between analytic and holistic rubrics, as well as examples and further references, see *Rubrics: useful assessment tools. Centre for Teaching Excellence, University of Waterloo*).

**Why insist on separating epistemic from other responsibilities universities have?**

This question follows on the previous one, in that it aims to nudge the authors away from using only an analytic approach. By insisting on distinguishing epistemic responsibilities from moral, practical, and social responsibilities, the authors impoverish the idea of what it means for universities to serve society. If the goal is to work towards alternative forms of assessment and accountability (thereby politicizing them further), excluding other responsibilities and artificially fragmenting the landscape accordingly, one would expect [a] the epistemic responsibility taxonomy to be situated within a larger responsibility taxonomy and/or [b] an argument that leaving other responsibilities aside is preferable. More in line with the suggestion to pursue a more holistic approach, we must ask: could we really say that a university is a good university if it meets only its epistemic responsibilities? We think not. Perhaps the *W-B* rubric we suggest, or another holistic approach, could help address this issue. Note that one could also include analytical rubrics for moral, practical, and social responsibilities of universities and incorporate the responsibilities included in each of these separate rubrics into a holistic approach.

Our point is not that analysis is always bad. Indeed, analysis can be quite informative and useful as part of a formative evaluation. We are simply suggesting that the authors consider using their analytic approach to complement a more holistic approach.

**Who counts, and why do they count?**
In §3, the authors suggest optimising their rubric by means of a Delphi Study “with international experts”, which could lead to fine-tuning it, but possibly also to radical revisions. If the latter is the case, then what is the status of the current five epistemic responsibilities? When it comes to the actual Delphi study, whom they choose to participate in the study will likely make a very big difference to the final design of the rubric. Presumably, the authors focus on “experts” because they assume experts know more about epistemic responsibilities than non-experts do. Yet, the way in which the authors present it suggests a retreat to the deficit/diffusion model of public understanding of science. Not only has the deficit model been shown to be factually incorrect, it also presupposes a social contract for science and scholarship that imagines universities as ivory towers. In their discussion of a university’s responsibility to serve society epistemically, the authors focus on the supply side of knowledge production, suggesting that knowledge dissemination is how best to serve society. Arguably, however, serving society – even if we limit this to an epistemic responsibility – means something other than telling society what we academics think they need to know. Here again, the separation between epistemic and other responsibilities creates a lot of friction, since a departure from the deficit model requires a high degree of interaction and participation beyond universities. In fact, one could argue that interaction and participation are epistemic requirements (co-production of knowledge).

Along these lines, we suggest that non-experts may have valuable feedback to offer, even if the authors ultimately decide only to pursue the development of an analytic rubric for epistemic responsibilities of universities. One way to include the demand side of knowledge production in the design of their rubric would be to recruit non-expert stakeholders to participate in the proposed Delphi Study and workshops or organise parallel expert (Delphi) and citizen (Citizen Summit) consultations.

We also have a few more minor points that nevertheless warrant attention:
1. Despite the argument that the rubric is to be applied to entire universities, the responsibilities focus very much on individuals and groups (which seem to be multiple individuals in the ways in which they are discussed) and less on the level of structures and collectives.

2. Peels et al. frame irreproducibility solely as the result of sub-par science and thus as a research integrity issue. Their previous work, as well current scholarly debates on the characters and qualities or irreproducibility and irreplicability, takes up a much more nuanced position. Perhaps the authors will consider adding some of that nuance here.

3. Excusing a few universities (technical universities or polytechnics, in this case) of taking responsibility for one of the epistemic responsibilities (#4) suggests that giving humanistic inquiry and education a proper place is optional. This seems to conflict with the idea that all responsibilities are equally important. It also opens up possibilities for policies that deprioritise humanities research and teaching (cf. the current Van Rijn report in NL).

References

Is the topic of the opinion article discussed accurately in the context of the current literature? Partly

Are all factual statements correct and adequately supported by citations? Yes
Are arguments sufficiently supported by evidence from the published literature?
Partly

Are the conclusions drawn balanced and justified on the basis of the presented arguments?
Yes

**Competing Interests:** The reviewers are currently engaged in an ongoing debate with the authors of the paper on whether the humanities need a replication drive like that currently ongoing for the sciences. Since the reviewers take the negative side of that debate – we do not think the humanities need a replication drive – and the authors defend the affirmative side, someone might believe we are incapable of offering a fair review. The debate is cordial, however, and one of the authors (Peels) has been included as a presenter in a session conference session on the topic organized by the reviewers. We expect that (fruitful) debate to continue, although it is possible that we could reach consensus on the matter. Although we offer a critical review here, we do so in the spirit of helping the authors strengthen their arguments and not from any ill will.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.

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