



# Recognition in numbers: can authorship norms in large research teams help reform research assessment practices?

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Received: 29 July 2025 / Accepted: 10 November 2025  
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## Abstract

Large-scale scientific collaborations have become a defining feature of contemporary research. While these consortia enable ambitious, interdisciplinary projects, they also challenge traditional norms of authorship and researcher assessment. This perspective explores the evolving role of authorship in collaborative science and its potential to disrupt the dominance of quantitative research metrics in academic evaluations. Specifically, I discuss the advantages and challenges in using quantitative metrics for research assessments and argue that authorship practices in large research teams can both reduce the clarity and utility of traditional metrics and open new avenues for recognizing diverse and currently underappreciated research contributions. I also propose that reforming authorship norms in research collaborations, for example through clear contribution statements, expanded recognition of research outputs, and transparent attribution, can act as a catalyst for broader systemic change in research assessments. Promoting transparent and fair research authorship practices through norm shifts in large research consortia could help rebalance current evaluation systems, fostering more ethical, equitable, and context-sensitive approaches to recognizing academic labour.

**Keywords** Academic authorship · Research consortia · Research evaluation · Quantitative metrics

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## Introduction

In the face of daunting global challenges, including pandemics, climate change, food security, and energy sustainability, the landscape of scientific research has shifted irreversibly. Science is no longer the sole domain of isolated academics or individual laboratories and research collaborations have become common across all scientific fields (Fortunato et al., 2018). Collaborative research teams have existed for decades in some fields of science, such as medicine or physics, but the frequency and size of scientific collaborations have recently expanded in these and other research fields, including biology, materials science, and psychology (Wuchty et al., 2007). Large-scale research consortia, anchored in the collaboration between scientists across institutions, countries, and disciplines, have nowadays become central engines of scientific discovery. Examples of large research consortia include the ATLAS (A Toroidal LHC Apparatus) collaboration operating the Large Hadron Collider at CERN, the Human Genome Project, or the more recent COVID-19 vaccine collaborations. Similar collaborations have also developed in the context evidence synthesis efforts, with the Intergovernmental Panel on Climate Change (IPCC) and its sister panel dedicated to Biodiversity and Ecosystem Services (IPBES) representing two iconic examples. Other instances of more targeted collaboration involving several researchers exist, including for example data compilation (e.g., Aydođan et al., 2024; Dornelas et al., 2018) and meta-science efforts (e.g., Gould et al., 2025; Silberzahn et al., 2018). Such collaborations have produced remarkable theoretical achievements, provided new insights to support decision-making, and developed practical solutions for pressing issues, demonstrating the extraordinary potential of collective research efforts to address societal grand challenges.

Clearly, the future of science will be collaborative. Yet, as large scale collaborations become a staple of knowledge production systems, they also challenge the traditional foundations of how scientific contributions are managed, recognized and assessed (Stubbs, 2024). For example, successfully coordinating a large team of international scientists requires different approaches to managing a small research lab. Similarly, the funding efforts and resources needed to create and maintain a large research consortium differ markedly from smaller research teams. However, chief among these challenges are perhaps issues related to authorship. Who should be named as an author in consortium-driven work, and on what basis? How do we ensure that attribution is both fair and ethical? And how can individual contributions be justly attributed and made visible in multi-authored work? These important and other questions related to authorship practices remain topical and the subject of much academic debate (e.g., Hosseini et al., 2025; Teixeira da Silva & Dobránszki, 2016; Zwart et al., 2024) because authorship is central to academic careers and recognition.

In this perspective, I aim to explore the potential of changing authorship practices in large-scale research collaborations to disrupt the dominance of quantitative metrics in research evaluations. First, I discuss some of the pros and cons of using quantitative metrics for research assessments. I then argue that authorship practices

employed by large research consortia have the potential to disrupt the overreliance on quantitative approaches in research assessments by (i) decreasing the value and applicability of quantitative metrics, and (ii) providing new opportunities for qualitative assessments of research contributions. I conclude this brief communication with some considerations on how normative changes in authorship reporting practices could benefit large research collaborations and promote better research assessment practices.

## The pros and cons of using quantitative metrics in research assessments

The widespread use of quantitative metrics in research assessments is a contentious matter subject to much debate. Quantitative metrics can certainly be valuable tools for research assessment and offer specific advantages when compared to qualitative alternatives. For example, quantitative metrics allow for rapid, broad-scale comparisons across researchers, institutions, with a certain degree of standardization (Ioannidis & Maniadis, 2023). Such metrics can help track research progress, identify trends, and flag anomalies in research performance while also potentially reducing subjectivity and bias in evaluation processes (Butler, 2007). Quantitative approaches also tend to be less resource-intensive than qualitative approaches to research assessment (Ioannidis & Maniadis, 2023). Some researchers have also proposed that quantitative metrics may be less susceptible to individual biases compared to approaches based solely on expert review panel (Taylor, 2011). However, overreliance on quantitative metrics for research assessment can also be limiting. Quantitative metrics usually miss or capture poorly aspects related to creativity, societal impact, and long-term value, thus reflecting a very narrow conception of research quality (Helmer et al., 2020). They can also give a misleading sense of accuracy and fairness because metrics are not always suitable for comparisons between research fields (Kaur et al., 2013) and career stages, thus potentially disadvantaging some researchers. Too much emphasis on quantitative metrics in research assessment can end up incentivizing researchers to focus on output quantity over quality (Müller & de Rijcke, 2017) or lead to metric “gaming” (e.g., self-citation, salami slicing, irrelevant citations) and other unethical practices (Purvis, 2006). Some authors have suggested the adoption of additional metrics against these metric gaming practices (Ioannidis & Maniadis, 2024), but that approach may be susceptible to similar tactics. Recognition of these drawbacks is not recent, and over the last decades there have been multiple calls for the implementation of more balanced and nuanced approaches to research assessment that include both quantitative and qualitative aspects (Aubert Bonn & Bouter, 2023; Butler, 2007; Kostoff, 1997). Despite this, quantitative metrics remain the norm and continue to have a central role in research assessments (van Helden & Argento, 2020), impacting academic hirings, career progression, and research funding, and their dominance remains a cause of concern among academic circles (Owan et al., 2024).

## The disruptive potential of large author teams on quantitative research assessments

The emergence of large collaborative teams has brought about multiple changes to scientific systems, including to authorship practices. It is not uncommon nowadays to see scientific publications authored by dozens or even hundreds of researchers. It is also not uncommon to see joint-first or join-last authorship in such publications, where multiple authors aim to claim similar credit. While this reflects the scale and nature of contemporary research collaborations, where more than one researcher can play a key role in the implementation of the project, it also raises important ethical and professional questions related to authorship attribution in collaborative scientific outputs. For example, there are concerns related to fair authorship attribution, the dilution of authorship credit, and ambiguity in recognizing individual contributions (Hosseini et al., 2025; Zwart et al., 2024). These issues also inevitably bring consequences for research assessment practices.

On the one hand, large author teams impact the perceived value of quantitative research metrics. Traditional metrics like citation counts, h-indices, or the number of publications lose clarity in the face of several publications co-authored by a large research team because multiple researchers end up sharing the same set of publications and becoming well-cited despite potentially large differences in contribution (Thelwall, 2020). This situation not only decreases the capacity of research metrics to effectively distinguish between researchers that are part of the same consortium, but it can also prove unfair for researchers with greatly different contributions or those who do not have the opportunity or capacity to participate in such collaborative efforts. For hiring committees, funders, and reviewers, assessing individual contributions in such a context becomes increasingly opaque. Because one of the main advantages attributed to quantitative research metrics is their capacity to effectively distinguish between researchers (Ioannidis & Maniadis, 2023), losing this capacity is likely to hamper their widespread use.

On the other hand, concerns about fair and ethical authorship attribution among large research teams offer new opportunities for more nuanced approaches that enable a better expression of individual contributions within collaborative research projects (Hosseini et al., 2025; Lin, 2024). Perhaps the most common recommendation in this scope is the adoption of clear authorship contribution models, such as the CRediT and MeRIT systems (Allen et al., 2014; Holcombe et al., 2020; Nakagawa et al., 2023). These approaches aim to provide clearer individual contribution statements which help to improve the transparency and accountability of authorship contributions and attribution, particularly if coupled with clear authorship guidelines among consortia. They can also assist research assessment practices by providing a qualitative description of individual research contributions. Another common recommendation is to expand the types of outputs considered in research assessments beyond the standard scientific publication. This includes contributions towards individual research components such as data, materials or protocols (Thibault et al., 2023), non-scientific research outputs such as brochures, newsletters or reports (Koier & Horlings, 2015), which often contribute to project impact beyond academia, and team infrastructure such as data stewardship, laboratory maintenance and software engineering (Bennett

et al., 2023). While such contributions can also be quantified, they defy simplistic numerical comparisons between researchers or projects (e.g., should producing one report be equivalent to developing a piece of software?) and may require more qualitative assessment practices.

Expanding the suite of contributions recognized in research assessments of large research teams may therefore force the adoption of additional qualitative assessment approaches that provide the detail and nuance potentially lacking in quantitative metrics. One possible way this could be achieved is through the development of author contribution reporting systems that emphasize individual contributions rather than specific tasks. Such systems could complement existing authorship reporting systems through a focus on the unique individual contributions provided by each author, rather than participation in specific tasks as emphasized by systems such as CRediT and MeRIT. Finding meaningful ways to report unique individual contributions may be challenging in very large teams but could open the door for recognizing other types of academic contributions that remain somewhat invisible, as outlined above. Implementing this type of authorship reporting in collaborative manuscripts could facilitate a more detailed assessment of individual contributions and encourage discussions about fair authorship attribution within teams by promoting clearer communication of the individual contributions of each team member.

## Normative change towards system change

Changing research assessment practices will ultimately require a shift in the norms that govern how science is valued, and authorship practices lie at the core of this process. As collaborative research becomes increasingly common, redefining how contributions are recognized, communicated and attributed can open the door to broader changes in the culture of academic evaluation. Research funders, institutions, journals and publishers all have a role to play in this shift but it is perhaps the researchers and their teams who play the bigger role. Large research collaborations are attractive for many reasons (Dusdal & Powell, 2021), including opportunities to engage in cutting-edge research, establishing a community, but also because they tend to produce bountiful and impactful publications which are well-valued in traditional research assessments. This situation implies there is a potential conflict for researchers between what is currently valued in research assessments and the promotion of more inclusive, transparent, ethical, and context-sensitive authorship practices, such as detailed contribution statements, expanded recognition of non-traditional outputs, or authorship models that better reflect collaborative work.

Some may argue that promoting such practices may be ineffective if not recognized in research assessments and even counterproductive if they demand additional time and effort that is taken away from research. However, these arguments lose context if such authorship practices become central tenets to the working dynamics of research consortia and abiding them a requirement for joining or staying in the research team. Such changes could promote a more open and fair discussion on authorship attribution within and between collaborative research teams. More importantly, the consequences of such a normative change in the authorship practices of

research consortia may ripple through the broader academic system. As authorship attribution becomes more reflective of actual contributions, it will become harder for research assessments to rely solely on publication-based metrics to assess merit. Not only that, a change in authorship reporting practices that promotes detail, nuance and openness will ensure that research assessment practices can leverage more relevant information and potentially lead to fairer and more transparent decision – or that information is available to challenge them when this is not the case. Research funders and institutions may then be compelled to invest in more qualitative, context-aware and well-justified assessment systems that better reflect the diversity of scientific labour. Ultimately, I argue that reforming authorship norms and practices is not only an ethical imperative but also a strategic pathway to broader, systemic change in how we evaluate researchers and research.

**Acknowledgements** I acknowledge personal funding from the Academy of Finland (grant agreement #348352) and the KONE Foundation (grant agreement #202101976).

**Author contributions** Not applicable.

**Funding** Open Access funding provided by University of Turku (including Turku University Central Hospital). I acknowledge personal funding from the Academy of Finland (grant agreement #348352) and the KONE Foundation (grant agreement #202101976).

**Data availability** Not applicable.

## Declarations

**Ethical approval** Not applicable.

**Conflict of interest** The author states that there is no conflict of interest.

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