

What Constitutes Authorship?

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The number of authors on a manuscript and disputes about author order and authorship are all sharply on the rise. These contentious issues cause much valuable time to be taken away from research. Of course, appropriate and fair representation of those who have contributed to a manuscript is to be desired. But this is a complex task, made more difficult by various out-of-date evaluation procedures, such as awarding credit primarily (and in some cases only) to the first author. It should also be expected that authorship practices vary from discipline to another and even from one research group to another. Often, many have contributed peripherally, but vitally, to the completion of the body of work described in the manuscript. Do they deserve authorship? It is easy to recognize that carried to an extreme, this type of involvement would produce a lengthy and unwieldy authorship list. Indeed, a record of dubious distinction was set in the March 13, 2012 issue of *Physical Review Letters* by G. Aad et al.¹ on a search for the standard model Higgs boson, which contains 24 pages of alphabetized co-authors (5,154 researchers in total). The other extreme are publications by a group of unidentified mathematicians who wrote a series of books beginning in 1935 under the pseudonym Nicolas Bourbaki.² Clearly, more discussion of what makes someone an author seems warranted.³

Authorship is not just about giving proper recognition to people who did the work. The integrity of the whole scientific enterprise is at stake because the public bases its admiration of science and its practitioners on the reliability and trustworthiness of the scientific publication process. One may ask how important is it to get the authorship question correctly resolved? If some deserving individual is omitted, it is obvious that damage has been done. The currency in the academic realm is reputation, which is certainly based, in large part, on the publication record of an individual. But does it hurt to include too many authors? Should authorship be awarded based on acquisition of funding, general supervision of a research group, general administrative support, or writing assistance? Naming too many authors reduces the credit that should be given to key researchers involved. Moreover, naming gratuitous authors inappropriately places accountability on others who are not qualified to explain or defend the findings of

the paper. Authorship confers credit but also comes with deep responsibilities (accountability) for the published work.

Another perplexing problem is author order. Some say it is a team effort so the order does not matter; one should simply list the authors in alphabetical order. Others say what really counts is the first author and, to a lesser extent, the corresponding author. This last approach seriously hinders collaborations between different groups. Some try to solve part of this dilemma with a footnote claiming that some of the authors contributed equally, whereas what the meaning of equal is often leads to more questions.

I propose a possible solution to this vexing authorship problem. I want all journals to publish a brief description of the role of each author. I believe this practice would have many advantages, in not only providing proper credit to those who deserve it, but also eliminating the pernicious practice of many who think that the first author and the corresponding author deserve the only recognition for the published manuscript. With the increase of multi-authored papers involving researchers belonging to different disciplines, this practice would go a long way in letting readers know who did what. It would also significantly encourage interdisciplinary collaborations because it would help reduce the needless agony of squabbling about who will be the first author of a study. It would also inform the interested reader who should be contacted about what aspect of the study. Some may still insist that everyone contributed to the research process as a team and should not be recognized separately, but at least we would know that is the prevailing attitude of the group or group leader. The problem of thousands of authors could be handled in supplementary material. I also believe that a policy of encouraging authors to identify their contributions would help increase the reliability of the manuscript and help others appreciate better who did what. So often I have seen that when a paper is retracted almost all the authors take no responsibility as suddenly it is claimed that the offending article is no longer any of their work. For many tenure, promotion, job hiring, and prize awarding decisions, knowing a researcher's contributions to a scientific publication is truly vital information. I also see another beneficial aspect of describing the roles played by each author. It puts a more human face on the trouble and toil that goes into generating research results. I think that any effort to do so should be warmly welcomed for showing others, particularly the public, how scientific research is really done.

References

1. G. Aad et al., *Phys. Rev. Lett.* **108**, 111803 (2012).
2. Maurice Mashaal, "Bourbaki, A Secret Society of Mathematicians," AMS, June 2006.
3. R. N. Zare, *Current Science* **106**, 1171 (2014).