EDITORIAL

Transparent author credit

Editor-in-Chief, Science *Journals.*
jberg@aaas.org

Authorship on papers is one of the major currencies of the scientific enterprise. Nevertheless, the contributions of different authors to a given paper have remained relatively opaque. Contributions are generally inferred from the order of authors, and implications of position on the authorship list vary between different investigators and scientific fields. A year ago, a group of editors and publishers across a wide range of disciplines met to discuss how to provide a more systemic solution to make author contributions more transparent. This week, their recommendations have been released (www.pnas.org/cgi/doi/10.1073/pnas.1715374115), and I applaud this effort and urge the wide adoption of this system.

More explicit articulation of author contributions can be tremendously beneficial. Earlier in my career, I served on numerous academic promotion committees and, in a few cases, faculty members took it upon themselves to thoughtfully annotate their publication lists, clarifying their roles in individual publications. This allowed the committees to distinguish between those papers for which the faculty member had made major contributions from those involving a lower level of effort. Such distinctions simply were not apparent from the author lists alone. One of the core recommendations involves use of the Contributor Roles Taxonomy (CRediT) system to categorize the efforts of different authors to a paper (docs.casrai.org/CRediT). This system has 14 categories, including Conceptualization, Investigation, Writing (original draft), and Supervision. Each author's efforts can be assigned to one or more of these categories. Many other divisions are certainly possible, but these 14 were derived from practices across a wide range of scientific disciplines. The use of a standardized set of categories can enable human- and machine-readable reporting of these contributions across journals.

Note that CRediT categories are intended to describe author contributions, not to define what constitutes an appropriate contribution to warrant authorship. The group recommended best practices for authorship rules, and we have aligned our editorial policies (www.sciencemag.org/authors/science-journals-editorial-policies) with these recommendations, including the requirement that any author must have made a substantial contribution to the conception or completion of the underlying research, approve the final version of the manuscript, and agree to be accountable for the integrity of his or her contributions and for the overall manuscript. The importance of such rules is to provide a framework for research teams to establish authorship and to avoid the inclusion of inappropriate authors. The committee also makes suggestions for the responsibilities of the corresponding authors of papers. Designation as a corresponding author generally recognizes the individual(s) who played a leading role in the research. As such, this role comes with considerable responsibility when publishing the research, which is articulated in the *Science* family's editorial policies.

"...the new recommendations are a welcome major step."

The group also recommended the use of standard individual identifiers, especially ORCID identifiers (https://orcid.org). A unique identifier associated with each author will enable linking data from different publications, including CRediT contributions, in the future. As someone who has spent considerable effort analyzing large data sets related to the activities of scientists, I can testify to the value of unique identifiers—they decrease the inefficiency and uncertainty associated with sorting out ambiguous names. The overhead associated with collecting such data during the manuscript submission and publication processes can pay big dividends, both to the investigators involved and to the scientific community.

No doubt, a system that promotes authorship transparency will need to evolve as practices are refined and the cultures of different institutions adjust to the approach. But the new recommendations are a welcome major step. The wide adoption of the suggested system should go a long way toward making the roles of different individuals involved with a research paper much clearer, moving beyond the obscure author order code that dominates so much discussion today.

–Jeremy Berg

10.1126/science.aat4136

Science

Transparent author credit

Jeremy Berg

Science **359** (6379), 961.
DOI: 10.1126/science.aat4136