



## Opening CRediT: A new approach to authorship and attribution within academia

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**Abstract** The traditional approach to academic authorship; listing individuals by their level of contribution and putting the most senior author at the end can lack transparency, introduce unfairness, and reinforce traditional power dynamics in academic seniority. This paper proposes we do away with the traditional approach to academic authorship and replace it with a system of contributors or 'credits' with clearly acknowledged (often multiple) roles. This approach would be informed by the Contributor Roles Taxonomy (CRediT). It provides information on the roles and responsibilities of each contributor, and a more detailed and comprehensive way of recognising the different types of contributions that authors make to a publication. It is inspired by the system used in movie credits. Merely listing each contributor as an author is overly simplistic and reinforces unequal power dynamics within academia. This paper aims to contribute to the debate surrounding the role of authorship, power and contribution within academic work. It explores the role of radical journals like *Stolen Tools* in decolonising the traditional conventions in academia that support the privileged at the expense of diverse individuals. Opening CRediT on papers may be a tool in building a fairer approach to authorship by providing more transparency and standardisation in recognition of contributions.

**Keywords:** publishing ethics, research ethics, academic traditions, authorship, collaboration

### CRediT:

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## 1 Introduction

There are many traditional rules within academic authorship such as the principal investigator or study designer/leader being named as last author. This rule encourages honorary authorship (Riesenberg & Lundberg, 1990). Throughout history diverse individuals such as Jocelyn Bell Burnell and Rosalind Franklin have had their academic work reduced or stolen through such patriarchal approaches and untransparent rules around scientific recognition.

Journal publication ethics guidelines now make clear what contributes to authorship. This has been codified by the Vancouver convention. The Vancouver Group are the International Committee of Medical Journal Editors (ICMJE), who in 1985 introduced a ratified set of accepted criteria for authorship. However, when combined with tradition and power and the experience of senior authors, the decisions of whom to name as an author, who should be acknowledged, and the order of those authors can be opaque.

There have been many calls for change to our current system of authorship which has remained largely static since the inception of academic publishing. Rennie et al. (1997) argue that the system which works perfectly for a single author can easily fall apart as the number of authors increases.

## 2 On collaboration

All scientific fields have seen a steady increase in the mean number of authors per paper since the 1950s (Faneli & Larivière, 2016). This increase can be attributed to increased specialisation, increased complexity of research, increased collaboration and changes in attitude towards and traditions surrounding the crediting of authorship (Parish et al., 2018). The absurdity of this situ-

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ation has been noted by the academic community. The Ig Nobel prize, awarded for research that “cannot or should not be reproduced” was awarded to Yuri T Struchkov in 1992 in the field of literature for publishing 3.9 papers per day over a 10-year span in the field of crystallography. Abrahams (2008) alleges that scientists were welcome to use the equipment at the Institute of Organoelement Compounds of the Academy of Sciences in return for adding Struchkov to the list of co-authors. In 1993, the Ig Nobel Prize for Literature was accepted by the New England Journal of Medicine on behalf of the 972 investigators listed as co-authors for the article ‘An International Randomized Trial Comparing Four Thrombolytic Strategies for Acute Myocardial Infarction’ with an impressive division of labour, with each co-author accounting for around two words. In 2015 a new record for authors: 5,154 was set (Aad et al., 2015) based on data from two detector teams at the Large Hadron Collider who collaborated for a more precise estimate of the size of the Higgs boson.

Castelvecchi (2015) humorously comments on this ‘Hyperauthorship’ noting that: only the first nine pages in the 33-page article describe the research (including references), the other 24 pages list the authors and their institutions. The same Atlas Collaboration has since grown and increased the record to 8778 authors (Aad et al., 2022).

The author list takes up a mere 17 pages of this paper. This is considerably more authors on one paper than are active in many scientific fields. This trend devalues the meaning of authorship and skews citation metrics, changing what it means to be listed as an author in the modern academic context.

I am glad that academia retains a sense of humour towards hyperauthorship. However, guest authors and ghost authors (Rennie & Flanagin, 1994) are a real problem in collaborative research, and in traditions embedded in labs and academic departments. Ghost authors are defined as authors who contributed to the work but are not listed, generally to hide a conflict of interest (Wislar et al., 2011). Guest authors are individuals given credit as authors who have not contributed to the writing of the manuscript, but are often included due to their position in an institution or connection with other authors (Al-Herz et al., 2014). The academic community can go further into addressing the issue of authorship inflation including guest and ghost authors. The system of credits within television or film can be used as an example of transparent acknowledgement of contribution. No one looks at the end credits of a film as a joke because they tend to be reasonably transparent. There is an understanding that multi-million-dollar films take hundreds or thousands of people to create them, and each person has unique credits demarking their particular role(s) in planning, creating and distributing each film. The importance of an internet movie database (IMDb) film credit on a blockbuster for the career of each CGI artist, technical consultant or casting director is as important as a Scopus or PubMed authorship for a new academic.

Academic contributions should be correctly attributed, and therefore CRediT is recommended as a simple, transparent way to represent the roles typically played by contributors to research outputs. Following a workshop led by the Institute for Quantitative Social Science (Institute for Quantitative Social Science, 2012), the 14 key roles agreed for CRediT were: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing (CRediT, 2020).



Figure 1: "London BLM March" by Jai Toor, 2020 Let us breathe and black lives matter signs

### 3 Authorship inflation

Outlier papers with thousands of authors and absurdity illustrate an important point: what it means to be an academic author should be standardised. However, the mean number of co-authors has been steadily increasing over time (Parish et al., 2018). There are also varied authorship traditions in different fields, which makes institution-wide metrics and comparison difficult. This pressure of smaller fields to inflate metrics to compete with larger fields to keep relevance and funding within their department can lead to authorship inflation: an increase in the average number of authorship credits for individual academic authors over time. Some authorship inflation comes from the increased number of individuals needed to deliver larger, more internationally collaborative projects. However, this increase in authorship needs to be handled transparently, ethically and with care so that accountability and transparency are maintained. In response to authorship inflation, some social science journals have limited the number of co-authors of an article. Many reference styles also have limits of the number of co-authors that are included in a citation (Vancouver's cite-six ruling, for instance) which does not help, but simply hides the problem. To standardise these author contributions, and reduce ghost, guest and forged authorship McNutt et al. (2018) argue that we should set standards for authorship that relate to the contribution and accountability of the research their name is attached to.

### 4 Equality

Women, marginalised individuals and racialised minorities are all less likely to have power within the attribution process of authorship and are more likely to be left off authorship lists (Son & Bell, 2022). The gender and racial pay gaps (Roper, 2019) reported in academia suggest that diverse individuals are more likely to be subservient to more powerful individuals in the authorship process who retain more power to decide authorship order. Ethically, credit should be assigned by contributions of individuals, not politics.

Authorship disputes can be damaging to careers and delay publications. They can lead to the breakdown of relationships and damage the academic process. Journal editors see these disputes regularly. Clearly demarcated rules and expectations of what defines credit are the answer to the oft-opaque traditional conventions and lack of systematic agreement of what defines authorship.

### 5 A new way

Authors or writers should be individuals that write a substantive part of a manuscript, and each paper should begin with a CRediT section. A guidance list of roles to be ac-

knowledged in this section should be used by journals and authors. CRediT should also be used alongside ORCID (<https://orcid.org/>) which provides a persistent digital identifier to make each contributor individually identifiable. CRediT information can also be encoded within the Extensible Markup Language (XML) (a guide for this can be found here: <https://jats4r.org/credit-taxonomy>) of a journal article to make this data machine readable. Databases (such as Google Scholar and Scopus) should scrape more data than simply authorship and index individuals' contributions beside their names.

Authorship of peer-reviewed journal articles should not be the sole and most important contribution considered by hiring and promotion, award and other committees. There should be a recognition that without editing, reviewing, data collection, analysis and other parts of the scientific process, progress cannot be made. The writing up of research should not be the only role that confers special recognition. Once again, the film industry recognises collaboration within the arts. The writing, directing, acting and other roles are each recognised separately and for their own merits.

### 6 Conclusion

By adopting opening CRediT, I hope that Stolen Tools will embed the principles of transparency and accountability within a fair and ethical approach to the dissemination of research. Perhaps the next step of accountability will be to embed open peer review, recognising the influence of reviewers within the direction of a scientific paper and clarity within the contribution of everyone involved in the research. Therefore, stating of mentors, editors and reviewers and reporting their diversity characteristics will be central to the change that we want to see in academic writing.

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