

CRedit author statement

CRedit (Contributor Roles Taxonomy) was introduced with the intention of recognizing individual author contributions, reducing authorship disputes and facilitating collaboration. The idea came about following a 2012 collaborative workshop led by Harvard University and the Wellcome Trust, with input from researchers, the International Committee of Medical Journal Editors (ICMJE) and publishers represented by Cell Press.

Term	Definition
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims
Methodology	Development or design of methodology; creation of models
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components
Validation	Verification, whether as a part of the activity or separate, of the overall replication/ reproducibility of results/experiments and other research outputs
Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse
Writing - Original Draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation)
Writing - Review & Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre-or postpublication stages
Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/ data presentation
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team
Project administration	Management and coordination responsibility for the research activity planning and execution

Funding acquisition

Acquisition of the financial support for the project leading to this publication

* Cited from from Brand et al. (2015), Learned Publishing 28(2)

https://www.researchgate.net/profile/Amy_Brand/publication/274098676_Beyond_authorship_Attribution_contribution_collaboration_and_credit/links/565b08c608aeafc2aac60656/Beyond-authorship-Attribution-contribution-collaboration-and-credit.pdf

Sample CRediT author statement

Zhang San: Conceptualization, Methodology, Software Priya Singh.: Data curation, Writing- Original draft preparation. Wang Wu: Visualization, Investigation. Jan Jansen: Supervision.: Ajay Kumar: Software, Validation.: Sun Qi: Writing- Reviewing and Editing.

1. Data reference

Tracing data : Data citation roadmap for Finland

Finnish Committee for Research Data (2018-04-10)

<https://www.doria.fi/bitstream/handle/10024/153328/Tracing-Data-Finnish-Committee-for-Research-Data.pdf?sequence=1&isAllowed=y>

Data reference should consist of following elements: Creator, title, host organisation, publication time and/or date, persistent identifier. Useful additional elements are: Version, resource type, license status, ORCID, embargo information.

2. Data and manuscript authorship roles

- Correspondence
- [Published: 04 November 2019](#)

Separate authorship categories to recognize data collectors and code developers

- [Robert M. Ewers](#),
- [Jos Barlow](#),
- [Cristina Banks-Leite](#) &
- [Carsten Rahbek](#)

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- **836** Accesses
- **1** Citations
- **16** Altmetric
- [Metricsdetails](#)

To the Editor — The current, authorship-based system for recognizing individual contributions to science only patchily recognizes the contributions of the primary data collection that underpins, and code development that supports, the entire discipline. Data collectors and code developers — scientific resource generators — are progressively being forced to donate the grant income and time and effort of generating, curating and documenting data and code to the discipline as a whole^{1,2,3}. Yet resource users — those that re-use previously published data and codes to generate new knowledge and publications — benefit from that time and effort but are not required to recognize it in any standardized manner. We need a new way to quantify and value what is currently anonymous; the fundamental contribution to scientific progress that generating scientific resources provides.

Many scientists agree that authorship is the ultimate reward for collecting data or developing code. However, the Vancouver Protocol tellingly states that “Participation solely in the ... collection of data does not justify authorship.” Citations are routinely raised as the obvious approach to solving this dilemma^{4,5}, but it is not enough. Citations carry less value to a scientist than authorship. Moreover, citations to scientific resources are agnostic to the impact of the papers that used those resources, resource citations are commonly buried in supplementary material where they do not get picked up by citation tracking software, and published resources not associated with a published manuscript do not contribute to a scientists’ citation indices.

We suggest one solution is to divorce authorship of a manuscript from authorship of the resources used in the manuscript, which can be achieved by creating separate categories of authorship: manuscript and resource authors. Here, a published paper would come with two separate author lists. Manuscript authors are those who developed the question, analysed and interpreted the data, and wrote the paper; “authorship for authors”⁶. Resource authors are those who contributed some or all of the data that were analysed or code that was used. In this system, a resource generator can receive credit for contributing to a paper, but without

implying that they agree with, understand, or have even seen, the analysis and the conclusions the manuscript authors have presented.