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Dr Liz Allen
Beyond Authorship: Introducing the Contributor Role Taxonomy (CRediT)

@allen_liz
Beyond authorship: Introducing the Contributor Role Taxonomy (CRediT)
About me (declarations)

• F1000 Director of Strategic Initiatives (2015 – present)
• Head of Evaluation at Wellcome (2000s - 2015)
• Co-led development of project CRediT (2010 - present)
• ORCID, Board of Directors (2010 – 2015)
• Software Sustainability Institute, Advisory Board (2016 – present)
• Crossref, Board of Directors (2017 – present)
• Visiting Senior Research Fellow, Policy Institute @ KCL
• Love all things research meta-data & ‘research on research’
What I am going to cover

1. Origins of the Contributor Roles Taxonomy (CRediT)
2. Adoption and implementation
3. Putting a lens on authorship (‘research on research’)
4. Debate & discussion
What I am going to cover

1. Origins of the Contributor Roles Taxonomy (CRediT)
Problems with authorship in scholarly publishing

1. Authorship doesn’t reflect range and nature of contribution
Does authorship reflect contribution?

The first author
Senior grad student on the project. Made the figures.

The second author
Grad student in the lab that has nothing to do with this project, but was included because he/she hung around the group meetings (usually for the food).

The third author
First year student who actually did the experiments, performed the analysis and wrote the whole paper. Thinks being third author is "fair".

The middle authors
Author names nobody really reads. Reserved for undergrads and technical staff.

The second-to-last author
Ambitious assistant professor or post-doc who instigated the paper.

The last author
The head honcho. Hasn't even read the paper but, hey, he got the funding, and his famous name will get the paper accepted.

Problems with authorship in scholarly publishing

1. Authorship doesn’t reflect range and nature of contribution
2. ... nor support accountability
When Authorship Fails
A Proposal to Make Contributors Accountable

Drummond Rennie, MD; Veronica Yank; Linda Emanuel, MD, PhD


Editorials

Authorship: time for a paradigm shift?

BMJ 1997;314 doi: https://doi.org/10.1136/bmj.314.7086.992 (Published 05 April 1997)
Cite this as: BMJ 1997;314:992
Problems with authorship in scholarly publishing

1. Authorship doesn’t reflect range and nature of contribution
2. ... nor support accountability.
3. There has been a demise of the lone author (in most disciplines)
Demise of the lone author

As the average number of contributors to individual papers continues to rise, science’s credit system is under pressure to evolve.

Multi authors

As noted in Nature today, collaboration has become the norm rather than the exception in many areas of science. Up until the late 20th century, it was common for scientists to work in isolation, publishing their findings in their own names. However, the rise of collaborative research has led to a significant increase in the number of authors on scientific papers. This trend is particularly evident in fields such as medicine, where large-scale clinical trials require the expertise of multiple researchers. The growth in collaborative research has also led to debates about authorship and credit attribution, with some arguing that the traditional model of individual authorship is no longer sustainable.

The rise of collaborative research has several implications for the credit system. First, it challenges the traditional model of authorship, where each author is credited for their individual contribution. In a collaborative setting, it can be difficult to determine the relative contributions of each author, and this can lead to disputes over credit attribution. Second, the rise of collaborative research has led to concerns about scientific integrity, as it can be more difficult to establish the credibility of a research result when multiple authors are involved. Finally, the rise of collaborative research has also led to debates about the role of scientific journals in the credit system, as they are the primary mechanism for assigning credit to individual authors.

Despite these challenges, the rise of collaborative research is likely to continue. As scientific research becomes more complex and requires the expertise of multiple researchers, it is likely that the traditional model of individual authorship will evolve to accommodate this new reality. This evolution will require changes in the credit system, as it is one of the key mechanisms for assigning credit to scientific research.
Shrinking share of solo-authored papers

Source: https://www.timeshighereducation.com/news/authorship-are-days-lone-research-ranger-numbered
Problems with authorship in scholarly publishing

1. Authorship doesn’t reflect range and nature of contribution
2. ... nor support accountability.
3. There has been a demise of the lone author (in most disciplines)
4. ... and a trend to Team Science (in many disciplines).
Trend in collaborative and ‘Team Science’
The jump in average number of authors listed on a paper is driven by the physical sciences.

Only papers included in the 68 journals tracked by the Nature Index are represented.

Source: Nature Index • Created with Datawrapper

2,926 authors from 169 research institutions!
Problems with authorship in scholarly publishing

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Problems with authorship in scholarly publishing

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5. Demand for information to support research assessment
6. ... accompanied by a ‘publish or perish’ culture.
Perish or Publish Dilemma: Challenges to Responsible Authorship

Vigilante Afikunmen, Margarita Piskutzé and Egiemenj Gofenen

Centre for Health Ethics, Law and History, Institute of Health Sciences, Faculty of Medicine, Vilnius University, 03101 Vilnius, Lithuania, vigilante.afikunmen@ms.vu.lt; margarita.piskutz@ms.vu.lt; eggiemenj.gofenen@ms.vu.lt

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Abstract. Controversies related to the concept and practice of responsible authorship have been among the most prominent issues discussed in the recent literature on research integrity. Therefore, this paper aims to address the factors that tend to two major types of unethical authorship, namely, honorary and ghost authorship. It also highlights negative consequences of authorship misuse and provides a critical analysis of different authorship guidelines, including a recent debate on the amendments of the International Committee of Medical Journal Editors (ICMJE) authorship definition. Empirical studies revealed that honorary authorship was the most prevalent deviation from the responsible authorship standards. Three different modalities of honorary authorship were distinguished: gift authorship, ghost authorship, and honorary authorship. Prevalence of authorship misuse worldwide and in Europe was alarmingly high, covering approximately one third of all scientific publications. No significant differences were found in authorship misuse between different health research disciplines. The studies conducted in North America highlighted the most effective means to cope with the phenomenon of authorship misuse. These were training in publishing ethics, clear authorship policies developed by medical schools, and explicit compliance with the authorship criteria required by the medical journals. In conclusion, more empirical research is needed to raise awareness of the high prevalence of authorship misuse among scientists. Research integrity training courses, including postgraduate and undergraduate, should be integrated into the curricula for students and young researchers in medical schools. Last but not least, further discussion on responsible authorship criteria and practice should be initiated.

Keywords: authorship; authorship misuse; honorary authorship; ghost authorship; publication ethics; research integrity

1. Introduction

Modern health care research must be conducted within the complex framework of normative guidelines. This framework covers two major fields of either different, however interconnected ethical issues. On the one hand, researchers must protect the rights and welfare of research participants. This is the core of what has been called research ethics since the emergence of the Nuremberg Code in 1947 and the adoption of the first version of the Declaration of Helsinki in 1964. On the other hand, another set of normative issues has become very prominent since the beginning of the 21st century. These are research integrity concerns focusing on research misconduct cases, such as fabrication or falsification of research data, and plagiarism as well as the so-called questionable research practices, such as data analysis, conflicts of interest and responsible authorship to mention but a few.

In this paper, we have concentrated on the controversies related to the concept and practice of responsible authorship and its misuse, which has recently been among the most prominent issues discussed in the literature on research integrity. Education rather than sanctions has been seen as a
Problems with authorship in scholarly publishing

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4. … and a trend to Team Science (in many disciplines).
5. Demand for information to support research assessment
6. … accompanied by a ‘publish or perish’ culture.
7. Space limitations have gone away!
8. And information about what ‘authors’ actually did is useful!
Credit where credit is due

Liz Allen, Amy Brand, Jo Scott, Micah Altman and Marjorie Hlava are trialling digital taxonomies to help researchers to identify their contributions to collaborative projects.

Research today is rarely a one-person job. Original research papers with a single author are — particularly in the life sciences — a vanishing breed. Partly, the inflation of author numbers on papers has led to research assessment through the endorsement of individuals’ contributions, researchers can start to move beyond ‘authorship’ as the dominant measure of esteem. For funding agencies, better information about the contributions of grant applicants would aid the decision-making process.

Journal articles could be classified using a 14-role taxonomy (see ‘Who did what?’). The survey was sent to 1,200 corresponding authors of work published in PLOS journals, Nature Publishing Group journals, Elsevier journals, Science and eLife. Corresponding authors were asked to indicate the contributions of individuals according
CRediT is a high-level taxonomy, including 14 roles, that can be used to represent the roles typically played by contributors to scientific scholarly output. The roles describe each contributor’s specific contribution to the scholarly output.

Background

CRediT grew from a practical realization that bibliographic conventions for describing and listing authors on scholarly outputs are increasingly outdated and fail to represent the range of contributions that researchers make to published output. Furthermore, there is growing interest among researchers, funding agencies, academic institutions, editors, and publishers in increasing both the transparency and accessibility of research contributions.

https://www.niso.org/standards-committees/credit
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Conceptualization</td>
<td>Ideas; formulation or evolution of overarching research goals and aims.</td>
</tr>
<tr>
<td>Methodology</td>
<td>Development or design of methodology; creation of models.</td>
</tr>
<tr>
<td>Software</td>
<td>Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.</td>
</tr>
<tr>
<td>Validation</td>
<td>Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.</td>
</tr>
<tr>
<td>Formal Analysis</td>
<td>Application of statistical, mathematical, computational, or other formal techniques to analyse or synthesize study data.</td>
</tr>
<tr>
<td>Investigation</td>
<td>Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.</td>
</tr>
<tr>
<td>Resources</td>
<td>Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.</td>
</tr>
<tr>
<td>Data Curation</td>
<td>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 re-use.</td>
</tr>
<tr>
<td>Writing – Original Draft</td>
<td>Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).</td>
</tr>
<tr>
<td>Writing – Review &amp; Editing</td>
<td>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 post-publication stages.</td>
</tr>
<tr>
<td>Visualization</td>
<td>Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.</td>
</tr>
<tr>
<td>Supervision</td>
<td>Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.</td>
</tr>
<tr>
<td>Project Administration</td>
<td>Management and coordination responsibility for the research activity planning and execution.</td>
</tr>
<tr>
<td>Funding Acquisition</td>
<td>Acquisition of the financial support for the project leading to this publication.</td>
</tr>
</tbody>
</table>
What I am going to cover

1. Origins of the Contributor Roles Taxonomy (CRediT)

2. Adoption and implementation
NISO has launched its work to formalize the Contributor Role Taxonomy (CRediT) as an ANSI/NISO standard. Initially, a small working group will focus on the 14 contributor roles in the existing CRediT taxonomy. Once the ANSI/NISO approval process has completed, a NISO CRediT Standing Committee will be set up to provide a forum for discussion and community feedback, support further implementations and use cases for CRediT, and to consider how CRediT can be further developed and expanded to support contributions in a wider range of subject areas.

This page will be updated with additional resources as the project progresses.
Implementation in the scholarly publishing workflow

Transparency in authors’ contributions and responsibilities to promote integrity in scientific publication

Marcia K. McNutt, Monica Bradford, Jeffrey M. Drazen, Brooks Hanson, Bob Howard, Kathleen Hall Jamieson, Véronique Kiernan, Emilie Marcus, Barbara Kline Pope, Randy Schekman, Sowmya Swaminathan, Peter J. Stang, and Inder M. Verma

Edited by Karen S. Cook, Stanford University, Stanford, CA, and approved January 18, 2018 (received for review August 30, 2017)

... and many more!
More than 75 percent decline over 27 years in total flying insect biomass in protected areas

Caspar A. Hallmann, Martin Sorg, Eelke Jongejans, Henk Stipel, Nick Hofland, Heinz Schwan, Werner Stennans, Andreas Maier, Robert Sumaer, Thomas Hören, Dave Goulson, Hans de Kroon

Published: October 18, 2017 • https://doi.org/10.1371/journal.pone.0185809

Abstract

Global declines in insects have sparked wide interest among scientists, politicians, and the general public. Loss of insect diversity and abundance is expected to provoke cascading effects on food webs and to jeopardize ecosystem services. Our understanding of the extent and underlying causes of this decline is based on the abundance of single species or taxonomic groups only, rather than changes in insect biomass which is more relevant for ecological functioning. Here, we used a standardized protocol to measure total insect biomass using Malaise traps, deployed over 27 years in 63 nature protection areas in Germany (96 unique...
More than 75 percent decline over 27 years in total flying insect biomass in protected areas

Caspar A. Hallmann

Martin Sorg, Eelko Jongejans, Henk Siepel, Nick Hofland, Heinz Schwan, Werner Stemmanns

Supporting information
Acknowledgments
References

PLOS ONE 10 Year Anniversary Collection: Editorial Board Favorites
More than 75 percent decline over 27 years in total flying insect biomass in protected areas

Casper A. Hellmann, Martin Sorg, Eveline Jongejans, Henk Siespel, Andreas Müller, Hubert Sumser, Thomas Hörren, Dave Goulson, Hans van der Werf
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Abstract

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The age of heterozygous telomerase mutant parents influences the adult phenotype of their offspring irrespective of genotype in zebrafish [version 2; referees: 2 approved]
How can we ensure visibility and diversity in research contributions? How the Contributor Role Taxonomy (CRediT) is helping the shift from authorship to contributorship

Liz Allen, Alison O’Connell, Veronique Kiermer

First published: 24 January 2019 | https://doi.org/10.1002/leap.1210 | Citations: 15
Implementation in the other parts of the research system ...

Tenzing Documenting contributorship with CRedit

1. Create your infosheet
   - Copy the infosheet template in your Google Drive File -> Make a copy
   - Fill out your copy of the infosheet
   - You can share it with your collaborators to make the process faster

2. Upload your infosheet
   - Download the filled out infosheet to your computer in a .txt, .txt or .xlsx format
   - If you use .xlsx format the contributorship information should be on the first sheet
   - Click the 'Browse' button and find your infosheet on your computer
   - If you want to take a look at the uploaded infosheet click 'Show infosheet'

3. Download the output
   - You can generate 3 types of outputs:
     - A human-readable report of the contributions with the "Author Contributions Text"
     - The contributors affiliation page information for the manuscript with the "Annotated author list with affiliations"
     - JATS XML containing the contributions with the "XML (for publishers only)"
     - [papaja] compatible YAML code of the contributor roles

Got a DOI? Claim and Give Some CRedit!
What I am going to cover

1. Origins of the Contributor Roles Taxonomy (CRediT)

2. Adoption and implementation

3. Putting a lens on authorship ('research on research')
Research on research: focus on contributions

Gender and diversity in research

Is Science Built on the Shoulders of Women? A Study of Gender Differences in Contributorship

Benoit Macaluso, Vincent Larivière, Thomas Sugimoto, Cassidy R Sugimoto

PMID: 27276004  DOI: 10.1097/ACM.0000000000001261

Division of labour and evolution of roles

The rise of the middle author: Investigating collaboration and division of labor in biomedical research using partial alphabetical authorship

Philippe Mongeau, Ehna Smith, Bruno Joyal, Vincent Larivière

Published: September 14, 2017  https://doi.org/10.1371/journal.pone.0184061

‘Politics’ of collaboration and ‘Team Science’!

Opinion: Authors overestimate their contribution to scientific work, demonstrating a strong bias

Nore Herz, Orrie Dan, Nitzan Censor, and Yair Bar-Haim

PMAS March 24, 2020 117(12):6282-6285; https://doi.org/10.1073/pnas.2003500117
Initiatives to encourage ‘Team Science’

Included recommendations for

Key Stakeholders

1. Open, transparent, standardized and structured **contribution** information.

2. Open and transparent research information infrastructure which links all **research inputs** and outputs to **individual contributors**

3. Minimise researchers’ **administrative burden** and should be interoperable.

https://acmedsci.ac.uk/policy/policy-projects/team-science
“Encourage responsible authorship practices and the provision of information about the specific contributions of each author.”
What I am going to cover

1. Origins of the Contributor Roles Taxonomy (CRediT)

2. Adoption, implementation & road map

3. Putting a lens on authorship (‘research on research’)

4. Debate & discussion
Intended and unintended consequences?

1. Intention vs implementation
   - a detail too far?
   - CRediT-based evaluation system?
   - Level of effort?
   - Fractionalisation??
   - Copyright?

2. Focus on ‘CRediT- seeking’

3. Keeping it simple vs value across fields

4. Need to keep any taxonomy up to date!
CRediT Community Interest Group coming soon!

Get involved!
What do you think?

Liz Allen
Director of Strategic Initiatives, F1000
@allen_liz
RIOT Science Club | July 2020