Case Study 14

Science, Technology, Engineering & Mathematics (STEM)

Assigning Authorships

For Trainees

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Introduction to good practice in authorship

Why does authorship matter?

> 'Correct authorship of research publications matters because authorship confers credit, carries responsibility, and readers should know who has done the research.'

UKRIO Good Practice in Research: Authorship

> 'Authorship conveys significant privileges, responsibilities, and legal rights; in the scholarly arena, it also forms the basis for rewards and career advancement.'

COPE Discussion Document: Authorship

Who qualifies to be an author?

There is no single, universal definition of authorship, and different academic disciplines have different practices and criteria that apply to authorship.

In **Science, Technology, Engineering and Mathematics** (**STEM**) disciplines, research publications are typically authored by several individuals. For some STEM disciplines, authorship lists routinely consist of numerous individuals.

Many STEM publishers provide criteria that specify the activities and contributions that qualify an individual to be named as an author. Some of these contributions do not involve actually writing (**authoring**) a publication and so some STEM publishers use the broader term **contributorship** when referring to authorship.

Criteria for authorship

The Vancouver recommendations for authorship, created by the International Committee of Medical Journal Editors (ICMJE), are commonly used by STEM publishers to devise and inform their own guidelines on who qualifies to be an author and who does not.

The ICMJE recommends that authorship should be based on the following four criteria. That a prospective author has:

- Made substantial contributions to the conception or design of the work; or to the acquisition, analysis, or interpretation of data for the work; **and**
- Drafted the work or revised it critically for important intellectual content; **and**
- Provided final approval of the version to be published; **and**
- Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of it are appropriately investigated and resolved.

Author responsibility

It is important to understand that while authorship brings credit, recognition and reward, it also comes with responsibility. As an author, you agree to be held accountable and responsible for the work reported in a publication that you are an author of. If you are an author of a single-author publication, you hold individual responsibility. If you are an author of a multi-author publication, you are jointly responsible together with your co-authors.

According to the Vancouver recommendations, this includes being accountable for the parts of a publication that you have produced as an author and being able to identify which of your co-authors are responsible for other parts. These recommendations also highlight that authors should '*have confidence in the integrity of the contributions of their co-authors.*'

Senior researchers, who are typically senior authors on publications, are also expected to ensure that good practice in authorship is adhered to by both their collaborators and team members, and to use fair and transparent processes when assigning authorship.

Authorship roles

Authors have different roles in scholarly publications that can involve different responsibilities. Authors can adopt more than one of these roles in a single publication.

- **Co-author**: this is typically someone (such as a research team member or a computational, statistical or technical collaborator) who has significantly contributed to conceiving ideas, and/or to devising and conducting experiments, collecting and analysing data, preparing and revising draft manuscripts, and finalising work for publication, together with others.
- **Lead author**: (also known as **first author**): this is typically the researcher who has contributed most of the work reported in a publication.
- **Corresponding author**: this is the author who takes primary responsibility for communicating with the journal following an article's submission, and will often be named as the author for readers to contact about a publication.
- **Senior author**: (also known as **last author**): this is often the person who leads the research team, and who oversees the manuscript's preparation and the work reported in it.

Ordering authorship lists

How authorship positions are assigned in scholarly publications varies among different academic disciplines. As such, you need to be aware of the accepted practice in your academic discipline, and to use fair and transparent practices to assign authors to a particular position in an authorship list.

Authors can be listed according to:

- their last name, in authorship lists that are arranged alphabetically;
- according to their relative contribution to the work reported in a publication, where those who have contributed the most appear first in the authorship list;
- in order of their respective seniority.

It is common practice in **scientific** disciplines to order authors in a manner that reflects their respective contributions to the work reported in a publication. When using this system, the authors listed in the first few positions should have contributed the most to an article, while those listed towards the end of an authorship list, should have contributed the least. The very last authorship positions are generally given to the most senior authors of the article, usually the principal investigators (PIs) and/or the research team leaders.

In **mathematical** disciplines, a mix of authorship practice is more common. Some fields and journals assign authorship positions alphabetically according to the authors' last name, while others use the above system in which authors are ordered according to their respective contributions. It is therefore important to check which system is considered to be appropriate in your field or target journal.

Under both systems, it is accepted practice to list two or more individuals as joint first co-authors if their contributions are equally significant, and as joint last authors if there is more than one senior investigator involved.

Author contribution statements

Many STEM publishers require authors to include an author contribution statement that lists what each author has contributed to the work reported in an article. Some journals often require these contributions to be described using a controlled taxonomy called the Contributor Roles Taxonomy (CRediT taxonomy).

Creating an authorship contribution statement is an important first step in setting out and describing each person's contribution to work that is being prepared for publication. They provide research teams with a useful tool to navigate discussions about authorship and research leaders with an accurate guide to make fair and transparent decisions about assigning authorship and ordering authorship lists.

Further information

Sources and where to go for more information on authorship:

- *COPE Discussion Document: Authorship*. (2019). https://publicationethics.org/files/COPE_DD_A4_Authorship_SEPT19_SCREEN_AW.pdf
- *COPE's How to handle authorship disputes: a guide for new researchers*. (2003). https://publicationethics.org/files/2003pdf12_0.pdf
- *ICMJE (Vancouver) recommendations: Defining the role of authors and contributors*. http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html
- *Montreal Statement on Research Integrity in Cross Boundary Research Collaborations*. (2013). https://www.singaporestatement.org/downloads/main-website/montreal-statement/123-montreal-statement-english/file
- *UKRIO Good practice in research: Authorship*. (2017). https://ukrio.org/wp-content/uploads/UKRIO-Guidance-Note-Authorship-v1.0.pdf
- *UKRIO Resources on Authorship*. https://ukrio.org/research-integrity-resources/authorship/
- *UKRIO webinar on Authorship and Publication Ethics by Dr Irene Hames*. (2020). https://ukrio.org/wp-content/uploads/Hames-Authorship-UKRIO-webinar-10June20-For-UKRIO-website.pdf
- *University of Edinburgh: Good conduct in authorship and publication practice*. http://www.docs.hss.ed.ac.uk/iad/Researchers/Research_staff/Good_conduct_in_authorship_and_publication_practice_an_introductory_guide.pdf

Assigning authorship case study

You are a part of a research team that has just concluded a four-year research study. At the next team meeting, you are to discuss authorship of the first journal article to be prepared for publication from this study. Work has yet to begin on this article, so the aim of this initial meeting is to decide what the scope of the research article will be and who qualifies to be an author.

Please take a look at the list of individuals below this box and decide:

1. Who meets the criteria for authorship and so should be included as an author of this article?
2. Where might those who qualify for authorship be placed in the authorship list?
3. Who should be mentioned in the article's acknowledgements section?
4. Who should not be included as an author of this article?

The criteria to use when resolving these questions is the system in which authors are ordered according to their *relative contributions*. Remember also the duties and responsibilities that come with authorship, which each author should be able to fulfil.

THE LIST OF INDIVIDUALS TO CONSIDER:

a. A *senior post-doctoral researcher*, who devised the technical protocol reported in this study and who obtained a significant amount of funding for this project. This post doc is no longer a member of the research team and has now set up their own lab at another research institute.

b. Three *post-doctoral researchers* (postdocs **A**, **B** and **C**), who conducted most of the experiments and collected most of the reported data. Two of these postdocs (**B** and **C**) also did most of the data analyses and generated the results that supported the study's main conclusions.

c. Two *graduate students*, who conducted experiments as part of this project but whose data are not included in this publication. One of the student's results helped to inform decisions taken during the research study and this student also provided helpful input to the research team's discussions.

d. A *post-doctoral researcher*, who joined the research team six months ago. This postdoc has contributed ideas and technical know-how to this project but has yet to get their own experiments up and running. This postdoc is

currently applying for additional funding for their project and is under a lot of pressure to publish something soon.

e. A *statistician*, who helped the research team to plan their study design and who advised on the appropriate statistical methodology to use.

f. A *bioinformatician*, who devised a computational model to analyse some of the project's data. This person trained two of the postdocs (**B** and **C**) on this model and so did not perform the computational modelling analyses themselves.

g. The *principal investigator* (**PI**), who conceived the idea for the project based on their previous work, and who obtained initial funding for it. This PI was very involved in collecting data during the early stages of the project but has become less hands on over time. They lead the project team's discussions and oversee the management and running of the research team.

h. The research group's *head of faculty*, who is very interested in the project and its progress and who occasionally joins the research team's meetings.