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Authorship in scientific publications: analysis and recommendations

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Foreword

In 2008, a Swiss Academies of Arts and Sciences working group chaired by Professor Emilio Bossi issued a “Memorandum on scientific integrity and the handling of misconduct in the scientific context”, together with a paper setting out principles and procedures concerning integrity in scientific research. In the Memorandum, unjustified claims of authorship in scientific publications are referred to as a form of scientific misconduct – a view widely shared in other countries. In the Principles and Procedures, the main criteria for legitimate authorship are specified, as well as the associated responsibilities.

It is in fact not uncommon for disputes about authorship to arise with regard to publications in fields where research is generally conducted by teams rather than individuals. Such disputes may concern not only the question who is or is not to be listed as an author but also, frequently, the precise sequence of names, if the list is to reflect the various authors’ roles and contributions. Subjective assessments of the contributions made by the individual members of a research group may differ substantially. As scientific collaboration – often across national boundaries – is now increasingly common, ensuring appropriate recognition of all parties is a complex matter and, where disagreements arise, it may not be easy to reach a consensus. In addition, customs have changed over the past few decades; for example, the practice of granting “honorary” authorship to an eminent researcher – formerly not unusual – is no longer considered acceptable. It should be borne in mind that the publications list has become by far the most important indicator of a researcher’s scientific performance; for this reason, appropriate authorship credit has become a decisive factor in the careers of young researchers, and it needs to be managed and protected accordingly. At the international and national level, certain practices have therefore developed concerning the listing of authors and the obligations of authorship.

The Scientific Integrity Committee of the Swiss Academies of Arts and Sciences has collated the relevant principles and regulations and formulated recommendations for authorship in scientific publications. These should help to prevent authorship disputes and offer guidance in the event of conflicts.

Professor Thierry Courvoisier, President of the Swiss Academies of Arts and Sciences

Professor Christian W. Hess, Chair of the Scientific Integrity Committee

1. Background

1.1. Introduction

Problems concerning authorship of scientific publications are the type of case most frequently referred to the Scientific Integrity Ombudsman of the Swiss Academies of Arts and Sciences.

Authorship disputes frequently arise as a result of false expectations, unclear arrangements and poor communication between those concerned. Even where guidelines accepted by all parties exist, there may be differences of opinion over whether someone should be listed as an author, or where an author’s name should appear in the list.¹ The problem has been exacerbated by the increasing number of publications with multiple authors. Enquiries received by the Swiss Academies Ombudsman indicate that the relevant guidelines often fail to address or provide sufficiently clear answers to important questions.

Disputes may also arise from genuine abuses, such as deliberate omission or inappropriate placement of co-authors, granting of undeserved authorship and academic ghostwriting.² “Publish-or-perish” pressures, power differentials and a (false) sense of loyalty may lead to violations of the rules of authorship.³ Recent decades have seen a cultural shift in the area of authorship. It is now increasingly considered unacceptable that junior scientists should not be credited with authorship for research and writing efforts undertaken on behalf of a superior. Today, many voices are calling for a rapid end to inappropriate authorship.⁴

The essential rules for the appropriate listing of authors were already specified – albeit in a very concise form – in the “Principles and procedures for integrity in scientific research” issued by the Swiss Academies of Arts and Sciences in 2008.⁵ The present document builds on these fundamental rules: it first analyses the guidelines on au-

thorship currently applicable in Switzerland and abroad and then formulates specific recommendations. The legitimization for the publication of these recommendations by the Swiss Academies does not derive from a statutory or explicit federal mandate. It is based on the recognition that guidelines on authorship which are clear and capable of commanding a consensus will support the fulfilment of one of the key tasks of the Swiss Academies – promoting the quality and effectiveness of scientific work.

1.2. Delimitation of the topic

This document is concerned with the authorship of articles published in scientific journals and of first editions of scientific publications (dissertations, monographs, etc.). It does not, however, deal either with publications issued as revised editions whose primary author(s) may long since have died, or with the question of whether and how the names of scientific editors and translators of texts by third parties are to be included. Nor does it cover the concept of the editor, or the relationship between a number of editors of a series of studies or a contributed volume and the authors of the individual parts/contributions.

The document does not discuss improper practices such as piecemeal publication of research designed to inflate the quantity of publications. Although such practices come under the heading of scientific misconduct, they are not directly related to the question of appropriate authorship.

1.3. Relationship between authorship guidelines and the principles of scientific integrity

The relevance of appropriate authorship to scientific integrity is sometimes questioned. It is argued that inappropriate listing of authors merely compromises the interests of individuals, and that science itself is only damaged by dishonest practices such as falsification or fabrication of data. The question of who precisely qualifies for authorship is thus claimed to be of secondary importance.⁶ However, anyone who considers values such as fairness, honesty and transparency to be of central importance for academic research will come to a different conclusion. While inappropriate authorship is not directly detrimental to the expansion of scientific knowledge, it has demotivating effects for some of the individuals concerned and it undermines the system of responsibility and public confidence in science.⁷

1.4. Relationship between authorship guidelines and national legislation

To date, legislative authorities in Switzerland and abroad have paid little attention to matters of scientific integrity, leaving such questions to be addressed by the self-regulatory powers of interested parties.

While copyright law⁸ regulates the rights of authors over their work, the present recommendations are concerned with the obligations of authors of scientific publications. In scientific publishing, complete and correct listing of authors is not primarily designed to satisfy the claims of individuals, but to provide information for the public. While anonymous works and the use of pseudonyms are permissible under copyright law, such practices in the case of scientific publications are not compatible with scientific integrity.

2. Analysis of existing authorship guidelines

Although authorship is of crucial importance in the academic sphere and certain rules do exist, it is still largely governed by established customs.⁹ Conventions vary considerably not only between but also within disciplines. Over the past 20 years – first in the US, then increasingly also in other countries – appropriate authorship assignment has been the subject of a growing number of essays, directives and recommendations.

Particular weight attaches to requirements specified by the editors and publishers of scientific journals, as compliance is made a condition for publication of scientific studies. Special mention should be made of the guidelines of the so-called Vancouver Group (International Committee of Medical Journal Editors)¹⁰, which have so far been adopted by more than 600 biomedical journals, and of the Committee on Publication Ethics¹¹. These guidelines include criteria for appropriate assignment of authorship.

In Switzerland, almost all universities and some universities of applied sciences have – within the scope of their powers – issued regulations on scientific integrity, generally also covering the question of authorship.¹² As shown by the following analysis, the provisions concerning authorship are frequently extremely brief, or even deficient; however, a large measure of consensus is apparent in the treatment of the key questions.

2.1. Obligation to list authors

In all the existing guidelines and directives, the obligation to list authors is either mentioned as something to be taken for granted or tacitly assumed.

In some cases, the requirement that authors be appropriately listed is expressed in provisions stating that all authors are to be listed and that only individuals fulfilling the relevant requirements are to be listed as authors.¹³

2.2. Requirements for authorship

In most of the guidelines/regulations, it is assumed that the description of authorship does not amount to a legal definition. In addition, there is a consensus that to qualify for authorship one must make a substantial contribution to a publication.¹⁴ For example, the University of Bern regulations specify that: “A person is listed as an author if he or she has personally made an important scientific contribution to the planning, conduct, evaluation or control of the research work.”¹⁵

However, the problem lies in defining what is to count as a substantial contribution. Here, regulations vary widely: in some cases, the question is not addressed at all, or it is only dealt with in a rudimentary manner by the enumeration of activities qualifying individuals for authorship (lists).¹⁶ At the other end of the spectrum are regulations proposing an elaborate scoring system. These two approaches are briefly presented below.

2.2.1. Lists for determining entitlement to authorship

In regulations of this kind, activities qualifying individuals for authorship (or not justifying authorship) are enumerated in a list:

- making a substantial contribution to the planning, execution, evaluation and supervision of research;
- involvement in writing the manuscript; and
- approving the final version of the manuscript.¹⁷

There is a general consensus that a managerial position within a research institution is not sufficient to justify authorship. The listing of authors on the basis of seniority within the hierarchy was rejected in the guidelines on scientific integrity issued by the Swiss Academy of Medical Sciences in 2002: “A managerial position within the research institution does not in itself entitle anyone to appear as an author, any more than the provision of financial and organizational support for a project.”¹⁸ However, it remains unclear in many regulations what weight is to be attached to a managerial position if it is associated with substantial contributions to a publication.

2.2.2. Scoring system for determining entitlement to authorship

Under this system, the quality and quantity of contributions to a scientific publication are rated, and points are awarded accordingly. With a maximum possible score of, for example, 300 points for a publication, all those individuals achieving more than 50 points are to be listed as authors. A scoring system of this kind allows the sequence of authors to be determined in accordance with their respective contributions – i. e. they are listed in descending order of total score. Scoring-based approaches have been discussed for over 30 years,¹⁹ but in Switzerland scoring systems are not widely used to determine who qualifies for authorship or the order of listing.²⁰ In addition, such systems may involve pseudo-precision, as the awarding of points may be just as arbitrary as the recognition of substantial contributions in less systematized methods.

2.3. Procedure for determining authorship and order of listing

In certain guidelines, it is suggested that the agreement of all parties is to be sought, and that the questions of authorship and order of listing should be discussed at an early stage of the project.²¹

2.4. Order of listing

As the length of bylines has increased, the question of where individual authors appear in the list has become more important.²² Various models exist for determining the sequence in publications with multiple authors. In an overview published in 2007²³, four basic approaches are presented which can help to avoid arbitrary or inappropriate determination and interpretation of author sequence. However, as demonstrated by this article, the order may be determined in different ways, and it is not possible to identify a single “correct” approach.

In the first approach, known as “sequence determines credit” (SDC), the sequence of authors reflects the importance of their contributions in descending order. The first author is thus accorded the greatest weight and the last author the least. It is essential that this should be clearly indicated since otherwise, in the light of different customs, the last author could be mistakenly credited with an important role,

such as generating the idea and initiating the research project.

The second approach involves listing all authors in alphabetical order. This is particularly appropriate in cases where all authors have made similar contributions to the publication. It is therefore known as the “equal contribution” (EC) approach.

The third approach highlights the importance of the first and the last author; it is known as the “first-last-author-emphasis” (FLAE) norm.

Finally, the “percent-contribution-indicated” (PCI) approach allows each author’s contribution to be expressed in percentage terms, using various scoring systems.

Among Swiss authorities, there is a broad consensus that authors are to be listed in order of the importance of their contributions, subject to special provisions concerning the role of the first and the last author.

Because of the variety of approaches and conventions employed, it is frequently difficult for the reader of a publication to identify the contributions made by individual authors on the basis of the order in which they are listed. A number of authorities²⁴ in the US have therefore proposed that the concept of authorship should be replaced by detailed descriptions of individual contributions (contributorship)²⁵.

2.5. Responsibilities of authors

2.5.1. First author

Special status is sometimes accorded to the first author: this position in the list is then associated with a project leadership role and with primary responsibility for the publication.²⁶ With this approach, it is immaterial whether the project leader actually made the most substantial scientific contribution. By contrast, in a number of disciplines (e.g. medicine), the author listed first is frequently the person who has invested the most time in the project. Often, this will be a doctoral or postdoctoral researcher. The (senior) project leader then appears as the last author.

In recent years, the practice of listing two people as joint first authors has become established; the fact that both authors equally contributed to the publication is indicated in a note.

2.5.2. Last author

Special significance attaches to the final position in the list of authors in the case of publications produced within hierarchically structured research teams at a research institution. If the author listed last is someone whose scientific seniority surpasses that of the other authors, this person will often be perceived as bearing primary responsibility for the publication.

2.5.3. Corresponding author

The corresponding author (whose contact address is printed in the publication) often appears as the first or last author. This function may be of purely administrative significance. Sometimes, however, it is also associated with seniority, or the corresponding author bears overall responsibility and represents the team of authors vis à-vis third parties.²⁷ If – for example when two laboratories collaborate – two senior

figures are involved, one of them will often appear as the last author and the other as the corresponding author.

2.5.4. Other authors

Listing of the other authors in the order of importance of their contributions is a widely recognized practice.

2.6. Acknowledgements

The option – or an obligation – to recognize under the heading of Acknowledgements certain contributions which do not merit authorship but which still deserve to be mentioned is included in some, but not all, existing guidelines.²⁸

3. Recommendations on authorship

3.1. Scope of recommendations

The following recommendations cover the question of who is to be designated as an author of a scientific publication, the order in which multiple authors are to be listed and which authors are responsible for the content of a publication. Also discussed is the question of who may or must be mentioned in an Acknowledgements section.

The recommendations are not concerned with other aspects of scientific publishing, such as the avoidance or disclosure of any ties that could compromise independence and procedures for resolving disputes.

Scientific publications outside the sphere of responsibility of the Swiss Academies are primarily subject to the regulations of the institution publishing, financing or otherwise supporting the publication. In cases where no authorship guidelines have been issued by an institution, or where such guidelines do not cover a specific point, the present recommendations should provide guidance.

3.2. Obligation to list authors

All persons fulfilling the criteria for authorship must be listed as authors of a scientific publication.

3.2.1. Basic principles

If a publication is based on the contributions of a large number of people – as is the case in large-scale physics projects, for example – it may be appropriate to list all the scientific collaborators, indicating the procedure adopted and the principle underlying the sequence of names (e.g. alphabetical order). Conversely, it is not acceptable to list persons who do not qualify for authorship in accordance with Section 3.3. Failure to give due credit in the byline to junior scientists for their research or writing efforts²⁹ contravenes the rules of scientific integrity. Anyone who fulfils the criteria for authorship must be listed. Anonymous publishing and the use of pseudonyms are not compatible with scientific authorship.³⁰

3.2.2. Professional editors / medical writers

Professional editors (e.g. medical writers) engaged to prepare scientific texts and graphics, or to put research findings into a form suitable for publication, are to be listed as authors if, by virtue of these activities, they influence the weight attached to the findings and the impact of the publication. If they are only responsible for purely linguistic

and editorial improvements, they are not to be listed in the byline; it is appropriate to mention them in the Acknowledgements. Any ties existing between industry and academic research must be disclosed.

3.2.3. Ghostwriting

A ghostwriter, commissioned to write on another person's behalf, generally works for a fee and agrees that the text will not be published under his own name. Ghostwriting is not compatible with the principles of scientific integrity.

3.2.4. Honorary authorship (gift authorship / guest authorship)

It is a violation of scientific integrity to grant authorship to a person who has not made a sufficiently substantial scientific contribution to a publication. This would include, for example, colleagues with only marginal involvement listing each other as authors in their publications, or a senior academic not involved in the research being added to the byline. The latter practice could be attractive both for a senior academic interested in receiving an additional authorship credit without making a personal contribution, and also for an author (or a company) wishing to benefit from the senior academic's reputation.

3.3. Requirements for authorship

An author is someone who, through his / her own scientific work, has made a substantial contribution to a publication. Authorship is justified by work, not position.

Anyone who, through his / her own scientific work, has made a substantial contribution to the planning, execution, evaluation or supervision of research, and to writing the manuscript, qualifies for authorship.

The characteristic aim of scientific activities is to gain and to document knowledge. Activities such as measuring objects or collecting literature are not deemed to be scientific if they are performed on the instructions of a third party without an appreciation of the underlying scientific question or the need to exercise personal judgement. However, if these activities involve analysis, evaluation, interpretation or a similar intellectual effort, or if they require special skills, they constitute scientific work and may justify authorship. Such activities include, for example, summarizing court rulings from a particular perspective, carrying out archive research (applying interpretative skills) in a historical project, or the full range of services provided by a laboratory technician with advanced methodological expertise.

Laborious efforts directed towards a specific goal are rightly regarded as a contribution to a publication but accorded less weight than scientific insight, even if this comes from participants who have invested less time in a project. Substantial contributions can thus be made by people who contribute little work, but whose experience, knowledge, originality or creativity promotes scientific discovery. It is not possible to define a threshold, in percentage terms, below which a contribution would not generally count as substantial. Determining the threshold in particular cases is a matter of judgement.

In the case of publications where findings are presented primarily in the form of formulae, tables and diagrams,

writing the text may be an activity of secondary importance.

Activities which are not of a scientific character include providing financial and organizational support for a project or simply supplying materials (e.g. biological materials) or equipment.³¹ The mere formulation of questions and commissioning of research do not constitute scientific activities justifying authorship. Contributions of this kind can be mentioned in the Acknowledgements.

A managerial position does not in itself justify authorship. However, if a manager consistently contributes to a research project and publication by providing support, advice and supervision, this contribution – partly on account of the experience associated with the managerial position – may be sufficiently substantial to warrant authorship.

3.4. Procedure for determining authorship

The question of who is to be designated as an author, and the order of listing, should be discussed – with all parties being consulted – as early as possible, but at the latest when the group of collaborators making substantial contributions is foreseeable. The scientific project leader – or, if no leader is appointed, the author with overall responsibility (as defined in Section 3.6.) – has the task of determining and if necessary revising the list of authors and bears the primary responsibility for authorship decisions.

To avoid disappointments and disputes, the listing of authors should be discussed by all concerned as early as possible and decisions should be recorded in writing³². This will allow individuals who can expect not to qualify for authorship to reconsider their participation at an early stage. Everyone involved in a project who is a candidate for authorship or who wishes to be listed as an author should be consulted. No influence is to be exerted by external parties who are not involved as authors by virtue of their scientific collaboration. Decisions which do not meet with the agreement of all concerned are to be justified in writing. This should help to promote an objective approach, improve acceptance on the part of individuals whose wishes are not fulfilled, and provide a basis for review should an ombuds office subsequently be involved.

The person who determines the list of authors bears responsibility for ensuring a transparent procedure, consulting all parties, justifying contested decisions in writing, and recording and communicating any amendments which may become necessary as the research project evolves.

3.5. Order of listing

Subject to the rules of first and last authorship, two or more authors are to be listed in the order of importance of their contributions.

3.5.1. Sequence based on importance

From the order in which authors' names are listed, readers of scientific publications tend to draw conclusions about the importance of the authors' contributions, and – in the absence of any indication to the contrary contained in regulations or a special note – the first author will be taken to be the main author. Accordingly, listing multiple authors in the order of importance of their contributions helps to avoid false impressions. If a different criterion is applied,

this should be disclosed (e.g. by a note such as “authors' names listed in alphabetical order”).

To indicate that the contributions of different authors are of equal importance, the term “co-authors” can be used. The practice of indicating seniority by designating the person concerned as the corresponding author is less clear and is therefore not recommended.

To avoid misunderstandings, the contributions of all the authors involved can be specified or described. This concept of “contributorship” promotes greater transparency. It thus meets the requirement of scientific integrity that authorship information should be provided in such a way as to ensure accountability and fairness. The concept of contributorship is explicitly recommended.

3.5.2. Project leadership and first authorship

If a publication reports the results of a research project which was led – in scientific respects – by a single person responsible for contributions of substantial importance, this project leader is to be designated as the first author. The justification for this is that the author sequence should provide information primarily on overall responsibility for the published content and only secondarily on individual contributions. However, the person doing the most work may also be listed as the first author where this is required by applicable regulations.³³ Publications associated with doctoral research – e.g. individual chapters of a thesis published in a journal – are always to appear with the name of the doctoral researcher in first-author position, with the programme leader possibly being added as second author.

For projects forming part of longer-term research programmes, the results of which are published serially over a period of time, first and last authorship of the individual parts are to be assigned respectively to the contributor doing the most work and to the project leader. Overall responsibility for the series rests with one person – e.g. the head of the institution. A note is to be included indicating that the project is part of a longer-term programme and giving the name of the programme leader.

If the most substantial contribution (e.g. an important discovery) is made by an author other than the project leader, this person is to be listed in second place, and the particular importance of the contribution can be indicated in a note. Outstanding individual contributions cannot be revealed by the author sequence, but only by the addition of specific information.

3.6. Authors' responsibility

Responsibility does not mean liability in the legal sense, but scientific responsibility. Academic authorship is not only a matter of providing evidence of achievements and priority, but also of accountability and fairness. Appropriate authorship information ensures that the right people receive credit for the work done and assume responsibility for the content of published research.

In the Swiss Academies' guidelines on scientific integrity published in 2008, overall responsibility was only considered in relation to the correctness of the content; in the context of the present recommendations, the scope can be broadened to cover content as such. Some scholarly claims – e.g. in the fields of theology, philosophy and jurispru-

dence – are to be assessed by the yardsticks of cogency or ability to command consensus rather than by that of correctness, or – on account of their axiomatic character – they are not amenable to verification. Lastly, responsibility also needs to be assumed for matters of decency and political correctness which have nothing to do with correctness of content.

3.6.1. Joint responsibility of all authors

Subject to the provisions in the next section concerning authors with overall responsibility, all authors are considered to be jointly responsible for the publication as a whole. In cases of misconduct, responsibility is not to be borne by those authors who, given the specific circumstances, had no opportunity, or obligation, to prevent the error.

Clearly defined responsibilities should lead authors to publish only content which they can endorse in good faith. The indissoluble link between authorship and responsibility must always be borne in mind and provides the justification for sanctions in the event of misconduct. Responsibility for serious and evident violations lies not only with those who have perpetrated them or benefit from them but also with others who could have prevented them without any risk of adverse personal consequences.

If an author withdraws because he/she refuses to share responsibility for the content or for the time or place of publication, the work can only be published if the remaining authors are prepared to assume responsibility for the departing author's contribution.

3.6.2. Author with overall responsibility

If an author is designated as having overall responsibility (be it the first, last or corresponding author), this author serves as the guarantor for the content of the entire publication.

This approach is appropriate for all publications which report the results of projects carried out according to a pre-defined research plan and involving a number of individuals who make contributions of different kinds to the project (e.g. in laboratory-based scientific projects).

Special, project-related status for the first author is not, however, appropriate or even possible in the case of research which is not organized in this way. In such cases, first-author position indicates that this person has made the most substantial contribution. In many humanities and social science disciplines, no special role is attributed to the last author. Unless otherwise indicated, the person listed last has made the least (sufficiently substantial) contribution.

3.7. Acknowledgements

Anyone who – without qualifying for authorship – has made a notable personal contribution to a publication can be mentioned in the Acknowledgements; the same applies to anyone who has made a publication possible through other significant contributions. A medical writer not listed as an author must always be mentioned in the Acknowledgements.

Acknowledgements should specify the type of contribution made. If acknowledgements are recorded – which is not generally obligatory – then mention should be made of all

those who have made notable contributions. Acknowledgements can be addressed to natural persons and to other entities. Acknowledgements should only be made for contributions of material relevance to the publication, such as research and editorial assistance, translation work, funding for project and printing costs, and organizational support.

Appendix

Glossary

Author with overall responsibility	The author with overall responsibility may be the first, the last or the corresponding author, serving as the guarantor for the content of the publication as a whole.
Corresponding author	The person whose contact address appears in the publication. This function may be of purely administrative significance and may be fulfilled by any of the co-authors; sometimes, however, a senior academic will serve as the corresponding author.
Ghostwriter	A person commissioned to write on another person's behalf. The writer, who generally works for a fee, agrees that the text will not be published under his own name.
Honorary authorship (gift authorship / guest authorship)	Authorship granted to a person who has not made a substantial scientific contribution, e.g. when colleagues list each other as authors in their publications, or a senior academic is included in the list of authors.
Medical writer	Professional editor engaged to prepare scientific texts and graphics, or to put research findings into a form suitable for publication.
Scientific activities / scientific work	Activities whose aim is to gain and to document knowledge. Activities are not deemed to be scientific if they are performed on the instructions of a third party without an appreciation of the underlying scientific question or the need to exercise personal judgement.
Scientific seniority	Recognized authority of a person within the academic sphere. Length of academic service is not decisive. Seniority is attained in particular through sole or first authorship of important publications and frequently confirmed by academic appointments and awards.

Regulations / guidelines issued by Swiss higher education institutions

A regularly updated list is available online at: www.akademien-schweiz.ch > Main topics > Scientific integrity.

Selected international recommendations

- Committee on Freedom and Responsibility in the conduct of Science (CFRS), International Council for Science (ICSU). Advisory Note "Bias in science publishing", 2011. www.icsu.org/publications/cfrs-statements/bias-in-science-publishing
- Committee on Publication Ethics (COPE). Code of conduct and best practice guidelines for journal editors, 2011. <http://publicationethics.org/resources/code-conduct>
- Committee on Science, Engineering, and Public Policy, National Academy of Sciences. On Being a Scientist.

- Responsible Conduct in Research, National Academy Press, 2005. www.nap.edu/readingroom/books/obas
- International Committee of Medical Journal Editors (ICMJE). Uniform Requirements for Manuscripts Submitted to Biomedical Journals. Version 2008. http://www.icmje.org/recommendations/archives/2008_urm.pdf
 - Office of Research Integrity. Authorship Guidelines, 2010. www.uaf.edu/ori/responsible-conduct/author-ship/

In addition, various national scientific academies and numerous (US) professional societies have issued recommendations concerning authorship.

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Footnotes

- 1 For an overview of research in this area see Maruši et al. 2011.
- 2 Both undeserved authorship and ghostwriting are widespread. Depending on the discipline and type of publication, studies have revealed inappropriate authorship in “only” 20% of articles (cf. Wislar et al. 2011), evidence of honorary authorship in 40% (cf. Mowatt et al. 2002) and evidence of ghost authorship in 75% (cf. Götzsche et al. 2007).
- 3 Cf. Geelhoed et al. 2007; Street et al. 2010.
- 4 Cf., for example, Council of Science Editors 2000, Greenland/Fontanarosa 2012.
- 5 Cf. Swiss Academies 2008, p. 18.
- 6 It should be noted that the conception of scientific misconduct in the US is based on a narrower definition (fabrication, falsification and plagiarism) than in Europe.
- 7 According to Wager et al. 2009, authorship problems were among the top three issues of concern for science journal editors (coming after redundant publication and plagiarism).
- 8 Cf. Federal Act on Copyright and Related Rights of 9 October 1992, SR 231.1.
- 9 Cf., for example, Pignatelli et al. 2005; Seashore Louis et al. 2008.
- 10 ICMJE 2010.
- 11 COPE 2011.
- 12 See the list of regulations /guidelines in the Appendix.
- 13 This is explicitly specified in the guidelines of the University of Basel (Art. 1.4 and 3.1) and of the ETHZ (Art. 14.1). In the guidelines of the Universities of Bern (Art. 5.2.d), Freiburg / Fribourg (Art. 2.3), St. Gallen (Annex, letter b) and Zurich (Annex 1. b.), it is implicit in the designation of practices deviating from this rule as misconduct.
- 14 References to a “substantial contribution” (or similar wordings) are to be found in the guidelines of the Universities of Basel (Art. 3.1), Bern (Art. 2.2.f), Freiburg / Fribourg (Art. 2.3.a + b), Geneva (Art. 2.11) and Lausanne (Art. 2.10), and of the EPFL (Art. 11.1) and the ETHZ (14.2.a). In the guidelines of the Universities of St. Gallen and Zurich, the “substantial contribution” requirement is implicit in provisions given in the Annex.
- 15 University of Bern, 2007, Art. 2.2.f.
- 16 This approach is adopted in the Vancouver Group guidelines: “Authorship credit should be based on: 1. substantial contributions to conception and design, acquisition of data or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content; and final approval of the version to be published. Authors should meet conditions 1, 2 and 3 [...] and all those who qualify should be listed.” ICMJE 2010.

- 17 The “approval of the final version” criterion is to be found in the guidelines of the EPFL, the ETHZ and the Universities of Geneva und Lausanne
- 18 SAMS 2002, p. 2281.
- 19 Cf. Hunt 1991.
- 20 An exception to this rule are the guidelines drafted by the body representing research associates and assistants (Mittelbaukommission) at Zurich University of Applied Sciences (ZHAW) in 2008. However, these have since been revised and withdrawn.
- 21 Cf. the guidelines of the ETHZ (Art. 14.5) and the EPFL (Art. 11.4).
- 22 Cf. Riesenberger / Lundberg 1990; Wren et al. 2007; Gawrylewski 2007.
- 23 Tschardt et al. 2007.
- 24 Cf., for example, Harvard Medical School 1999; the ICMJE (2010) recommends that editors “develop and implement a contributorship policy”.
- 25 Cf. Rennie et al. 1997; Bates et al. 2004.
- 26 Cf. the guidelines of the EPFL (Annex II): “The primary author (that is, the author listed first in the article’s byline) must have demonstrated the ability and willingness to exert scientific leadership of the project so as to (a) assume responsibility for a major professional aspect of the work, and (b) ensure that all the project objectives are met.”
- 27 Cf. the guidelines of Eawag, PSI, EMPA and WSL (otherwise similar to the wording of the ETHZ Guidelines).
- 28 This is included as an obligation in the EPFL Directive (Art. 11.2) and as a recommendation in the ETHZ Guidelines (Art. 14.3).
- 29 Cf. Kwok 2005; Bhopal et al. 1997.
- 30 It is, however, acceptable for persons whose marital status has changed to publish under their new name or to continue publishing under their original name.
- 31 If what is supplied has been processed (e.g. materials which have undergone fixation or extraction, transgenic animals generated by the supplier, or patient data processed or documented to meet specific research requirements), or if equipment has been specially developed or adapted, the provision of such resources may merit authorship
- 32 Cf. Albert / Wager 2003.
- 33 The person doing the most work and the person making the most substantial contribution are not necessarily identical.

References

- Albert T, Wager E. How to handle authorship disputes: a guide for new researchers. COPE Report. 2003;32–4.
- Bates T, Anić A, Marušić M, Marušić A. Authorship criteria and disclosure of contributions: comparison of 3 general medical journals with different author contribution forms. JAMA. 2004;292:86–8.
- Bhopal R, Rankin J, McColl E, Thomas L, Kaner E, Stacy R, et al. The vexed question of authorship: views of researchers in a British medical faculty. BMJ. 1997;314:1009–12.
- COPE: Committee on Publication Ethics. Code of conduct and best practice guidelines for journal editors, 2011. <http://publicationethics.org/resources/code-conduct>
- Council of Science Editors. Authorship Task Force. Is it time to update the tradition of authorship in scientific publications? 2000. www.councilscienceeditors.org/i4a/pages/index.cfm?pageid=3376
- Federal Act on Copyright and Related Rights of 9 October 1992, SR 231.1.
- Gawrylewski A. Bringing order to authorship. Scientist. 2007;21:91.
- Geelhoed RJ, Phillips JC, Fischer AR, Shpungin E, Gong Y. Authorship decision making: an empirical investigation. Ethics Behav. 2007;17:95–115.
- Götzsche PC, Hröbjartsson A, Krogh Johansen H, Haahr MT, Altman DG, Chan A-W. Ghost authorship in industry-initiated randomised trials. PLOS Medicine. 2007;4:e19:47–52.
- Greenland P, Fontanarosa P. Ending honorary authorship. Science. 2012;337:1019.

- Harvard Medical School. Authorship guidelines, 1999. <http://hms.harvard.edu/content/authorship-guidelines>
- Hunt R. Trying an authorship index. *Nature*. 1991;352:187.
- ICMJE: International Committee of Medical Journal Editors. Uniform Requirements for Manuscripts Submitted to Biomedical Journals. Version 2008. http://www.icmje.org/recommendations/archives/2008_urm.pdf
- Kwok LS. The white bull effect: abusive coauthorship and publication parasitism. *J Med Ethics*. 2005;31:554–6.
- Marušić A, Bošnjak L, Jerončić A. A systematic review of research on the meaning, ethics and practices of authorship across scholarly disciplines. *PLOS One*. 2011;9: e23477:1–17.
- Mittelbaukommission der Zürcher Hochschule für angewandte Wissenschaften (ZHAW). Richtlinien für die Bestimmung der Autorenschaft bei wissenschaftlichen Publikationen, 2008.
- Mowatt G, Shirran L, Grimshaw JM, Rennie D, Flanagan A, Yank V, et al. Prevalence of honorary and ghost authorship in Cochrane reviews. *JAMA*. 2002;287:2769–71.
- Pignatelli B, Maisonneuve H, Chapuis F. Authorship ignorance: views of researchers in French clinical settings. *J Med Ethics*. 2005;31:578–81.
- Rennie D, Yank V, Emanuel L. When authorship fails: a proposal to make contributors accountable. *JAMA*. 1997;278:579–85.
- Riesenbergs D, Lundberg GD. The order of authorship: who's on first? *JAMA*. 1990;264:1857.
- Seashore Louis K, Holdsworth JM, Anderson MS, Campbell EG. Everyday ethics in research: translating authorship guidelines into practice in bench sciences. *High Educ*. 2008;79:88–112.
- Street JM, Rogers WA, Israel M, Braunack-Mayer AJ. Credit where credit is due? Regulation, research integrity and the attribution of authorship in the health sciences. *Soc Sci Med*. 2010;70(9):1458–65.
- Swiss Academies of Arts and Sciences. Integrity in scientific research: Principles and procedures. Bern 2008.
- Swiss Academy of Medical Sciences (SAMS). Integrität in der Wissenschaft/Intégrité dans la science. *Schweizerische Ärztezeitung/Bulletin des médecins suisses*. 2002;83:2280–2287;2288–2295.
- Tschamtko T, Hochberg ME, Rand TA, Resh VH, Krauss J. Author sequence and credit for contributions in multiauthored publications. *PLOS Biology*. 2007;5:e18:13–4.
- Wager E, Fiack S, Graf C, Robinson A, Rowlands I. Science journal editors' views on publication ethics: results of an international survey. *J Med Ethics*. 2009;35:348–53.
- Wislar JS, Flanagan A, Fontanarosa PB, DeAngelis CD. Honorary and ghost authorship in high impact biomedical journals: a cross sectional survey. *BMJ*. 2011;343:d6128:1–7.
- Wren JD, Kozak KZ, Johnson KR, Deakyne SJ, Schilling LM, Delavalle RP. The write position: A survey of perceived contributions to papers based on byline position and number of authors. *EMBO Rep*. 2007;8:988–91.

Information on the preparation of these recommendations

In 2012, the General Secretariat of the Swiss Academy of Medical Sciences (SAMS) carried out a literature search on authorship and surveyed the Swiss Federal Institutes of Technology, Universities and Universities of Applied Sciences on the subject of authorship guidelines. The results provided a basis for the preparation of a draft version of the recommendations by Professor Christian Brückner, the Integrity Officer of the Swiss Academies of Arts and Sciences.

This draft was discussed and adapted by the Scientific Integrity Committee of the Swiss Academies of Arts and Sciences and submitted for consultation at the end of 2012 to the Universities, the Federal Institutes of Technology, the Rectors' Conference of the Swiss Universities of Applied Sciences and the Swiss National Science Foundation. In February 2013, the suggestions received were discussed and, where appropriate, incorporated by a sub-committee of the Scientific Integrity Committee.

In March 2013, the final version was discussed and adopted by the Executive Board of the SAMS and the Board of Directors of the Swiss Academies of Arts and Sciences.