Educational Research (ISSN: 2141-5161) Vol. 3(3) pp. 202-211 March 2012
Available online@ http://www.interesjournals.org/ER

Review

The pinnacle of science education and ethical collaboration: Successful publishing

Jaime A. Teixeira da Silva

Faculty of Agriculture and Graduate School of Agriculture, Kagawa University, Miki-Cho, Ikenobe, 2393, Kagawa-Ken, 761-0795, Japan. E-mail: jaimetex@yahoo.com

Abstract

Education in the world of science has one purpose: to bring scientists to the level of understanding in their field of specialization that would allow for the successful dissemination of research in an internationally reputable journal. However, success does not depend exclusively on the volumes of literature that are studied, but most importantly, on the collaborative relationships that are established and on the concerted efforts made, within an ethical framework, that would be able to lead to the successful publication of those results in a peer-reviewed journal. International writing collaboration – the focus of this short discussion – is one solution to success in scientific publishing by introducing new measures of overcoming ethical hurdles, and with constant re-evaluation and re-adjustment of that collaboration, global competitiveness is possible, thus advancing science.

Keywords: Collaboration, education, partnerships in science writing, publishing ethics.

BACKGROUND

COLLABORATION AND ITS APPLICATION TO SCIENCE RESEARCH AND PUBLISHING

Collaboration is broadly the process in which two or more parties (individuals or institutions) work together towards a common goal. In science, collaboration (a recursive process where two or more researchers or scientific organizations work together to realize a common purpose or goal(s) by coming together and fundamentally changing their individual approaches to achieve a common goal), a partnership (arrangement where entities and/or individuals agree to cooperate to advance their scientific interests) or co-operation (the process of working or acting together in which the individual researchers maintain their separate activities, but do some work together to meet a common goal), or CPC, are meant to move a proposal forward and to reach a common goal, which could take the form of a research

project or, ultimately, a scientific publication. CPC can ensure a balance of power in science in an ever-competitive world (Teixeira da Silva, 2011a).

The most common form of scientific CPC is research CPC, often in a laboratory research team in which students or researchers assume several separate or overlapping tasks associated with different aspects with a supervisor that leads the group forward in attaining the desired outcome, namely obtaining data that would be worthy of a scientific publication in a reputed journal. The entire process of research project development, hypothesis testing and final manuscript preparation and publication are the culmination of years of investment in science education. A well invested education with a poorly rounded application is a wasted investment. CPC in research often reaches out to national and international partners to fulfill gaps in their research methodology resulting from a lack of suitable equipment, technical know-how or time. Increasingly, economically developed countries are stimulating CPC with developing countries (The Royal Society, 2011). In all CPCs the ultimate goal is to publish the data set in an internationally reputable journal. More often than not, authorship status is regulated *a priori* by the laboratory and by the collaboration partners and not by journals or publishers. One of the purposes of this mini-review is to provide a basic ABC on how to optimize the science education fundamentals so that the investment might be well applied.

A less common level of CPC is writing or publication CPC, but one which is, at least among plant scientists, an essential one, although not without its fair level of debate on the ethical aspects (Teixeira da Silva and Van, 2011). Scientists, their opportunities, conditions or skills are not equal, particularly in terms of experimental execution, data analysis or manuscript writing. Often the skills required to structure a manuscript suitable for publication in a high-level peer-reviewed journal, which are usually developed over years of writing and research experience, are lacking. In most cases, an individual scientist peaks towards the end of their academic career, and in many cases, even for native English speakers, an extremely high level of linguistic and stylistic perfection is rarely reached. Thus, at the level of writing CPC, a partnership with one or more scientists who would provide a strong form of support at the level of linguistics and scientific rigor (editing) would greatly increase the likelihood of acceptance of a manuscript, thus exposing that valuable data-set to a wider scientific audience, thus achieving the ultimate goal of research namely is the public dissemination of those results and findings (Teixeira da Silva, 2011b). Bahr and Zemon (2000) stated that "… in the sciences … collaboration encourages author productivity and enhances article quality. As research becomes more quantitative, collaboration increases". Dreyfuss (2000) indicated that traditionally, scientists, artists, and professors develop ideas alone, utilizing only their own knowledge and research to complete their works although recently, due in part to an increasing need for specialization, globalization of the marketplace, rapid growth of the Internet, and an expansion in intellectual property law, collaborative production is replacing individual efforts. This is leading to a dichotomy in intellectual property rights: one point of view is that legal intervention is unnecessary since CPC partners are able to make their own decisions without conflicts of interest; the other is that legal intervention is necessary to protect intellectual property rights. On the whole there is a shifting trend from individual authorship to CPC authorship (The Royal Society, 2011).

International collaborations doubled from 1990 to 2005 (Leydesdorff and Wagner, 2008), dubbed as the "scientometrics revolution of the 21st century", joining tools such as Google maps, ISI and Scopus data-bases (Leydesdorff and Persson, 2010). Investment in science CPC, including writing CPC, can pay off in terms of prominence and reputation, economic returns, or the emergence of transnational links. The number of

internationally co-authored articles is growing at a faster rate than traditional "nationally-co-authored" articles (NSB, 2002); the former are cited more often than nationally co-authored papers. In that study, during 2000-2005, a core group of 14 most cooperative countries formed (see Table 1 in Teixeira da Silva, 2011c). Since these countries have strong national systems, countries peripheral to the core group may be automatically disadvantaged and thus marginalized. A closer look at their data shows that while there were approx. 50,000 co-authored records in 1990, increasing to about 150,000 in 2005, i.e. a three-fold or linear increase over a 15-year period, this translated into a four-fold or exponential increase in the number of international addresses, 150,000 in 1990 to over 600,000 in 2005, translating from 35 to 64 countries. Over the past 10 years, in several EU countries, main innovation and research "incubators", namely technology parks, research centers and universities, strongly influenced the scientific publication ranking, for example CORDIS (2009). They host researchers and therefore ideas, functioning as innovation accelerators and fostering the formation of spin offs and start-ups, creating a dynamic interaction among companies, research, finance and the authorities, thus contributing to the creation of a growth-oriented scientific and productive environment that exponentially increases the demands of applied research and the need to publish the resulting scientific data in international journals to attract funds through CPC. The trend appears to be moving in this direction even 5 years later (The Royal Society, 2011).

Nowhere in these analyses or even within the literature does any detailed explanation exist – and almost deliberate avoidance – regarding the ethical nature of scientific or writing CPC. Rather, information is fragmented, available as sub-sets of individual publisher's ethical guidelines, or published on suspect and unreliable web-pages, wikis or blogs.

This manuscript seeks to close that gap in our knowledge between what authorship is perceived to be, how scientific publishing is conducted in such a way that it influences authorship status and some understanding of the decisions required to broadly establish writing and publishing CPC ethical guidelines.

HOW DOES SCIENCE PUBLISHING ETHICS AND RELATE TO AND GOVERN CO-AUTHORSHIP?

Nearly all aspects of authorship and publication are covered only by guidelines and unspoken custom, despite the central importance of this aspect in science publishing and exposure of the scientific worth of research. Consequently, authorship practices can vary dramatically, often reflecting strong cultural differences (Suhr, 2009).

An author is the creator of unique literary, or artistic, works whose originality is protected under intellectual property laws, i.e. copyright (UK-US) or authors' rights (European); creative ability is primarily derivative, generally collective, and increasingly corporate and collaborative (Woodmansee, 2004). In science, authorship is central to the responsible conduct of research (RREE 2011). In the context of writing CPC, genuine authorship is never considered to be solitary (as was believed until the early 20th Century; Strange, 2008), but rather collaborative and group-oriented, although philosophical beacons tends to be individualistic and solitary in nature, as for this paper. Multi-authorship in science writing (i.e., writing CPC) is necessary to credit the range of people and tasks involved in a project; the writing, research, experimentation, development and editing are all significant components in the production of a collaborative project (Woodmansee, 2004), all brought together to create the ultimate object, a research paper. Radically collaborative writing follows a wiki-type model in which anyone can contribute and thus become an author by contributing to the development of a topic or idea, which is probably amenable to derivative communication

but not to original communication (Sanger, 2008). In this model, there is equal ownership or equal rights over the resulting work, but there is no lead author. Radical collaboration or multi-authorship are not the same and should not be confused. On CPC, the RREE (2011) states that "the nature of collaborations is variable, but responsible collaborations are always defined by openness and early, on-going communication. Science is a communal enterprise; both science and society are best served by collegiality and open collaboration. There should be a mutual understanding of what is to be exchanged through the collaboration, how the research will be undertaken, and how the products of the collaboration will be shared. Collaboration is most likely to succeed if expectations are clearly communicated (and perhaps documented) before commitments are made."

WHOSE RULE DO WE FOLLOW, AND HOW?

Many, if not most, bio-medical journals have adopted the definition as given by the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" of the International Committee of Medical Journal Editors (ICMJE; http://www.icmje.org) (2006). Many ethical bodies and publishers have aligned themselves with this definition, such as The Committee on Publication Ethics or COPE (http://publicationethics.org/), World Association of Medical Editors or WAME (http://wame.org/), The Council of Science Editors or CSE (http://www.councilscienceeditors.org), and Elsevier's PERK (http://www.elsevier.com/wps/find/editorshome.editors/Introduction), *inter alia*. Under the ICMJE definition, someone is an author if and only if they have done all of the following: "1) made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafted the article or revised it critically for important intellectual content; 3) approved of the final version to be published." In practical terms, within the context of research CPC, it is becoming increasingly difficult for any one researcher or supervisor to assume all three responsibilities and there is a classical division of labor to optimize time and human resources. The ICMJE definition goes on further to state: "Acquisition of funding, collection of data, or general supervision of the research group alone does not constitute authorship." ... "The group should jointly make decisions about contributors/authors before submitting the manuscript for publication. The corresponding author/guarantor should be prepared to explain the presence and order of these individuals. It is not the role of editors to make authorship/contributorship decisions or to arbitrate conflicts related to authorship." The ICMJE definition specifically excludes authorship for anyone whose contributions consist solely of arranging funding, collecting data, or supervising the research group and that each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Although this definition is a valuable guideline because of its specificity, it is at odds both with common practice and with other views of authorship (Yank and Rennie, 1999). If indeed research and writing CPC cannot all be performed by one individual, and within the context of a complex experimental design, a division of labour is required, either as nCPC or tCPC/iTPC. This situation would come to direct loggerheads with ICMJE's formal definition, thus either invalidating much research already published in bio-medical journals, or the ICMJE guidelines themselves. How then could public responsibility be assumed by individual partners if each one has assumed completely different roles and if none has been able to assume all three responsibilities as defined by the ICMJE? This then would introduce a second dilemma and contradiction about the ICMJE guidelines and definitions and which would not correspond to the reality in many (or possibly even most) research and publishing CPC cases. Since publishing copyright is often transferred from authors to

publishers who abide by the ICMJE ethical guidelines, and since authors are requested to always agree to having fully respected the ethics of that journal or publisher upon transfer of copyright, this double contradiction in terms within ICMJE guidelines would thus either invalidate the copyright (on the grounds of illogical discourse) or show the authors to be untruthful (for declaring a reality which is most highly likely to be untrue). To eliminate possible discord between what constitutes opinion, definition, guidelines and ethics, I propose that a writing CPC be considered to be a matter of opinion and not necessarily ethics (except in extreme cases such as ghost authorship), since the needs, the practice and the implementation cannot be determined by the journal or the publisher, but rather by individual laboratories, universities or research institutes to reflect practical needs. Provided that at least one of the ICMJE clauses is respected, this should suffice to fulfill the intellectual basis of authorship, even if it does not fully address public responsibility in terms of execution. In this case, each organ (= researcher) of the research body (= objective) assumes public responsibility for their specific function and as a whole, all members of the research group assume collective public responsibility towards their study methodology and data set. However, in addition, the guidelines set forth by journals or publishers could serve as valuable guidelines to determine authorship and co-authorship prior to submission of a manuscript. Since it is currently impossible for any journal or publisher to verify the validity of any claim made by a scientist or author, or to verify the actual participation of any author within the context of the research described within a research paper – other than through a signed declaration –, to enforce "rules" of authorship ethics would be unrealistic, unjust and incorrect (to some extent). Rather, journals and publishers should focus on reviewing the scientific content of a manuscript to ensure its scientific validity until such point that software or methods are available to irrefutably prove the intellectual participation of a scientist to merit (or not) authorship. They could attempt to dissuade false authorship by requiring signed declarations of ethics, and detailed explanations of the functions of each author within a manuscript, as expanded upon next.

The contributorship model of many journals now lists the exact or "explicit" contribution made by each author, and tends to be more flexible than the ICMJE model (RREE, 2011). Although the openness provided by the contributorship model indicates the specific role played by each author, it does not indicate whether those roles are ethical or not and hence does not address the issue of ethics in CPC. The Journal of Investigative Medicine, in May 2007, for example, gave a breakdown of what different authors contributed in contributorship models applied in different medical journals (Baerlocher et al., 2007). What is extremely surprising is that only a small percentage of authorship actually fulfilled all the requirements as established by ICMJE. Instead, what was found was a more realistic situation, as explained above, where each author assumed one or more roles or responsibilities within the context of the research project team or manuscript writing, but never – or extremely rarely – all three. Of direct relevance and pertinence to this manuscript is that ~75% of all authorships were attributed to one of the co-authors who had drafted the manuscript while ~65% of all authorships were attributed to editing the drafted manuscript. Simplified, what this says is that, as recently as 2007, most (i.e., almost two-thirds) of all authorships in bio-medical journals, were related to the importance of writing, editing and drafting a manuscript, fully validating the claim that a writing CPC is a fully valid author, without any ethical hindrances (simply because 65-75% of highly acclaimed bio-medical journals and their respective publishers had fully accepted (indirectly) these manuscripts after peer review).

Elsevier, currently the largest science publisher, owns >25% of all the world's science, and is thus extremely relevant to this discussion. Elsevier claims on its web-site

to strictly follow the rules and guidelines as defined by ICMJE, stating in its own Ethical Guidelines for Journal Publication top page (http://www.elsevier.com/wps/find/intro.cws_home/ethical_guidelines), under the section "Authorship of the Paper": "Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. All those who have made significant contributions should be listed as co-authors. Where there are others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors. The corresponding author should ensure that all appropriate co-authors and no inappropriate co-authors are included on the paper, and that all co-authors have seen and approved the final version of the paper and have agreed to its submission for publication." At first glance, to the untrained eye, the Elsevier guidelines might appear identical to the ICMJE guidelines. Ironically, and an extremely fundamental difference is that while ICMJE demands all three conditions, Elsevier's PERK only requires one (the difference indicated by a difference in only one word, and vs or). This places the authorship requirements as defined by ICMJE in direct conflict (philosophically, ethically and possibly even legally) with those as defined by Elsevier's PERK. Ironically, many Elsevier journals follow ICMJE guidelines, but the ethical guidelines are incompatible. The ethical guidelines governing co-authorship as established by other small and large commercial publishers will be discussed in detail elsewhere, although a few important case studies are highlighted next.

The *Annals of Internal Medicine* (AIM; http://annals.org/site/misc/ifora.xhtml) requires that each author sign a document indicating their involvement. AIM states "Authorship implies accountability. Listed authors must have contributed directly to the intellectual content of the paper, and the corresponding author should list the specific contributions of all authors in the appropriate section of the Authors' Form. Authors should meet all of the following criteria, thereby allowing persons named as authors to accept public responsibility for the content of the paper: 1. Conceived and planned the work that led to the article or played an important role in interpreting the results, or both. 2. Wrote the paper and/or made substantive suggestions for revision. 3. Approved the final version." As for ICMJE, all of these conditions must be met, although there is room for interpretation of the responsibilities of the author if condition 1 of ICMJE and AIM are compared. Both, however, are in stark contrast to the requirements as established by Elsevier's PERK. The latter, however, actually reflects a closer vision of the reality of many or most research teams with large numbers of members or with CPC. AIM states that by signing, authors indicate they have been truthful and that every author has received due credit, although how truthfulness is assesses is not indicated. If one author declines to sign the AIM form, the manuscript is returned to the authors for them to work out their dispute.

Unlike the medical sciences, the natural sciences, including plant science, have no universal standard for authorship, but some major multi-disciplinary journals and institutions have established guidelines for work that they publish (Website 1). Proceedings of the National Academy of Sciences of the United States of America (PNAS) has an editorial policy that specifies "authorship should be limited to those who have contributed substantially to the work" and furthermore, "authors are strongly encouraged to indicate their specific contributions" as a footnote (http://www.pnas.org/site/misc/iforc.shtml#ii). PNAS defines authorship as "limited to those who have contributed substantially to the work. The corresponding author must have obtained permission from all authors for the submission of each version of the paper and for any change in authorship. All collaborators share some

degree of responsibility for any paper they coauthor.

Some coauthors have responsibility for the entire paper as an accurate, verifiable report of the research. These include coauthors who are accountable for the integrity of the data reported in the paper, carry out the analysis, write the manuscript, present major findings at conferences, or provide scientific leadership to junior colleagues. Coauthors who make specific, limited contributions to a paper are responsible for their contributions but may have only limited responsibility for other results. While not all coauthors may be familiar with all aspects of the research presented in their paper, all collaborators should have in place an appropriate process for reviewing the accuracy of the reported results. Authors must indicate their specific contributions to the published work. This information will be published as a footnote to the paper. Examples of designations include: Designed research, performed research, contributed new reagents or analytic tools, analyzed data, or wrote the paper. An author may list more than one contribution, and more than one author may have contributed to the same aspect of the work." This model and interpretation of co-authorship seems to suit the plant sciences and covers and allows for international writing CPC. By assuming the "or" clause, it is also more aligned with Elsevier's PERK.

The American Chemical Society specifies that authors are those who also "share responsibility and accountability for the results" but does not provide details but rather emphasizes academic professionalism instead (2008 version; www.acs.org). The U.S. National Academies, convergent with the Online Ethics Center (http://www.onlineethics.org) specify "an author who is willing to take credit for a paper must also bear responsibility for its contents. Thus, unless a footnote or the text of the paper explicitly assigns responsibility for different parts of the paper to different authors, the authors whose names appear on a paper must share responsibility for all of it." (http://www.nationalacademies.org/). This is far more realistic than the ICMJE model, such that each CPC member assumes collective responsibility towards a research project and its derived data set and published paper. In mathematics and theoretical computer science the authors are listed in alphabetical order of their last names, irrespective of their contribution to the work, using the Hardy-Littlewood Rule (Hardy and Littlewood, 1932). If the CPC has already begun, the Hardy-Littlewood rule says that it stays a joint work even if the contribution is not of the same proportion. Similar to the contributorship model is the Quantitative Uniform Authorship Declaration (QUAD) system, in which authors are listed in descending order of total contributions across four categories: 1) conception and design; 2) data collection; 3) data analysis and conclusions; 4) manuscript preparation (Verhagen et al. 2003). In their model, an author should contribute at least 10% to any one category, although the authors do not provide any practical means of quantifying any single participant's contribution nor do they provide guidelines as to how the journal or publisher could verify authorship contribution claims.

The American Psychological Association (APA; http://www.apa.org/ethics/code/index.aspx) has similar guidelines as medicine for authorship. The APA acknowledges that authorship is not limited to – but does not necessarily exclude – the writing of manuscripts (i.e., writing CPC), but must include those who have made substantial contributions to a study such as "formulating the problem or hypothesis, structuring the experimental design, organizing and conducting the statistical analysis, interpreting the results, or writing a major portion of the paper", once again validating writing CPC. While the APA guidelines list many other forms of contributions to a study that do not constitute authorship, it does state that combinations of these and other tasks may justify authorship. Like medicine, the APA considers institutional position, such as Department Chair, insufficient for attributing authorship. The British Sociological Associa-

tion states that “Everyone who is listed as an author should have made a substantial direct academic contribution (i.e., intellectual responsibility and substantive work) to at least two of the four main components of a typical scientific project or paper: a) Conception or design; b) Data collection and processing; c) Analysis and interpretation of the data; d) Writing substantial sections of the paper (e.g. synthesizing findings in the literature review or the findings/results section)” (2001 Edition: http://www.britsoc.co.uk/Library/authorship_01.pdf).
Herein lies a standpoint quantitatively (and responsibility-wise) intermediate to ICMJE’s guidelines and Elsevier’s PERK.

In all these cases, even with written and signed declarations, there is still absolutely no verifiable way (by the journal, publisher, or even public) to confirm the actual participation of a co-author within a research project, to prove their public responsibility or to measure or quantify the nature of participation as being “substantial” or “significant”. Unlike statistical analyses in science research, where the term “significant” refers to a confidence interval conferred upon by statistical analyses– most commonly at 1% or 5%– the term as used in ethical guidelines proposed by ethical institutes or publishers does not take on the same meaning, since responsibility cannot be clearly quantified, weighed or measured, only in gross amounts and qualitative statements, and is thus subject to individual and subjective interpretation (either by authors, editors, reviewers or publishers). The use of the term “significant” in ethical guidelines related to authorship is thus undeniably invalid and should be strongly avoided. Rather a quantifiable system should be implemented, and one which better reflects the realities of research teams, as presented elsewhere.

CONCLUSIONS AND PROPOSALS FOR CHANGE

In science, as for almost every career, education over what can easily span 20-30 years would invariably lead, in most scientists’ cases, to the publication of research results. Thus, the pinnacle of science research is publishing, *de facto*. Serious divisions within academic and philosophical circles merit the constant assessment and re-assessment of the issue of authorship and publishing ethics to meet the challenges of the digital age. Awareness by those who are either in the learning curve of their careers and even by those who are already established leaders is the first step towards reaching consensus as to what constitutes ethical co-authorship and fair, honest and transparent publishing rights.
Undeniably the issue of authorship, as defined by leading bio-medical ethical bodies and even publishers has slightly different interpretations and nuances. Although a great majority of the pre-requisites for authorship are logical and even though there is general agreement to their universality, there are still several sticky points, issues that diverge and definitions that are either poorly defined, or contradictory (e.g. ICMJE *versus* Elsevier’s PERK, a difference created by only a single word, and *versus* or).

In this paper, I have broadly shown what defines authorship, and have indicated several apparent black-on-white contradictions, in words and definitions, that will thus create, no doubt, confusion among authors and scientists as to who or for what a person can be considered a co-author. I propose a broad term, a CPC, both for bio-medical science and research, that defines collaboration at several levels that would allow the person who is considered to be an author to not only assume intellectual recognition for their role and participation in the research or in the final product, the research paper,

but to assume collective public responsibility towards all aspects from conception to completion, even if their individual role only spanned part of the process. Since, and this is a great advance in philosophy from previous definitions, the final product of a research project is the research paper, the person who in fact is responsible for the intellectual "construction", writing and editing of the manuscript deserves authorship for the mere reason that such an effort would most likely guarantee publication.

There are four concrete solutions to solving the issues of authorship: 1) Firmly establishing, within a research institute, detailed and unbiased ethical guidelines related to both research and publishing that are publically available and easily accessed; 2) creating a system that quantitatively assesses the participation of an author and thus their position within a manuscript, eliminating conflicts and disputes; 3) creating new unbiased authorship guidelines that would serve the publishing community (publishers and independent journals) as well as the scientific community (research institutes, laboratories and individual scientists); 4) establishing a unique set of documents that would represent a universal perspective on research, publishing and writing CPC, possibly represented in several languages, as well as local sub-sets of ethical guidelines that would target culture-specific issues.

CPC is already a tried and tested concept with a growing following (Teixeira da Silva 2011d; Zeng et al., 2011), although the number of scientists who have the authoritative ability to become CPC partners is limited due to limitations in experience. However, by maintaining the bar high, the choice of CPC partners becomes limited, but in so doing, ensures the best possible quality while minimizing the risk of unethical behaviour by CPC partners, fortifying thus, the quality of the manuscript and the target journal.

Authorship allocation and ethics continue to be unsolved issues, probably due to the dynamic nature in which science research is evolving to meet the challenges of the 21st century.

ACKNOWLEDGEMENTS

The author wishes to extend his vote of thanks to all those scientists who have walked his path in search of truth and discovery. The author has also found meaningful interpretation and support of his views on authorship from the words of Sir Isaac Newton "If I have seen further than others, it is because I have stood on the shoulders of giants". The author thanks Pham Thanh Van for constructive discussion.

REFERENCES

Baerlocher MO, Newton M, Gautam T, Tomlinson G, Detsky AS (2007). The meaning of author order in medical research. J. Invest. Med. 55 (4): 174–180.

Bahr AH, Zemon M (2000). Collaborative authorship in the journal literature: Perspectives for academic librarians who wish to publish. College Res. Libraries 2000: 410–419.

CORDIS (2009). http://cordis.europa.eu/piedmont/infra-science_technology_en.html

Dreyfuss RC (2000). Collaborative research: Conflicts on authorship, ownership, and accountability. Vanderbilt Law Review 1161

Hardy GH, Littlewood JE (1932). Some properties of conjugate functions. J. Reine Angew. Mathematik 167: 405–423.

International Committee of Medical Journal Editors (2006). Uniform requirements for manuscripts submitted to biomedical journals. J. Amer. Med. Assoc. 4277: 927–934.

Leydesdorff L, Persson O (2010). Mapping the geography of science: Distribution patterns and networks of relations among cities and institutes. http://www.leydesdorff.net/maps/geography_of_science.pdf

Leydesdorff L, Wagner C (2008). International collaboration in science and the formation of a core group. J. Infometrics 2: 317–325.

NSB (2002). Science and Engineering Indicators 2002. Washington, DC: National Science Board. http://www.nsf.gov/statistics/seind02/

RREE (Resources for Research Ethics Education) (2011). http://research-ethics.net/topics/collaboration/

Sanger L (2008). Should science communication be collaborative? Plenary address at PCST-10 (10th conference of the International Network on Public Communication of Science and Technology), Malmö University, Malmö, Sweden, June 25, 2008. http://www.larrysanger.org/scicomm.html

Strange K (2008). Authorship: why not just toss a coin? Am. J. Physiol. Cell. Physiol. 295 (3): C567–C575.

Suhr J (2009). Science communication in a changing world. Ethics Sci. Environ. Politics 9: 1–4.

Teixeira da Silva JA (2011a). Who owns science, owns society. Maejo Intl. J. Sci. Technol. 5 (1): S1–S10.

Teixeira da Silva JA (2011b). Weaknesses in publishing: Identify, correct and strengthen. Maejo Intl. J. Sci. Technol. 5 (1): S11–S20.

Teixeira da Silva JA (2011c). The ethics of collaborative authorship. EMBO Rep. 12: 889–893.

Teixeira da Silva JA (2011d). International writing collaboration strengthens publishing: New policy and ethical guidelines for co-authorship. Online J. Sci. Technol. 1 (4): 31–42.

Teixeira da Silva JA, Van PT (2011). Ethics of authorship: survey among plant scientists. Asian Australasian J. Plant Sci. Biotech. 5 (1): 85–89.

The Royal Society (2011). Knowledge, networks and nations: Global scientific collaboration in the 21st century. RS Policy document 03/11, DES2096, London, UK, 114 pp

Verhagen JV, Wallace KJ, Collins SC, Scott TR (2003). QUAD system offers fair shares to all authors. Nature 426: 602.

Website 1: http://reference.findtarget.com/search/Academic_authorship/

M (2004). Beyond authorship: Refiguring rights in traditional culture and bioknowledge. http://filer.case.edu/~ijd3/authorship/index.html

Yank V, Rennie D (1999). Disclosure of researcher contributions: a study of original research articles in The Lancet. Ann. Internal Med. 130 (8): 661–670.

Zeng S-J, Dobránszki J, Bulley S, Winarto B, Van PT, Qin Y-H, Hu G-B, Ruan C-J, Teixeira da Silva JA (2011). Ethical international scientific writing collaboration, co-operation and partnerships around the world. Case studies and testimonials. Scientific Res. Essays 6 (33): 6730–6747.