



Chapter 4: Publication Practices

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Description

Chapter 4 of "An Instructor's Guide to Ethical Issues in Physics"

Body

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Section 4.1: Introduction

Many students, particularly undergraduates, do not know much about publishing in academic journals. Therefore, it will probably be necessary for instructors to provide some background information before getting into ethical issues related to publishing. It is important for students to understand the motivations for publishing and the logistics of publishing. An important personal motivation is establishing a track record of research in order to make progress professionally and to attract research funding. The community-oriented motivations include contributing to the permanent research record to provide a nearly global exchange ideas, which promotes growth of scientific knowledge. As far as logistics are concerned, it would be good to describe for students the step by step process, taking a paper from concept to final publication. It is common for students to be unaware that authors often need to pay publication fees, not all coauthors are directly involved in writing a

paper, papers published in reputable journals are peer reviewed, and peer review is no guarantee that a paper is technically correct.

The focus of this chapter will be all aspects of publication in journals except peer review. Peer review will be covered in Chapter 5, where its impact not only on publications but also on grant applications and job performance reviews will be discussed.

Section 4.2: Authorship

A good starting point in addressing authorship issues is the APS Guidelines on Ethics, which states,[\[1\]](#)

Although there is no universal definition, authorship creates a record of attribution, establishes accountability and responsibility with respect to the work, and is key in establishing careers. Authorship should be limited to, and should not exclude, those who have made a significant contribution to the concept, design, execution, or interpretation of the research study. Authors should be able to identify their specific contribution to the work.

It further identifies a key obligation: “All authors must agree to publication of a manuscript and take public responsibility for the full content of their paper.”

Various models proposed for formalizing the assignment of authorship and the order of authors have been proposed, including numerical schemes based on each individual’s contribution to the paper. Despite the natural tendency for physicists to try to model situations in ways that provide definitive answers or predictions, it is not clear that any of the proposed models will work in the physics community. One particularly challenging area in physics is that many experiments require significant technical effort for instrumentation. Arguably, an individual whose sole responsibility in an experiment is to maintain an off-the-shelf cooling system, monitoring it and replenishing refrigerant as needed, has made a significant contribution to the execution of the experiment and would, by current guidelines, be included as an author. In practice, though, most people in such a role would likely get acknowledged for their technical assistance rather than get listed as an author of the paper. It may be helpful to consider whether the contributions of the individuals require discipline-specific knowledge.

A commentary by Wyatt in *Physics Today* [2] on the topic of the growing length of author lists on journal articles sparked an interesting response in the form of Letters to the Editor. [3] Wyatt's commentary includes both a numerical analysis and a discussion of criteria for authorship.

Bozeman and Youtie pull together a large number of authorship-related cases reported by survey respondents and others in the research community they interviewed. [4] This cross-disciplinary study highlights, among other things, some issues that arise because authorship conventions differ from one discipline to another. While from an academic research perspective, the entire paper is valuable, for classroom purposes, a great deal of useful information can be obtained even if there is only enough time to read a few sections. In particular, the ethical issues related to authorship decisions are outlined in the section, "Ethical Issues and Co-authorship." The sections entitled "The Interview Data" and "The Website Posts" briefly describe how the cases were obtained. The sections that follow contain numerous, paragraph-long descriptions of authorship problems encountered by people in STEM fields. The cases are broken up into categories: some represent situations in which people apparently deserving to be listed as authors were not, while others involve people who were included as authors despite apparently having made little contribution to the paper.

An important limitation to the data accumulated by Bozeman and Youtie, as the authors themselves point out, is that the cases they report are described from just one perspective. Had it been possible to interview multiple people about the same case, a different picture might emerge. This limitation does not interfere with students having a good discussion of ethical issues arising in these cases, based solely on the information *as presented* about those cases. It is likely that in the course of a classroom discussion, questions will arise about whether hearing another perspective on a given case would change one's conclusions about it or whether more information would be helpful. Such questions can be helpful as a reminder to students that care should be taken to seek multiple perspectives before reaching a conclusion in situations that can influence relationships between people or someone's career.

Discussion Prompts

1. What motivations are there to be generous with offering a spot on the author list to individuals whose contribution to the project were only tangential?

2. How, if at all, does the inclusion of tangential contributors harm the scientific community?
3. In several of the cases cited by Bozeman and Youtie, the power dynamic resulted in questionable authorship decisions. Discuss those cases with particular attention to whether or not there might be avenues available to address the questionable authorship practices without relying on the free and full cooperation of the individuals in positions of power.
4. In which cases cited by Bozeman and Youtie would an earlier discussion among collaborators have headed off later problems in assigning authorship?
5. Discuss hypothetical situations in which a collaboration might establish authorship guidelines early in a project but authorship disputes could still arise. Based on your discussion, do you still think it is valuable for collaborations to address authorship issues early in a project?

Section 4.3: Citations

Several reasons exist for citing other work in a paper. These citations are a way of acknowledging the work of others in the field. They help place the present work in the context of earlier work (including by the present authors), thus helping to form a coherent representation of the body of knowledge in a particular area. Finally, they provide a means for authors to more concisely represent their new contributions by referring the readers to other publications for the background material necessary to understand the present contribution.

The Office of Research Integrity has an online guide, “Avoiding Plagiarism, Self-Plagiarism, and Other Questionable Writing Practices: A Guide to Ethical Writing.”[\[5\]](#) Of particular relevance to the issue of proper citations are the sections titled “Plagiarism: Acknowledging the Source of Our Ideas,” “The Lesser Crimes of Writing: Carelessness in Citing Sources,” and “The Lesser Crimes of Writing: Selective Reporting of Literature.” Each of these sections is relatively short, being the equivalent of a couple of pages of printed text. Students should also review the section called References in Scientific Communication in the APS Guidelines on Ethics.¹ Lastly, it may be helpful to discuss strategies for searching out prior work that should be cited in a manuscript.

Discussion Prompts

1. How is the scientific community harmed when insufficient attention is paid to citing prior work?
2. Look up a journal article in each of several different physics journals. How does the number of papers cited in the introduction compare to the number cited in the remainder of the paper? Are the sources cited in the introduction used in the paper a different way than the sources cited after the introduction?
3. Discuss the parallels between the ORI discussion of selective reporting of literature and Feynman's discussion of utter honesty in reporting on experimental results (see this ***Instructor's Guide***, Section 3.6 Reporting results).

Section 4.4: Plagiarism

Definitions of research misconduct commonly center on the phrase, “fabrication, falsification, and plagiarism”. Among research compliance professionals, this is often abbreviated FFP. Plagiarism has a long history of being outside the bounds of good behavior in the academic community, although instructors should be aware that there are cultural differences in how plagiarism is defined. Instructors can introduce the topic of plagiarism by directing students to their library's website—most such sites have a section devoted to discussing this topic. It is also important to review the section on plagiarism in the APS Guidelines on Ethics.¹ Plagiarism extends beyond using someone else's words without proper citation to using someone else's ideas and figures. Instructors in all classes can model good practice for their students by always citing sources for images they use that have been downloaded online.

There are two articles from ***Science and Engineering Ethics*** that an instructor may find useful in helping to frame a classroom discussion on plagiarism. One by Pupovac and Fanelli reviews surveys involving plagiarism in the context of research. [\[6\]](#) Much of this paper is more detailed than would probably be needed for a classroom discussion of plagiarism. Most of the relevant information can be found in the abstract of the paper, which indicates that the overall rate of survey respondents admitting to plagiarism is about 2%, and the rate of those who indicate they have witnessed plagiarism is about 30%.

A paper by Li does a nice job of providing an overview of plagiarism issues.^[7] It includes a review of how plagiarism-detection software is used, and how it can be misused. It also discusses the challenges faced by authors whose native language is not English. Given the descriptive nature of this article and its moderate length, this is a good choice for instructors who wish to give the class a reading assignment on plagiarism in addition to what is found on their library website.

Discussion Prompts

1. In what ways can plagiarism harm the scientific community?
2. Suppose you are giving a talk to fellow classmates. Your talk includes (1) your discussion of a problem from an introductory textbook regarding a block sliding down a ramp, (2) a free body diagram you found on the internet that applies to the situation, and (3) the application of Newton's Second Law of Motion. Which of these three components might require citing a source to avoid plagiarism, and which components, if any, will always require citing a source?

Section 4.5: Self-plagiarism, dual submission, and fragmented publication

Self-plagiarism is a term used to describe authors using material appearing in one work they have written as a component of another work. An article by Moskovitz argues that plagiarism includes the concept of stealing in its definition, and hence the phrase "self-plagiarism" is nonsensical.^[8] Moskovitz instead prefers the term "text recycling." This article, while lengthy, addresses a number of important issues. Whether or not text recycling is acceptable in the academic community depends not only on how much material is being recycled but also how that material is being reused. The source of the material is also important. It is commonly accepted for an individual to take material from one of their non-public documents, such as a grant application, and reuse it in a public document, such as a journal article. The author also points out that since most works (e.g., grant applications, conference presentations, journal articles) have multiple authors, then it is often unclear who "owns" the material and might thus be able to reuse it without permission or attribution. Moskovitz's article might be too lengthy a reading assignment for this issue, but a fair number of the points made by the author are encapsulated in the first and the final sections, making for a much more abbreviated text.

Dual submission can be considered a special case of self-plagiarism, in which authors submit either identical manuscripts or manuscripts with large portions of identical material to two (or more) journals, without informing both journals of what is being done. Almost every scientific journal has a policy prohibiting dual submission. This policy may not seem natural to students since it is different than processes like applying for admission to schools, where multiple applications are common. They may need help in understanding the resources that would be expended if scientists routinely submitted the same manuscript to multiple journals and then either published in the first journal to accept the submission or chose which journal to publish in once all of the acceptances were given.

If two different journals publish the same, or nearly the same, paper, that can also waste resources. One temptation for authors to publish essentially the same paper in two different journals is that doing so would lengthen their list of publications, making them appear to be more productive researchers. Dual publication may violate copyright agreements, such as those Physical Review commonly require of authors.[\[9\]](#)

The Office of Research Integrity has guidance on self-plagiarism in the form of a detailed essay.[\[10\]](#) It covers dual publication, overlapping publications, and text recycling, among other issues, and the essay also provides information on why these forms of self-plagiarism can be problematic. While self-plagiarism in many cases is considered to be unethical, it is not considered to be a form of research misconduct according to the Office of Research Integrity definition.

Fragmented publication occurs when authors take a single research project whose results could readily be presented in a single paper and instead spread the results out over several papers. As with dual submission, this practice makes inefficient use of journal resources and it can misrepresent the research productivity of the authors as being greater than it actually is. The Office of Research Integrity has a few paragraphs on this topic, with a couple of examples from the field of medicine.[\[11\]](#)

Discussion Prompts

1. Why is it acceptable for an author to use, without attribution, passages from one of her grant proposals in a paper she is writing, while it is unacceptable to use without attribution a passage from a paper she has previously had published in a new paper she is submitting for publication?

2. Suppose you are part of a group that has jointly submitted a grant application. Five years later, you are no longer part of that research group but you continue to do research in that field. Under what circumstances, if any, would it be acceptable for you to reuse text from that original grant application in any of your future writing?
3. Look up the instructions to authors from several physics journals with different publishers. What is their stated policy on dual submission? Are there any differences, major or subtle?
4. Pick a simple undergraduate physics experiment (such as studying pendulum motion) and imagine it is forefront research. Describe a situation for which a collection of results from this apparatus should not be broken up into two separate papers and a situation in which it would make sense to break up the results into two separate papers.

Section 4.6: Errata and retractions

To maintain the integrity of the research record, authors have a responsibility to take action when an error in one of their publications comes to their attention. If the error only affects some portions of the paper and does not change most of the conclusions, then the correction is usually made in the form of an erratum. A simple exercise for students is to have them look up ten to twenty errata in a physics journal just to get a feel for what types of corrections appear. It is fairly common for an erratum not to directly involve scientific content. For instance, an acknowledgment may have been left off. Other errata, however, clearly affect the scientific content of the paper. More significant corrections lead to a paper being retracted. Notice of an erratum or retraction typically appears on the title page of the electronic form of the paper so that a reader is unlikely to miss it.

Hosseini et al. published a study of what they termed “self-retractions,” that is retractions initiated by authors (as opposed to those initiated by journal editors).[\[12\]](#) The study was based on interviews with eleven authors who had made such a retraction. Among the key findings were (1) most of the authors had originally approached the journals about making a correction, but the editors decided it should be a retraction, (2) all of the authors worried about a retraction having a negative impact on their careers, but they indicated that the effect had either been neutral or positive, and (3) most authors found the process of issuing a retraction and of

communicating with the editor to be difficult.

A second paper, by Williams and Wager, gives the perspective of editors on the retraction process.^[13] This study was based on interviews with five journal editors who had been involved with one or more retractions in the previous two years. It includes retraction cases initiated by the authors as well as those initiated by others, such as a case in which an individual whose work had been plagiarized brought the problem to the attention of the editor. It was noted that the relative rarity of the need for retraction coupled with the wide range of situations associated with retractions makes it difficult to develop uniform procedures for handling retractions. This may in part explain the communications difficulties between authors and editors that were noted in the Hosseini study. The Williams and Wager study also explores nuances associated with retractions of multi-author papers when the editor is not directly in contact with all of the authors.

For an instructor with plenty of time to delve into the issue of errata and retractions, these two papers make an excellent complementary pair for a student reading assignment. If time is more limited, though, the instructor could read or skim these two papers and base classroom discussion on the Research Results section of the APS Guidelines on Ethics¹, item 4 of which addresses the obligation to correct the publication record when necessary.

Discussion Prompts

1. What are reasons that a paper may need to be corrected through an erratum or may need to be retracted?
2. What complications arise when a paper needing an erratum or retraction has more than one author?

Section 4.7: Conflicts of interest

In the context of publications, a conflict of interest occurs when some entity to which an author is connected may benefit directly and financially from a specific possible outcome of the research. For instance, if an author has part ownership of a company that is using technology being reported on in an article, the author has a conflict of interest. In this case, the company could use a favorable journal article to promote sales of its technology. There are two concerns about conflicts of interest. First, the

conflict may lead to the author to a biased interpretation of the results, intentionally or unintentionally. Second, even if the author maintains objectivity, the existence of the potentially conflicting relationship may lead others to question the integrity of the research record.

Most journals have policies requiring the disclosures of potential conflicts of interest at the time of manuscript submission, and some of these disclosures become part of the final manuscript. The American Institute of Physics has a brief statement on conflicts of interest.[\[14\]](#) The Optical Society of America goes into more detail.[\[15\]](#) Financial conflicts are more common in the life sciences, so it can be helpful to read a statement on conflicts of interest from a journal that extends to that field. **Nature** is one example.[\[16\]](#)

Discussion Prompts

1. What are the differences between the American Institute of Physics statement on conflicts of interest and that of the Optical Society of America?
2. Would research be overly constrained if conflict of interest policies focused on avoiding conflicts entirely as opposed to disclosing the existence of conflicts?
3. Suppose as a graduate student, you get involved with a study comparing the atmosphere in several different physics departments across the country, looking at factors such as how welcoming they are to under represented groups in physics. One of the departments in your study is the one where you did your undergraduate work. If you publish the study, do you have a possible conflict of interest that needs to be declared?

Section 4.8: Publication metrics

In the not too distant past, research productivity was commonly judged by the number of papers on your publication list, with a slightly more refined evaluation being based on how many of those publications were in top tier journals. Counting papers is a simple task for someone either lacking the discipline-specific expertise or the lacking the time to make quality judgments. This approach to productivity evaluations likely gave rise to practices like fragmented publication, discussed above. In an effort to stop rewarding publication for the sake of extending one's publication list, agencies like the National Science Foundation began limiting the number of papers you could list on your biosketch in a grant application.

Since then, there has been a trend to shift the focus, at least somewhat, from quantity of publications to a quantitative measure of the impact of the publications. Any scheme to quantify the impact a paper has on the development of knowledge in a field is likely to, at the very least, miss some nuanced situations. Additionally, just as the publications system can be gamed when the productivity is quantified by counting publications, it can also be gamed when productivity is measured through some numerical calculation of impact.

Why is the assessment of research productivity an ethical issue? Physicists should be judged fairly, especially when career-related decisions are made. At the same time, those who are involved in evaluating physicists have a limited amount of time, so there is a tendency for evaluators to seek out quantifiable metrics that allow for rapid evaluations to be made. If these metrics are too readily gamed, then the more honest physicists may be put at a competitive disadvantage.

There is no shortage of literature discussing the use of citation data in evaluating scientific papers. Several schemes have arisen that reduce the citation history of papers with a specific author to a number, which then may be compared to others in the same or a similar field. Such numerical calculations have been used in some cases by peers and supervisors to evaluate the research credentials of scientists. Schreiber has a paper defining and discussing the h , g , A , and R indices, and applying these tools to a population of 26 physicists from Norway in order to better understand the differences in the information they convey.[\[17\]](#) The paper highlights some subtle differences in the way each index treats an author's citation record, but more importantly for students, it describes the four different rating schemes and illustrates the ways in which each, not surprisingly, does not tell the full story of the impact of papers associated with an author.

When a Letter to the Editor of *Physics Today* included a proposal for a new index,[\[18\]](#) three replies were published a few months later,[\[19\]](#) indicating that there is much interest in this topic. A Commentary in *Physics Today* provides a concise review of some work addressing the question of how effective the h -index is in predicting the future productivity of a scientist.[\[20\]](#) The answer appears to be, only somewhat. References 17-19, taken together, form a fairly short reading assignment, sufficient to help students understand the complexities of reducing a measure of research productivity down to a single number. On the other hand, students may gain better insight into the more commonly used h -index by first reading Schreiber's paper.

One final Commentary can be read independently of all of the above.[\[21\]](#) The author uses his research into the citation record of his own papers to point out that commonly used sources of citation counts are not always accurate.

Discussion Prompts

1. Discuss what sort of information is lost when reducing a physicist's publication record to a single number, such as an h-index.
2. Would having several different indices, each reflecting a different aspect of a physicist's research record, be beneficial, or is it not feasible to come up with any effective scheme of quantifying a research record?
3. If your answer to the previous question was that quantifying a research record is not feasible, imagine you are faced with sifting through a stack of one hundred applications for a physics-related position. Would you reconsider using a numerical approach to evaluating research productivity, even if it were imperfect?
4. Discuss how reliance on a single index to rate research productivity can distort research incentives and hurt overall progress in science. Do these harms outweigh the benefits associated with the incentives provided by an index system (such as the h-index)?

Section 4.9: Journal quality

Journal quality plays a role in how effectively research is communicated and in how the quality of the research is evaluated. Peer reviewed journals range from the extremely competitive to the extremely lax, and it is often the case that people outside a particular field are not in a position to judge where on this spectrum a particular journal lies.

Concerns over journal quality are not new. Mermin wrote an opinion piece in 1985 about the enormous financial burden libraries had in keeping up with an ever increasing number of journals that in turn had ever increasing subscription costs. [\[22\]](#) Framing this as an ethical issue, without using the word, "ethics", he advocated targeting some journals for elimination by coordinated efforts among libraries to cancel subscriptions and by physicists resigning from their editorial boards.

More recently, Memon has looked at a large number of predatory journals, for-profit publications of dubious academic value.[\[23\]](#) While the paper is somewhat lengthy, most of it is in the form of a table listing individual journals and their characteristics. A student could read about a half a dozen pages of text and skim the table to come away with the essence of the article. This paper probably strays some from the topic of ethics into educating students on an important career skill: how to spot a predatory journal.

One metric that is commonly used to measure the quality of a journal is the Impact Factor (IF). The IF of a journal in any given year is the average number of times each paper published by that journal in the preceding two years has been cited in that given year. Journals with high IFS usually tout this fact, and there is a tendency for authors to want to publish in high IF journals, due to the tendency for many evaluators to link high IFS with prestige. As with any metric that attempts to quantify quality with a single number, the IF has some shortcomings. Moustafa has a short commentary on how use of the IF can skew our perception of journals and how its overuse can have detrimental effects on the scientific community.[\[24\]](#)

Discussion Prompt

If a single number cannot properly reflect the quality of a journal, then should multiple numbers be used to quantify multiple aspects of the publication record, or is the answer to avoid use of numbers entirely?

Section 4.10: Publication in the electronic age

The growth of the internet, and with it, electronic publishing, has brought a number of significant improvements to academic publishing. There are two improvements of particular note to ethics. First is the linkage between an erratum and the paper it corrects. After a paper is published, if an author wants to correct it, an erratum is published in a subsequent issue of the journal. In the online version of the journal, that erratum is conveniently linked to the original paper on its title page, meaning that anyone who takes the time to read the paper will immediately have the correction drawn to their attention. In the print-only era that represents the bulk of the history of most academic journals, there was no easy link to the erratum. A

paper published in January might not have an erratum appearing until June, or later. In order to see if an erratum had been published, one would either need to scan subsequent journal issues in their erratum section or scan the journal's annual index to check for other publications by the same author. As a result, it was quite common for authors to cite a paper that had been corrected without also citing the correction. The citation of papers without their errata, at the time, allowed errors in the publication record to propagate. A study of errata in *Physical Review* articles in the 1990s showed that errata were rarely cited when their corresponding original paper was cited.[\[25\]](#) The electronic linkage of a paper to its erratum has effectively eliminated this as a point of concern.

A second key improvement in the internet age is the ready availability online of many prepublication versions of journal articles. Before the development of online repositories like arXiv for these prepublication versions, there was the "preprint" system. Authors who wrote a paper would circulate photocopies of their submitted manuscripts prior to their acceptance for publication, as one way of publicizing their work. While this system for the most part was not intended to promote favoritism, the fact is that typically people who received these advance looks were those who had some connection with the authors; others had to wait several months for the paper to appear in print.

A third improvement is in the area of public access. In 2013, the National Science Foundation announced its Public Access Plan, in response to a federal government directive that the public be given free access to the results of federally-funded research.[\[26\]](#) The policy requires that publications resulting from funded research be available to the public within one year of the original publication date. Implementation of this policy has been greatly facilitated by the ability to disseminate information electronically. For instance, the National Science Foundation established the Public Access Repository as a means for complying with the public access policy.[\[27\]](#)

There are some potentially disturbing trends in publication. A commentary by Day discusses the possible future for robotic authors.[\[28\]](#) Hinsen points out that the current systems for electronic publication of journals do not differ significantly from the old print versions.[\[29\]](#)

Reading an electronic paper is about the same experience. He argues we are not taking full advantage of the flexibility of the computer as a communications tool,

and as a result, we are unable to effectively communicate information about our research. While in principle it is considered unethical to publish results without providing sufficient information to your peers to allow them to reproduce your results, in practice, Hinsien argues, journals do not always provide adequate tools for us to share that information.

Discussion Prompt

How might journals take better advantage of the flexibility of computers to improve communication of scientific results?

[Continue to Chapter 5: Peer Review](#)

Acknowledgment

The author is grateful for the time and effort of the anonymous reviewers of this work, and for their numerous helpful suggestions.

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