This PDF version of a talk that I often give to undergraduate or graduate student audiences was a result of my personal experiences in academia. I started graduate school after years away from the university setting (mostly writing and climbing) with almost no understanding of academia and especially the process of publishing and getting grants. Most of what I learned about the process, I learned through the rocky road of submitting my first papers and proposals, applying for jobs and tenure, and trying to keep my research going. This presentation is an attempt to provide some advice about this part of the process of science. The web version will only include limited commentary, and I will attempt to update as frequently as possible – at least whenever I give the talk again.
Publish and perish: pitfalls in the process of scientific publication and why we should publish less.
The first few slides present reasons for giving the talk, most importantly:

1. A lot of science published today is junk that is the consequence of the pressure to publish, especially in good journals. As a consequence there is a glut of literature that includes LPUs (least publishable units) that may never be read or cited, papers filled with errors, and (in the worst case) papers reporting on fabricated data.

2. The pressure to publish starts early on in a scientist’s career – even as an undergraduate. However, many academic jobs for those with advanced degrees do not require a huge list of publications.

3. The talk focuses on the process of publishing, how publishing pressures have created problems in this process, how to fix some of these problems, and how to get a job that requires an advanced degree.
Lady Middleton could no longer endure such a conversation, and therefore exerted herself to ask Mr Palmer if there was any science in the journal *Science*. ‘No, none at all,’ he replied, and read on.
Jobs crisis sparks call for freeze in number of PhD students in US

WASHINGTON. The number of life sciences PhD students in the United States should be frozen at current levels, recommends a report by the National Research Council. Trends in the Early Careers of Life Scientists, released today (10 September), says that increasing numbers of graduate students and postdoctoral fellows are failing to find long-term jobs.

Nearly four times more PhDs are being produced each year than in 1960, with a 42 percent increase between 1987 and 1996. Almost all the growth is in biomedical fields, and much is accounted for by foreign scientists. But jobs in the academic community, government and industry have not kept pace. There have been increases in the length of time taken to complete a PhD, the average age at graduation, the numbers of young scientists taking up postdoctoral fellowships and the length of time spent as postdocs.

"In 1987, 70 percent of PhDs held postdoctoral or other non-faculty jobs at universities five to six years after graduating, or were outside science altogether. By 1995, that number had risen to 87 percent," the report says. The report notes that this situation has produced a "crisis in expectation" among young scientists. The fact that many PhDs are not finding jobs, even after years of dedicated effort, is "frustration, disappointment and even despair in the laboratory and academia," the report says. "Further increases in the competition could discourage the best from entering the field."

The authors point out that even projected increases in government funding, for instance, an anticipated doubling of the budget of the National Institutes of Health — are unlikely to ensure the current growth in permanent jobs. Nor, they say, can industry be counted on to hire more people, given recent downsizing.

They recommend that life sciences PhD programmes should not be expanded, and that the numbers of students be kept "in "rare and special circumstances," such as encouraging the education of under-represented minorities.

"If growth cannot be slowed or reversed, the system is delaying independence and stifling creativity at precisely the most productive phase of the scientist's life," the report says.

If growth is not stopped, the report notes, the situation will only worsen: for instance, if the 5.1 percent growth rate in PhD graduates between 1995 and 1996 were continued, the number of PhD graduates would double in 14 years.

William Brinkley, the president of the Federation of American Societies for Experimental Biology, and a member of the panel that wrote the report, says: "The hard facts are that across the life sciences, we have a huge reservoir of outstanding people, capable of filling the need that we see in the growth of science in recent years."

The report urges universities to move towards using permanent, non-PhD technicians to carry out work now being done by graduate students and postdoctoral fellows. It also suggests that they consider reducing the numbers of graduate students supported by NIH grants.

Shirley Tilghman, a professor of molecular biology and a Howard Hughes Medical Institute investigator at Princeton University, who chaired the 16-member panel that wrote the report, blames the structure of the US research enterprise, in which senior scientists rely on a cadre of young graduate students and some 20,000 postdocs to staff their laboratories at bargain rates. "We are creating this working class who are absolutely essential to the conduct of research, and yet they are spending many junior positions which are not considered on some kind of a career trajectory," Tilghman says.

Tilghman likens the situation of postdocs to jettisons on a plane: "They are circling, going up and down, and waiting for the turn to land. We have to think hard about the ways in which we have allowed what were supposed to be training positions to become these kinds of holding-pattern positions."

But some in the field question whether a moratorium on PhD programme growth would be accepted by institutions and senior scientists when they believe that young researchers are still a "great" opportunity for research.

"It's difficult to tell people to stop training young people when they look at a trainee and think: 'This is how we get work done.' " says Frank Solomon, a professor of biology at the Massachusetts Institute of Technology who chairs the education committee of the American Society for Cell Biology.

Others question whether the crisis described in the report has reached the proportion that would require a freeze on PhD programmes. "We cannot predict future job opportunities and therefore we cannot say when we're going to need to enter the steady state. We don't want to turn off bright young people because of a negative press," says Susan Gerbi, chair of the department of molecular biology, cell biology, and biochemistry at Brown University in Providence, Rhode Island.

The report notes that graduate programmes are required to confront prospective students with the hard facts of their career prospects, by providing data on the careers of PhD graduates over the previous 10 years. The information "will have the salutary effect of letting market forces control the rate of entry into the field."

And the report urges government agencies to shift towards funding more broadly to undergraduates and individual fellowships, with fewer of the research grants that have almost entirely fuelled the growth in the number of PhD trainees over the last 10 years. "This is an attractive solution, as sources of funded students, these do less for the student, the report says.

The report indicates that PhD programmes should be broadened to prepare graduates for alternative careers that, it maintains, do not require a PhD. "The report says foreign scientists accounted for most of the increase in PhD graduates since 1987. But it urges that this should not lead to "arbitrary limitations on the number of visas issued for foreign students,"" says Meredith Wadman.
1. Publication process (2 working examples, rules, etc.)
2. Problems with glut of literature
3. Problems with peer review (partly because we publish too much)
4. Problems with synthesis
5. Solutions
6. How do you get a job/promotion if you don’t publish?
The next slides illustrate my view of how science is done, particularly ecology and evolutionary biology. These parts of the process of science are well covered in graduate courses, but the unstated assumption is that at some point results from different parts of the process should be published. But how does the publication process work? This should be covered in greater detail in most science programs, starting with undergraduate courses. I discuss several examples (from my own work) of how the publication process works and discuss issues such as how authorship is decided.
Models (mathematical and verbal) and observations

Hypotheses

Statistical models (inferential statistics)

Theory

Ticks, lore, paradigms
Models (mathematical and verbal) and observations

Statistical models (inferential statistics)

Theory

Ticks, lore, paradigms

PUBLISH
Models (mathematical and verbal) and observations

Statistical models (inferential statistics)

Theory

PUBLISH?

Ticks, lore, paradigms
Authorship in ecology: attribution, accountability, and responsibility

Jake F Weltzin, R Travis Belote, Leigh T Williams, Jason K Keller, and E Cayenne Engel

Quality and quantity of publications are among the most important measures determining the success of ecologists. The past 50 years have seen a steady rise in the number of researchers and collaborative manuscripts, and a corresponding increase in multi-authored articles. Despite these increases, there remains a shortage of useful and definitive guidelines to aid ecologists in addressing authorship issues, leading to a lack of consistency in what the term “author” really means. Deciding where to draw the line between those who have earned authorship and those who are more appropriately credited in the acknowledgments may be one of the more challenging aspects of authorship. Here, we borrow ideas from other scientific disciplines and propose a simple solution to help ecologists who are making such decisions. We recommend improving communication between co-authors throughout the research process, and propose that authors publish their contributions to a manuscript in a separate byline.


AN EXAMPLE:

There are five steps to the preparation of a manuscript/paper. \textbf{Significant} participation in at least three of the five entitle a co-worker to authorship.

1. The original idea
2. The funding
3. The field/lab work in collecting the data
4. Analyzing the data and coming to some conclusion
5. Actually writing the paper
Additional authors

- consultants (editorial or statistical)

- anyone who contributed in a significant manner to the collection of data (e.g. taxonomist experts who confirm identifications)

- people who had a significant contribution to the collection of data

- people who had a significant contribution to the funding of a study (but not necessarily so)

- the supervising professor/scientist
With the next series of slides, I discuss how journals are ranked, how scientists are evaluated based on how much they publish, what journals they publish in, and how much they are cited. I also discuss the fact that there is excessive pressure to over-publish and to target “high impact” journals.
Models (mathematical and verbal) and observations

Statistical models (inferential statistics)

Theory

PUBLISH

In “good” journals.

Ticks, lore, paradigms
The ISI® Journal Citation Reports (JCR®) impact factor has moved in recent years from an obscure bibliometric indicator to become the chief quantitative measure of the quality of a journal, its research papers, the researchers who wrote those papers, and even the institution they work in.
Figure 2a. Subject Variation in Impact Factors

- Fundamental Life Sciences
- Neuroscience
- Clinical Medicine
- Pharmacology & Toxicology
- Physics
- Chemistry & Chemical Engineering
- Earth Sciences
- Environmental Sciences
- Biological Sciences
- Materials Science & Engineering
- Social Sciences
- Mathematics & Computer Sciences

Mean Impact Factor (1998)

Figure 2b. Impact Factors and number of Authors per paper

Pearson’s $r = 0.843$, $N = 12$, $P < 0.001$

Figure 3. Impact Factors and Journal Type

Impact Factor window

Citations

Time after publication (Years)

Review

Letter

Full Paper
Although quantifying the quality of individual scientists is difficult, the general view is that it is better to publish more than less and that the citation count of a paper (relative to citation habits in its field) is a useful measure of its quality. How citation counts are weighed and analysed in practice becomes important as publication records are increasingly used in funding, appointment and promotion decisions. Typically, a scientist’s full citation record between individuals. We analyse three measures of author quality: mean number of citations per paper, number of papers published per year, and the Hirsch index. A scientist is said to have Hirsch index \( h \) if \( h \) of their total, \( N \), papers have at least \( h \) citations each, and the remaining \( (N-h) \) papers have fewer than \( h \) citations\(^1\). For this study, we adopt Hirsch’s assumption that \( h \) divided by \( N \) “should provide a useful yardstick.” To calibrate our results,
How to judge a book by its cover? How useful are bibliometric indices for the evaluation of “scientific quality” or “scientific productivity”?

Oliver von Bohlen und Halbach
Institute for Anatomy and Cell Biology, Ernst Moritz Arndt University of Greifswald, Friedrich Leipfer Strasse 21, 17487 Greifswald, Germany

1. Introduction

A central question in evaluation processes is how to define the impact and relevance of the scientific research output of a scientist. This question is not easy to answer, since it is difficult to quantify the quality of individual scientists. A general assumption is that it is better to publish more than less and that the citation count of a paper is a useful measurement of its quality. Since publication records are increasingly used in funding or appointment decisions, it is important how the citations are counted, and how these counts are weighted and analysed. A scientist’s full citation record is normally determined by (1) counting the number of published items, (2) summarizing the citation count of all papers, published by an individual scientist, (3) calculating the average citations per paper, and (4) using the Hirsch index (Hirsch, 2005). Especially the Hirsch index (h-index) is nowadays seen as an important indicator of scientific quality. The h-index is considered helpful because it includes both the scientific productivity and the apparent scientific impact of a scientist (Krieger et al., 2010).

Access to the full citation distribution for an entire subfield is essential for the analysis. Existing databases can therefore actively help to quantify the quality of individual scientist. Indeed, the standard criteria were presented in different databases (Web of Science (ISI); Scopus (Elsevier) or Google Scholar (Google Inc)) that are often used for evaluation.

Here, it is not necessary to discuss which is the best model, based on theoretical statistical or probabilities models. Instead, the reliability and usefulness of the available methods should be tested – from a practical point of view, e.g., in filling an open position in the discipline of Anatomy & Cell Biology. Thus, the indicators must be useful for the analysis of a very small group of individuals, since only a small number of applications would be included in the search for a suitable candidate.

The different available parameters each have different advantages and disadvantages. These will be briefly summarized:

1. The total number of publications (P) measures mainly productivity; however, it does not reflect the impact (van Raan, 2006).
2. The personal impact factor (C) calculates how many times all the published items of one author have been cited. This factor has been introduced as a factor reflecting the quality of scientists (Bomann and Daniel, 2000). However, the personal citation
Models (mathematical and verbal) and observations

PUBLISH

Every scientific thought that ever occurred to you.

Theory

Statistical models (inferential statistics)

Ticks, lore, paradigms
Another example:
The following slides constitute my critique of the pressure to “publish or perish.” I present a heuristic path diagram, with black arrows representing positive causal effects and red lines with bullet heads representing negative effects of one variable on another. I provide a number of examples for each proposed causal relationship – both from the literature and from my own work.
Black arrows indicate positive effect; red dots indicate negative effect. Path coefficients are not included due to lack of data. LPU = least publishable unit.
Publish or perish pressure

LPU hastened premature publishing, red, rich specific progress

Errors
(who has not done the experiments) writes the paper reporting work done by a junior scientist (who has). The team leader is more experienced and more able to present the work in the best possible light — and for this, a lack of knowledge of the details can be advantageous! The student or postdoc is released to go back to the bench, increasing productivity. However, she or he does not get taught how to write up results.

Editors. It is no surprise that editors of elite journals receive many submissions. For example, Nature now receives around 9,000 manuscripts a year (double that of 10 years ago) and has to reject about 95% of biomedical papers. Development, a quality specialist journal, now rejects roughly 70%, compared with 50% in 1990. In leading journals there are too many submissions to send most out for peer review, so the editor’s decision has become, quantitatively, much more important than the judgement of reviewers. Consequently, editors are courted by authors who resort to tactics such as charm offensives during "presubmission enquiries", networking at conferences and wheedling telephone

*Après le déluge: searching for the needle of quality in the haystack of submissions.*


Figure 1 The yearly error rate in articles and reports in a major scientific journal from 1960 to 1997. Based on a sample of 12 issues per annum. 

a, Total rate and the rates judged to be due either to authors or to the journal. b–d, Errors broken down by type and severity.

Authors may be less careful due to pressures to publish.
Reviewers and editors may be less thorough.
Science may be far more complex.
Journals may be contributing to errors.
Error rate has not changed, but criticisms have increased.

Figure 1 The yearly error rate in articles and reports in a major scientific journal from 1960 to 1997. Based on a sample of 12 issues per annum. a, Total rate and the rates judged to be due either to authors or to the journal. b–d, Errors broken down by type and severity.
Publish or perish pressure

- Literature glut
- Scientifc misconduct

LPU

haste

premature publishing

errors

Obscure, specialized, jargon-rich fields

Scientific progress

time to publish

review process

Scientific progress
Based on 70 ophthalmological journals between 1997 and 2000. Of 2,210 publications, 60 were genuine duplicates and 1.39% were redundant. The estimate is very conservative. (Mojon-Azzi et al. 2003.)
Systematic Characterizations of Text Similarity in Full Text Biomedical Publications

Zhaohui Sun1, Mounir Errama2, Tara Long3, Chris Renard2, Nishant Choradia2, Harold Garner1*
1Virginia Bioinformatics Institute, Blacksburg, Virginia, United States of America, 2Department of Math and Natural Sciences, Collin College, Plano, Texas, United States of America

Abstract

Background: Computational methods have been used to find duplicate biomedical publications in MEDLINE. Full text articles are becoming increasingly available, yet the similarities among them have not been systematically studied. Here, we quantitatively investigated the full text similarity of biomedical publications in PubMed Central.

Methodology/Principal Findings: 72,011 full text articles from PubMed Central (PMC) were parsed to generate three different datasets: full texts, sections, and paragraphs. Text similarity comparisons were performed on these datasets using the text similarity algorithm eBLAST. We measured the frequency of similar text pairs and compared it among different datasets. We found that high abstract similarity can be used to predict high full text similarity with a specificity of 20.1% (95% CI [17.3%, 23.1%]) and sensitivity of 99.999%. Abstract similarity and full text similarity have a moderate correlation (Pearson correlation coefficient: −0.423) when the similarity ratio is above 0.4. Among pairs of articles in PMC, method sections are found to be the most repetitive (frequency of similar pairs, methods: 0.029, introduction: 0.0076, results: 0.0043). In contrast, among a set of manually verified duplicate articles, results are the most repetitive sections (frequency of similar pairs, results: 0.94, methods: 0.89, introduction: 0.62). Repetition of introduction and methods sections is more likely to be committed by the authors themselves (adds of a highly similar pair having at least one shared author: introduction: 2.31, methods: 1.83, results: 1.03). There is also significantly more similarity in pairs of review articles than in pairs containing one review and one nonreview paper (frequency of similar pairs: 0.0167 and 0.0023, respectively).

Conclusion/Significance: While quantifying abstract similarity is an effective approach for finding duplicate citations, a comprehensive full text analysis is necessary to uncover all potential duplicate citations in the scientific literature and is helpful when establishing ethical guidelines for scientific publications.

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Copyright: © 2010 Sun et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

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* E-mail: garnerh@vt.edu

Introduction

Computational methods have proven effective in the identification of highly similar and potentially unethical scientific articles. In our previous study, the text similarity-based information retrieval search engine eBLAST [1] was trained with the MEDLINE abstract dataset [2] to create Déjà vu, a publicly available database of over 70,000 highly similar biomedical citations [3]. The abstract of each MEDLINE citation was compared to its top related article in MEDLINE (a feature available from MEDLINE) using eBLAST. The citation pairs with similarity ratios exceeding the calibrated threshold were deposited into the Déjà vu database [3]. Subsequently, the computationally discovered similar citation pairs were manually examined by several curators to verify, classify, and characterize them [3]. The ongoing analysis of entries in Déjà vu has uncovered several unethical publication practices ranging from co-submission to plagiarism to data falsification [4,5]. However, our current computational method is not without limitations. Because it utilizes only abstracts to find similar citations, it inevitably omits potential duplicate full text articles whose abstracts may not appear similar enough to warrant further investigation.

Full text articles have become increasingly available via PubMed Central (PMC), NCBI’s free digital archive of biomedical and life sciences journal literature. As of October 2009, there are 765 journals indexed in PMC whose archives of full text articles are freely available on the web (http://www.ncbi.nlm.nih.gov/ pmc/index.html). The electronic availability of such manuscripts has aided in the identification of duplicate citations by allowing for more transparency and thus more precise characterizations of the similarities amongst these articles.

Our previous publications regarding scientific integrity [4,5] through the duplicate findings in Déjà vu have stimulated a broad range of discussions on scientific ethics [6,7]. Although individual thoughts on this topic vary, a general consensus can be drawn that scientific publishing standards are simply not well established enough to account for all types of dubious behaviors [7]. The systematic full text similarity analysis performed in this study will help quantify the current trends and behaviors of duplicate...
Smikin and Roychowdhury. 2002. Based on propagation of citation errors (tracking 4300 citations of 1 paper), 4 out of 5 authors have not read all papers they cite. Only 22-23% of citations followed from a reading of the original paper.
In 2001, he was listed as an author on an average of one research paper every eight days.

In 2001 he announced in Nature that he had produced a transistor on the molecular scale. Schön claimed to have used a thin layer of organic dye molecules to assemble an electric circuit that, when acted on by an electric current, behaved as a transistor.
In a notable move aimed at curbing fraud in scientific publications, the journal *Science* said last week that it will probably begin targeting certain “high-risk” papers for extra scrutiny.

The move comes in response to a report from an external committee convened by the journal to assess its handling of the papers behind the Woo Suk Hwang fraud scandal. And it turns on its head — for a handful of papers at least — the traditional presumption that manuscripts submitted to a journal are researched and written honestly.
Example 3:
JOHNNY CASH once sang that he found it “very, very easy to be true”. Post-modern literary theorists find concepts of truth rather more slippery, particularly in the case of Alan Sokal. Dr Sokal is a physicist who, in 1996, submitted a deliberately nonsensical article to Social Text, a cultural studies journal. The article was published in a special issue on the “Science Wars”—an attempt to examine, from various perspectives, the role of science in culture. Dr Sokal, who was seeking to satirise post-modernism’s chronic lack of intellectual rigour, owned up to his hoax, provoking a lively debate.
We suggest a new solution of the initial spacetime singularity. In this approach the initial singularity of spacetime corresponds to a zero-size singular gravitational instanton characterized by a Riemannian metric configuration (++++) in dimension D = 4. Connected with some unexpected topological data corresponding to the zero scale of spacetime, the initial singularity is thus not considered in terms of divergences of physical fields but can be resolved within the framework of topological field theory. Then it is suggested that the 'zero-scale singularity' can be understood in terms of topological invariants (in particular, the first Donaldson invariant Sigma (i)(-1)(ni)). With this perspective, here we introduce a new topological index, connected with zero scale, of the form Z(beta =0) = Tr(-1)(s), which we call the 'singularity invariant'. Interestingly, this invariant also corresponds to the invariant topological current yield by the hyperfinite IIinfinity von Neumann algebra describing the zero scale of spacetime. Then we suggest that the (pre-)spacetime is in thermodynamical equilibrium at the Planck-scale and is therefore subject to the KMS condition. This might correspond to a unification phase between the 'physical state' (Planck scale) and the 'topological state' (zero scale). Then we conjecture that the transition from the topological phase of the spacetime (around the zero scale) to the physical phase observed beyond the Planck scale should be deeply connected to the supersymmetry breaking of the N = 2 supergravity.
The next section focuses on problems with the review process, some of which are caused by pressures to over-publish, extreme competition for academic jobs and funding, and the glut of literature.
What was the worst/most memorable comment you ever received from a referee?
For my first paper in *Nature*, the core referee’s objection was not the data, not the science, but that my lab had not established its reputation in the field.

**Francis Albarède**

Francis Albarède is professor of geochemistry at the École Normale Supérieure in Lyons, France, recipient of the Bowen Award and the Holmes medal, and senior editor of the *Journal of Geophysical Research: Solid Earth*.

What was the worst/most memorable comment you ever received from a referee?
Something along the lines of: “I don’t care what the data say, I do not believe molecular preservation is possible in specimens this old.”

**Mary Schweitzer**

Mary Schweitzer is a pioneer in the emerging field of studies on biomolecules retrieved from the fossil record. She is in the Department of Microbiology and the Museum of the Rockies at Montana State University, Bozeman, Montana.
Bala ant *Paraponera clavata*

La Selva: $18 \pm 4.5$ per hectare

Protect .04 tons wet-weight leaves per hectare per year.
Actual review comments received by Dyer (combined into one sentence) - The author is an odious specter who is naïve and narrow-minded, his methods are obscure, and he is clearly running a seat-of-the-pants operation that does not resemble science.

Problems with peer review process

- scientific misconduct
  (reviewers are competitors or otherwise biased)
- reviewers are unqualified
- reviewers do not have time
- reviewers are anonymous, authors are not
- reviewers are not required to cite sources
- editors cannot critically assess all reviews
Peerage of Science

For Authors, a way to focus on science

Peerage of Science peer review is done once, before submitting to any journal. Authors are anonymous during the review process, until they accept a publishing offer or submit to a non-participating journal. Authors set the deadlines upon submission, balancing the trade-off between duration and time for deliberation. The revision can be written knowing the weight of each carefully written, peer-reviewed review. The end result includes standardized quantitative evaluation in addition to the reviews.

Most importantly, Authors have freedom of choice: the reviews can be exported to accompany submission to anywhere Authors choose, or Authors may choose from publishing offers sent by participating Journals.

For Reviewers, a way to merit

Peerage of Science offers reviewing opportunities, not reviewing requests. Reviewers can freely choose whether, when and where they want to invest their time and expertise. All deadlines are known in advance, so Reviewers can engage in processes that fit their schedules. Reviewers have absolute anonymity: only the silent server somewhere knows their identity, unless they choose to reveal it.

Most importantly, Reviewers can personally benefit from the work they do: the scores Reviewers get for their reviews, and the number of reviews done, accumulate and build a quantifiable, peer-reviewed reputation as an expert in specific fields of research. In addition, Reviewers can choose to write publication-quality reviews, and publish them as citable, peer-reviewed short articles.

For Editors, a way to enhanced decisions

Peerage of Science frees Editors to concentrate on their crucial role as guardians and gate-keepers of science and stewards of their Journals, instead of having the time-consuming task of organizing peer review for manuscripts authors choose to submit, out of which most end up rejected. Editor workload is drastically reduced, as they can create alerts that automatically notify about manuscripts fitting their Journal's scope, quickly view all information and decide whether to start tracking a manuscript, receive alerts whenever something happens to a manuscript they are tracking, and can make decisions based on peer-reviewed reviews, quantitative indices and comparisons to score distributions of earlier manuscripts in the field.

Most importantly, Editors get a significant advantage: the opportunity to offer publishing proactively (with terms freely defined by the Journal) to best manuscripts, before they are sent to other Journals.

The next section focuses on how the current publication process has produced a large number of unreadable and unhelpful literature - but there are certainly many gems in there as well! This leads to a discussion of how the publication process can be improved (other than simply “reducing pressure to publish”) and how we can synthesize huge piles of publications.
Articles. The greater length of Articles relative to Reports must be justified by their significance to the science. We are asking authors to submit shorter, better-organized pieces that make use of Ecological Archives for digital publication of appendices and supplements.
Nature: What do you most dislike about having research published?

Gerry Melino: Having to read it a few years later.

Lee Dyer: Having to write like a scientist.

Format/style of scientific papers

Journals are filled with error-ridden, dry, uncreative works that do not lend themselves to scientific progress or generality.
Investigators who feel that their results march with full generality into the annals of science are kidding themselves.
EXAMPLE 5

Trophic cascades in tropical versus temperate systems.
Data Papers (abstract up to 350 words). Data Papers should emphasize the collection, organization, synthesis, and thorough documentation of data sets of ecological value. Only the abstract appears in Ecology; the data and metadata are available through Ecological Archives. By providing a peer-review process for such Data Papers, ESA hopes to provide a high-profile outlet for data compilations and recognition for ecologists who create them. Special instructions for Data Papers explain how to prepare data and metadata.
Data Papers

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Data Papers for 2011


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Quandary: Scientists Prefer Reading Over Publishing 'Open Access' Papers

by Gratie Hart in 14 January 2011, 247 PM | 13 Comments

SOLUTIONS

BERLIN—Scientists love open-access papers as readers, but as authors they are still skeptical, according to a new study of available journals and researchers’ attitudes on the topic. The EU-sponsored Study of Open Access Publishing (published the SOAP project) surveyed 50,000 researchers for their opinions on open-access journals, which make all their papers freely available online and usually charge authors a fee for each published paper. (Here’s an example called 

The study found overwhelming support for the concept, with 99% of respondents saying that open access is beneficial to their field. But that support didn’t always translate into action. Although 53% of respondents said they had published at least one open-access article, overall only about 10% of papers are published in open-access journals. “We cannot ignore this gap anymore,” says Salvatore Melle, project leader for open access at CERN near Geneva, Switzerland, and a member of the study team.

The study, which released its full results yesterday at a symposium here, found two main reasons researchers don’t submit their work to open-access journals.

Almost 40% said that a lack of funding for author fees was a deterrent. And 30% cited a lack of high-quality open-access journals in their field. Clearly, “Journal quality and impact factors are most important—not [open access]—when deciding where to submit” for the majority of scientists, says Peter Strickland of the International Union of Crystallography, which publishes the fully open-access Structure Reports Online as well as seven subscription-based journals.

Requiring authors to make sure the results of their work are freely available has had only partial success. Robert Kiley, head of digital services at the Wellcome Trust’s Wellcome Library in London, said at the symposium that open-access rates had risen from 12% to 50% since the funder began requiring its grantees to publish in open-access journals or deposit their papers in a freely available repository. Kiley acknowledged, however, that the Wellcome had not imposed sanctions on researchers who failed to comply. “We are trying to persuade people rather than punish them,” he said.

The study also makes it clear that open-access journals are proliferating, especially among small publishers. The study found that one-third of open-access papers were published by the more than 1500 open-access publishers that publish only a single journal. Several hundred new open-access journals are being launched each year, noted Caroline Sutton of the Open Access Scholarly Publishers Association in The Hague. “It’s really difficult to launch a new subscription-based journal, but the open-access fee model is scalable,” she says. “As you receive more submissions and publish more papers, you get more fees.”

The study also identified 14 “large publishers” that publish either more than 50 journals or more than 1000 articles per year. The group accounts for roughly one-third of open-access publications, the study found. Other large publishers are catching up. Half a dozen large scientific publishers have announced new open-access journals in the past 6 months, notes Mark Patterson, director of publishing at the Public Library of Science (PLoS). All are modeled on PLoS ONE, the publisher’s biggest journal (and main revenue generator). The journal publishes papers after an accelerated peer review in which experts check for scientific rigor but not overall importance. Nature Publishing Group is the latest to jump on board. It announced last week that it was accepting submissions for a new rapid-review, all open-access journal, Scientific Reports, due to begin publishing in June.
SOLUTIONS

• Fix problems with the review process. (reward reviewers, punish dishonesty, decrease # pubs reviewed)
• Publish less.
• Do not push undergraduates to publish.
• Allow more time for dissertations.
• Modify hiring criteria.
• Modify tenure criteria.
• Publish more data papers.
• Diversify the publishing process.

Writing scientific papers should include time for further research (if necessary), careful revision, and maturation of the work into a significant study.
The slides that follow are accompanied by a discussion of the job market for PhDs in ecology and evolutionary biology and talk about the role of evaluation metrics, such as number of publications, for different types of jobs. - some times search committees are actually looking for quality over quantity! I also discuss the broad array of jobs that PhD biologists can seek and go into the process of applying for jobs, interviewing, and negotiating when an offer is made.
Just one example: Graeme Eisenhofer, NIH.
SCIENTIFIC PRODUCTIVITY: WANING IMPORTANCE FOR CAREER DEVELOPMENT OF TODAY'S SCIENTIST?

Figure 1. Total number of publications from 1990-1994 in rank order for each of the individuals on tenure track mid 1994.

Figure 2. Impact factor scores of publications (1990-1994) in rank order for each of the individuals on tenure track mid 1994.

Figure 5. Number of citations each scientist received for first authored papers determined from the 1990-1993 citation index.
Mean h-index for full professors at a tier one research institution is: 12 +/- 6.8
At other institutions it is even lower.
Employment

HAVE PhD
FINISHED 3 POSTDOCS
PUBLISHED 6 PAPERS
WILL WORK FOR FOOD
Employment options outside of academia

Industry
- pharmaceutical
- biotech
- agriculture
- statistics

Agency
- Land management
- Other governmental (EPA, USDA)
- NGOs

Museums
Ecotourism
More options for people with advanced degrees

- research
- teaching
- journalism
- technical writing
- publishing
- intellectual property
- patent law
- public policy
- museum curating
- investment banking
- research admin
- educational admin
- grants admin
- bioinformatics
  ... and much more
Finding a match

<table>
<thead>
<tr>
<th>you</th>
<th>the job</th>
</tr>
</thead>
<tbody>
<tr>
<td>what you enjoy</td>
<td>responsibilities</td>
</tr>
<tr>
<td>what you want</td>
<td>income</td>
</tr>
<tr>
<td>your strengths</td>
<td>effort</td>
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<tr>
<td>your constraints</td>
<td>impact</td>
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<tr>
<td></td>
<td>location</td>
</tr>
</tbody>
</table>
Networking

- most important source of information
- importance increases with experience
- >75% of all jobs come from networks
- developing your network.
How to get an academic job

• Work hard.

• Publish all the chapters of your dissertation, only if they warrant publication.

• Apply to all relevant jobs.

• Do a good postdoc.

• Teach your own class.

• Service (review papers and proposals, get on search committees, etc.)
How to get an academic job

• Work hard.

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• Apply to all relevant jobs.

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• Teach your own class.

• Service (review papers and proposals, get on search committees, etc.)

Note: I am not advising graduate students to avoid publishing! I published all the data chapters from my dissertation (and they were reasonable quality, I think), and I urge my students to do the same. The point of this talk was a general critique of the pressure to over-publish as well as a review of how science works once you have results to report.
How to get an academic job

 Luck