

IUCr input to ICSU on the two related issues of *Open access* and *Evaluation by metrics*

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Communicated by Prof Dr Sine Larsen, Immediate Past President of the IUCr, to ICSU Sept 1st 2013.

1. Open Access

1.1 Publications

The difficulties with accessing publications for readers have become increasingly severe, with articles held behind journal subscription paywalls. This is most notably a problem for tax-paying members of the public who may well wish to read about medical or climate research for example. Researchers, who publish publications and are readers themselves of course, have been somewhat insulated from the subscriptions costs paid by their libraries. These costs have steadily escalated, especially from some commercial publishers. This is exacerbated by the additional tactic of some publishers of bundling of popular journals with others that are 'rarely read'. This approach has also been increasingly resented by librarians. Via considerable pressure from funding agencies like the USA's NIH and the UK's Wellcome Trust so called Green Open Access is a major achievement of the last few years and whereby a hard won agreement that publishers provide publication copies after 1 year is a very pragmatic solution that IUCr firmly supports. The Gold open access publication method, of researchers always paying article processing charges giving readers guaranteed and immediate access to those publications has been championed by The Wellcome Trust and now by RCUK (from April 2013) who now provide their funded research grants with monies for these article processing charges.

If the vision of authors alone having to pay for publication of their results comes about globally the real danger is that only a small fraction of what we discover in our research will be published in future. What is the alternative for the unfunded research within the successful 'peer reviewed publication old traditional method' of communicating research results? Perhaps the Article Processing Charge (APC) can be waived for a given author's article? This is potentially a very important point that could also affect, besides non-funded researchers in the developed world, also a perhaps much larger number in the developing world. Striking a balance between Open Access for readers and Open Access for Authors by ICSU is very important. The vast majority view of Funding Agencies is not to introduce Gold Open Access but to support the Green Access approach (albeit not shared by the UK which is the exception and who do prefer Gold Open Access).

1.2 Data

The IUCr and its journals are an exemplar with respect to requiring the processed experimental data and the derived molecular coordinates to be attached to its publications. This was introduced over a decade ago both for structural studies in chemistry and materials science, condensed matter physics and for biology. In 2011 it set up a Diffraction Data

Deposition Working Group to examine the possibility of extending this approach to include raw, unprocessed, data with its publications. Initiatives already taken by the Working Group include: (1) encouraging different communities within crystallography to develop the best metadata descriptors needed to characterise the raw data from different types of experiment; (2) demonstrating via specific research articles how this can be achieved (eg see J Appl Cryst 2013 doi:- [doi:10.1107/S0021889812044172](https://doi.org/10.1107/S0021889812044172)].

The public funding model of the Protein Data Bank (PDB) has the obvious advantage that data held in the PDB is accessible at no cost to the end-user even if a publication is behind a subscription pay wall. To guard against shortfalls in public funding from a single hosting country, the PDB is now managed by a worldwide consortium able to draw on public funding from a number of countries. Other crystallographic databases have evolved historically on a subscriber's model where the person or institution using the database pays. Such databases are perceived by their subscribers as providing added value to the data collection through aggregation, validation, curation and development of software-based analysis tools. However, they do face challenges in adding this value without encroaching upon the right of access to the un-curated data that they originally collected. Such important databases must carefully balance a desire for openness in exposing their content with the charging mechanism they apply to their subscribers in order to achieve financial sustainability. At present, there is no indication that public funding might be available to provide open access to the contents of these databases. Clearly Agencies and Organisations need to be careful about recommending well-meaning policies for 'Gold Open Access' but without realistic business plan ideas how to fund them (see **Science** 9 August 2013: Vol. 341 no. 6146 pp. 616-617 ... *Who Will Pay for Public Access to Research Data?*). The finance model of 'Author ie researcher pays', and its pros and cons, are the same as detailed in section 1.1 for publications.

The IUCr Working Group on Data Deposition is also scrutinising the retention period for raw data (typically 10 years since last access ie which is the UK's EPSRC's policy) and whether and how to make raw data available after a period and where publication has not resulted. There are sensitivities here for crystallography researchers who have invested effort in preparing and studying a sample; this is a significant difference from a science such as astronomy that studies 'the night sky' – clearly not prepared by the researcher in their home laboratory!

2 Evaluation by Metrics

The IUCr does not take a prescriptive view of the use of metrics to evaluate research or researchers eg in promotion or appointment committees. This should be left to the judgement of an individual employer. Used sensibly we would remark that it is possible to avoid the obvious weaknesses of eg citations data for a given publication such as the case of an incorrect but high profile piece of research (the first cold fusion publication being a notable example). That said evaluation solely by metrics with no personal judgement is also going to fall into difficulties like the variation of average citation statistics per research field ie which can and does vary between research fields. As a learned-society publisher, we provide authors the chance in a couple of the journals we publish, in total nine titles, for scientists to report results that individually may have

relatively little novelty or obvious immediate citation impact, but which collectively build a deeper understanding of the fundamental properties of nature that can lead to very significant new discoveries and theories. We also insist, as with all our publications, in the attachment of the derived and processed data to these publications making an especially strong collection in structural chemistry and biology.

Appendix Invite from ICSU:-

Re. Open access and Evaluation by metrics

Dear ICSU member,

On behalf of the Executive Board, we are seeking your input into a discussion ICSU is intending to organize at the 2014 General Assembly on the two related issues of *Open access* and *Evaluation by metrics*, which could lead to corresponding resolutions being proposed to the General Assembly.

The questions surrounding open access to the scientific literature and data have become impossible for individual scientists to ignore, as national and supra-national funding agencies take increasingly aggressive action to ensure that the results of the research they fund are freely available to all. This is linked with the promotion of new publication models that affect authors in ways that depend on their ability to pay. Related to this is the high cost of many existing subscription based journals and books, access to which is thus dependent on institutional and national wealth. At the same time, an emphasis on more open access to data, increasingly important in the new data rich science era, is raising new issues regarding security, ethics, IPR, formal publication of data, incentives to scientists to provide their data etc. A related trend is that research funders, universities and governments are increasingly relying on quantitative metrics, in particular based on citation statistics, to evaluate universities, departments and individuals, thus encouraging researchers to adopt practices that maximize these metrics.

The issues surrounding open access have been addressed in several ICSU documents and studies. Indeed, ICSU's pivotal Statute V states:

*The Principle of Universality (freedom and responsibility) of Science: the free and responsible practice of science is fundamental to scientific advancement and human and environmental well-being. Such practice, in all its aspects, requires freedom of movement, association, expression and communication for scientists, **as well as equitable access to data, information, and other resources for research.** It requires responsibility at all levels to carry out and communicate scientific work with integrity, respect, fairness, trustworthiness, and transparency, recognising its benefits and possible harms.*

*In advocating the free and responsible practice of science, ICSU **promotes equitable opportunities for access to science and its benefits**, and opposes discrimination based on such factors as ethnic origin, religion, citizenship, language, political or other opinion, sex, gender identity, sexual orientation, disability, or age.*

The recent CFRS advisory note http://www.icsu.org/publications/cfrs-statements/data-sharing/ICSU_CFRS_Advisory_Note_Data_Sharing addresses the sharing of scientific data, with a focus on developing countries.

The ICSU Ad-hoc Strategic Coordinating Committee on Information and Data (SCCID Report, 2011) <http://www.icsu.org/publications/reports-and-reviews/strategic-coordinating-committee-on-information-and-data-report> makes various recommendations to improve universal and equitable access to data and information for science, including clarification of ICSU policies and terminology.

We welcome your comments in general on these interrelated issues, and specifically in relation to the following questions:

1. What requirements do funders of research in your country or subject area currently make, or plan to make, as regards open access publication, including open access to data? (Please give links to relevant documents.) What advantages and disadvantages do you see in such open access requirements, whether in your country/subject area or elsewhere?
2. To what extent are metrics being used to evaluate universities, departments and individuals in your country or subject area, what metrics are used, and how are these influencing publication trends and incentives for researchers?
3. What useful role, if any, do you think ICSU can play in these matters?

We would appreciate replies by **1 September 2013** to Rohini@icsu.org.

Sincerely,

Professor John Ball,
on behalf of the EB sub-group on Data and Information