



# Research assessment and the rising tide of metrics

Ben Johnson

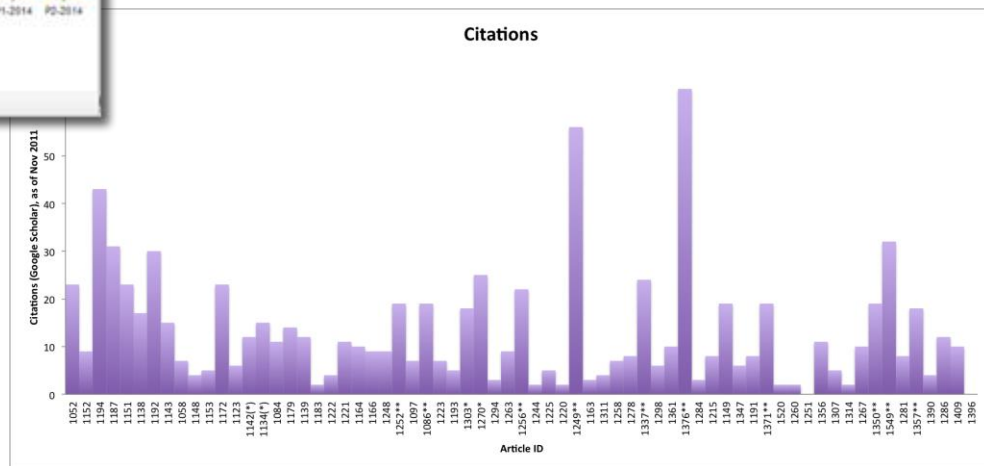
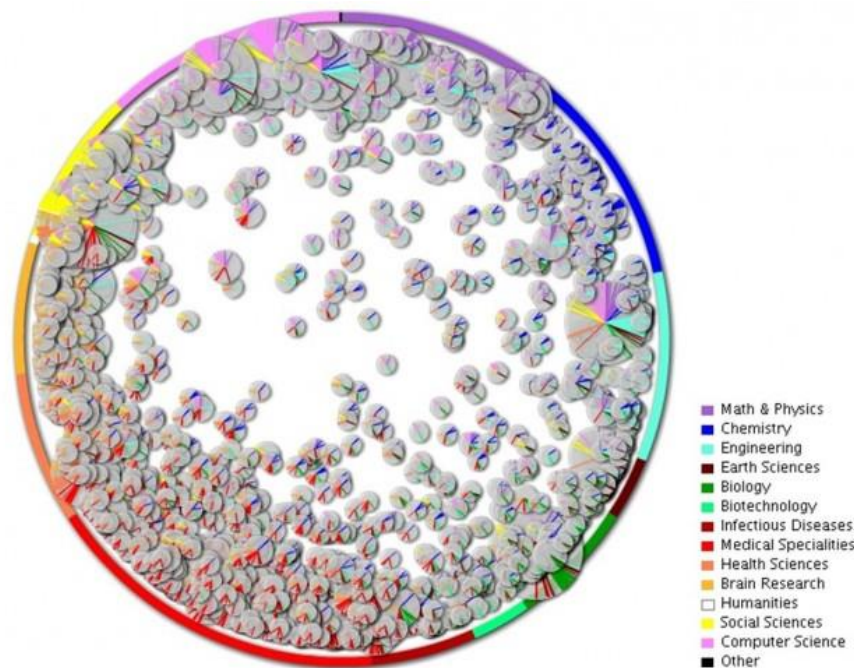
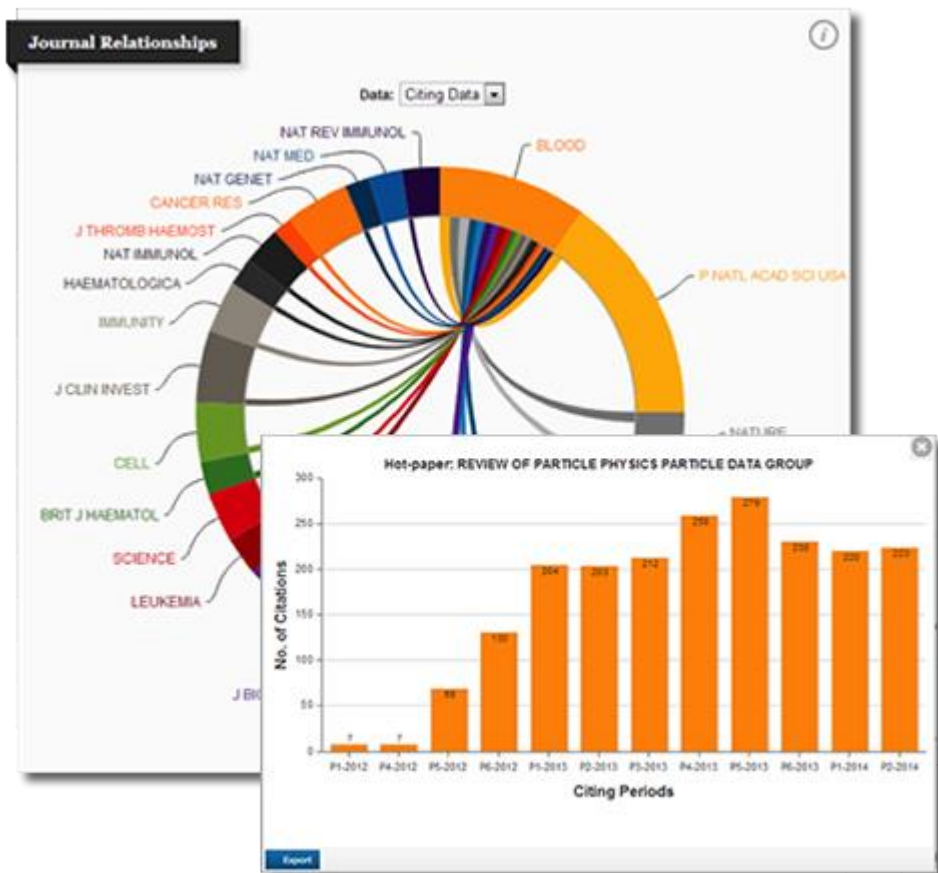
Research Policy Adviser, HEFCE

13 October 2015

# About HEFCE

- We invest in the teaching, research and knowledge exchange activities of English higher education institutions. £3971M per annum (= €5362M)
- We regulate and oversee English HEIs (quality and financial sustainability)
- **We operate the UK-wide Research Excellence Framework (REF) [www.ref.ac.uk](http://www.ref.ac.uk)**

# Metrics everywhere!





# The Metric Tide

<http://www.hefce.ac.uk/rsrch/metrics/>

Report of the Independent Review  
of the Role of Metrics in  
Assessment and Manag



## The Metric Tide

### Literature Review

Supplementary Report I to the  
Independent Review of the Role of  
Metrics in Research Assessment  
and Management

July 2015



## The Metric Tide


### Correlation analysis of REF2014 scores and metrics

Supplementary Report II to the  
Independent Review of the Role of  
Metrics in Research Assessment  
and Management

July 2015



<http://www.responsiblemetrics.org>



*“I have asked HEFCE to undertake a review of the role of metrics in research assessment and management. The review will consider the robustness of metrics across different disciplines and assess their potential contribution to the development of research excellence and impact...”*

David Willetts, Minister for Universities & Science,  
Speech to Universities UK, 3  
April 2014



# Steering group

The review was chaired by **James Wilsdon**, Professor of Science and Democracy at the Science Policy Research Unit (SPRU), University of Sussex. He was supported by an **independent steering group** and a secretariat from HEFCE's Research Policy Team:

**Dr Liz Allen** (Head of Evaluation, Wellcome Trust)

**Dr Eleonora Belfiore** (Associate Professor of Cultural Policy, University of Warwick)

**Sir Philip Campbell** (Editor-in-Chief, Nature)

**Professor Stephen Curry** (Department of Life Sciences, Imperial College London)

**Dr Steven Hill** (Head of Research Policy, HEFCE)

**Professor Richard Jones FRS** (Pro-Vice-Chancellor for Research and Innovation, University of Sheffield) – representing the Royal Society

**Professor Roger Kain FBA** (Dean and Chief Executive, School of Advanced Study, University of London) – representing the British Academy

**Dr Simon Kerridge** (Director of Research Services, University of Kent) – representative of the Association of Research Managers and Administrators

**Professor Mike Thelwall** (Statistical Cybermetrics Research Group, University of Wolverhampton)

**Jane Tinkler** (Parliamentary Office of Science & Technology)

**Dr Ian Viney** (Head of Evaluation, Medical Research Council) – representing RCUK

**Professor Paul Wouters** (Centre for Science & Technology Studies, Uni of Leiden)



# Our approach and evidence sources

- Steering group: diverse expertise and extensive involvement;
- Broad TORs: opening up, rather than closing down questions;
- Transparent: publishing minutes & evidence in real time;
- Formal call for evidence, May to June 2014;
  - 153 responses; 44% HEIs; 27% individuals; 18% learned societies; 7% providers; 2% mission groups; 2% other
- Stakeholder engagement
  - 30+ events, inc. 6 review workshops, including on equality & diversity, A&H. Invited fiercest critics!
  - Ongoing consultation & use of social media e.g. **#hefcemetrics**;
- In-depth literature review;
- Quantitative correlation exercise relating REF outcomes to indicators of research;
- Linkage to HEFCE's evaluations of REF projects;
- Interim findings on 25 March; followed by full report on 9 July.



Online tools

- R&D Solutions for Industry
- Elsevier BioSource
- Elsevier Research Intelligence
- Products & Services
- Research Initiatives
- News & Events
- Resource Library
- FAQ
- Erbase
- ErCompass
- Engineering Village
- Geofacts
- IllumiD

Response to HEFCE's call for evidence: Independent review of the role of metrics in research assessment

Share This: [f](#) [t](#) [in](#) [v](#)



This document describes Elsevier's position on the use of research metrics in research assessment by laying out 12 guiding principles. It is a response to the request for evidence issued by the Higher Education Funding Council for England (HEFCE) that runs the national assessment exercise (REF) in the UK.

**Subjects, Products & Services:** Analytical Services; Evaluating Performance; Measuring Research Performance; Pure; Research Management; SoVal  
**Updated:** 2014-07-22 12:00:00

## Why Metrics Cannot Measure Research Quality: A Response to the HEFCE Consultation

JUNE 16, 2014 / MEERA



**Update 24th June:** 7500+ views, 100s of shares, 200+ signatories! And a new post with some responses to further issues raised.

The Higher Education Funding Council for England are reviewing the idea of using metrics (or citation counts) in research assessment. We think using metrics to measure research quality is a terrible idea, and we'll be sending the response to them below explaining why. The deadline for receiving responses is 12pm on Monday 30th June (to

SOME NOTES ON RHETORIC



SUBSCRIBE!

Join 3,927 other followers

Enter your email address

Yes please!

RECENT POSTS

[Resistance to Global LGBT Norms](#)

## DC's Improbable Science

Truth, falsehood and evidence: Investigations of dubious and dishonest science



SEARCH THIS BLOG

To search, type and hit enter

META

- Register
- Log in
- Entries RSS
- Comments RSS
- WordPress.org



— [Bad financial management at Kings College London means VC Rick Trainer is firing 120 scientists](#)  
 What is meant by the "accuracy" of screening tests? —

**Should metrics be used to assess research performance? A submission to HEFCE**

June 18th, 2014 - 10 Comments

[Join to follow us](#)

The Higher Education Funding Council England (HEFCE) gives money to universities. The allocation that a university gets depends strongly on the periodical assessments of the quality of their research. Enormous amounts of time, energy and money go into preparing submissions for these assessments, and the assessment procedure distorts the behaviour of universities in ways that are undesirable. In the last assessment, four papers were submitted by each principal investigator, and the papers were read.

In an effort to reduce the cost of the operation, HEFCE has been asked to reconsider the use of metrics to measure the performance of academics. The committee that is doing this job has asked for submissions from any interested person, by June 20th.

RECENT POSTS

- [UCL's senior common room and the Boston marathon: emancipation in the 1960s, and now](#)
- [Some more pharmacological history: the legend of the broken and the statistics of purity in heart](#)
- [What is meant by the "accuracy" of screening tests?](#)
- [Should metrics be used to assess research performance? A submission to HEFCE](#)
- [Bad financial management at Kings College London means VC Rick Trainer is firing 120 scientists](#)
- [Deadly Medicines and Organised Crime: a review](#)
- [On the hazards of significance testing](#)



Thursday, September 25, 2014 | Views, Policy and News on the Transformation of Research Communications

# PLOS Opens

— From Open Buttons to OpenCon —  
 Building a student community

A license to please →

## PLOS Response to the HEFCE RFI on Metrics in Research Assessment

By Cameron Neylon  
 Posted: July 2, 2014

SHARE [f](#) [t](#) [in](#) [v](#)

*The Higher Education Funding Council for England, the body that manages the UK's Research Excellence Framework, recently announced an enquiry on the use of metrics in research assessment. HEFCE's views on research assessment matter a great deal to UK Universities because the REF distributes a substantial proportion of the UK's research funding as block grants on the basis of that assessment. As part of this process the enquiry committee issued a call for evidence. The covering letter and summary of the PLOS submission are provided below, you can find the full PLOS RFI response at [PlosShare](#).*

Dear Committee Members

Thank you for the opportunity to respond to your call for evidence. PLOS has been at the forefront of experimenting with and advocating for new modes of research assessment for a decade. Recent developments such as [DORA](#) and your own enquiry suggest that the time is appropriate for a substantial consideration of our approaches and tools for research assessment.

Subscribe via RSS reader

Recent Posts

- [Policy Design and Implementation Monitoring for Open Access](#)
- [eXO-NewLearners Update](#)
- [The rise and rise of Creative Commons: Over 1.6M CC Licensed Scholarly Articles](#)
- [Momentum growing in support of Creative Commons framework](#)
- [Wikidata: We need to choose the main stream over our small pool](#)

Recent Comments

- [On the Subject of Creative Commons \(Y M\) Maud Tumbelin](#) on [The rise and rise of Creative Commons: Over 1.6M CC Licensed Scholarly Articles](#)

About PLOS Opens

The PLOS Opens blog provides news and views on the ongoing transformation of research communication. We talk about open access, policy, and approaches to open research. Posts will cover evidence and data, opinions and critical analysis from the PLOS Advocacy Team, other PLOS staff and invited guests.

The PLOS Advocacy Team

Catriona MacCallum studied evolutionary biology at Edinburgh. She joined PLOS in July 2013 as a launch editor of PLOS Biology and was also involved in the development of the Community Journals and PLOS ONE. As part of the advocacy team, she focuses on EU policy. She is also a Consulting Editor on PLOS ONE and a member of the Board of CASPA.



# World University Rankings 2015-16

IN PARTNERSHIP WITH  
**ELSEVIER**

2016 ▼

The Times Higher Education World University Rankings 2015-2016 list the best global universities and are the only international university performance tables to judge world class universities across all of their core missions - teaching, research, knowledge transfer and international outlook.

Filter by name

Filter by country

Rankings Only

Performance Breakdown

Key Statistics \*

Rank

Title

1

**California Institute of Technology**

United States of America



Add

2

**University of Oxford**

United Kingdom



Add

## World University Ranking News

THE World Academic Summit 2016 to take place at Berkeley

Times Higher Education subject rankings 2015-2016 published from 14 October

World University Rankings 2015-2016: results announced  
1

## Tweets

Follow



**Gary Wood** @GC\_Wood 29m

#EmbedEnterprise for authentic learning, research-led teaching, innovation and creativity. #GreatHEteaching [twitter.com/timeshighered/...](#)

Retweeted by TimesHigherEducation

Expand



**Felicity** @Dr\_Coumarin 39m

Avoid leaning on the lectern. Very hard to regain composure from the floor of the lecture theatre. @timeshighered @DrPetra #greatHEteaching

Retweeted by TimesHigherEducation

Expand



**TimesHigherEducation** @timeshighered 13m

Barely one in four new courses launched

## Announcing the 2<sup>nd</sup> Altmetrics Conference: Amsterdam

To follow the successful first annual altmetrics conference, 1:AM (London), 2:AM will be held in Amsterdam on October 7-8th 2015.

Join us at this year's meeting to continue discussions on all things altmetrics, where we'll build on the themes and ideas of last year. To help us bring the final program together we'd love to know which topics are of most interest to you - please do take a few minutes to give us your thoughts in [this short survey](#).

There'll be lots happening, including a hack day ahead of the main event. The 2:AM conference will be held in concert with the altmetrics research conference, altmetrics15 (Oct 9) to further collaboration and cross-pollination between research and practice - more details on this will follow soon.

*Stay tuned for further programme details!*

### Tweets



**2AM Amsterdam** @2AMconf  
2:AM #altmetrics conference travel grant applications now open: see [ow.ly/OMDd8](http://ow.ly/OMDd8) & [ow.ly/OMDd8](http://ow.ly/OMDd8) #libchat #phdchat

25 Jun

Expand



**2AM Amsterdam** @2AMconf  
Science journalist @SLSingh announced as keynote speaker for @2amconf #altmetrics conference: Oct 7-8, Amsterdam [ow.ly/OoLMI](http://ow.ly/OoLMI)

16 Jun

Expand

Tweet to @2AMconf

Supported by:

wellcome trust



ELSEVIER



nature publishing group



The San Francisco Declaration on Research Assessment (DORA), initiated by the American Society for Cell Biology (ASCB) together with a group of editors and publishers of scholarly journals, recognizes the need to improve the ways in which the outputs of scientific research are evaluated. The group met in December 2012 during the ASCB Annual Meeting in San Francisco and subsequently circulated a draft declaration among various stakeholders. DORA as it now stands has benefited from input by many of the original signers listed below. It is a worldwide initiative covering all scholarly disciplines. We encourage individuals and organizations who are concerned about the appropriate assessment of scientific research to sign DORA.



Download the Declaration (PDF)

Download the DORA Logo (ZIP)

Download the DORA Poster (PDF)

## San Francisco Declaration on Research Assessment

*Putting science into the assessment of research*

There is a pressing need to improve the ways in which the output of scientific research is evaluated by funding agencies, academic institutions, and other parties.

To address this issue, a group of editors and publishers of scholarly journals met during the Annual Meeting of The American Society for Cell Biology (ASCB) in San Francisco, CA, on December 16, 2012. The group developed a set of recommendations, referred to as the *San Francisco Declaration on Research Assessment*. We invite interested parties across all scientific disciplines to indicate their support by adding their names to this Declaration.

The outputs from scientific research are many and varied, including: research articles reporting new knowledge, data, reagents, and software; intellectual property; and highly trained young scientists. Funding agencies, institutions that employ scientists, and scientists themselves, all have a desire, and need, to assess the quality and impact of scientific outputs. It is thus imperative that scientific output is measured accurately and evaluated wisely.

The Journal Impact Factor is frequently used as the primary parameter with which to compare the scientific output of individuals and institutions. The Journal Impact Factor, as calculated by Thomson Reuters, was originally created as a tool to help librarians identify journals to purchase, not as a measure of the scientific quality of research in an article. With that in mind, it is critical to understand that the Journal Impact Factor has a number of well-documented deficiencies as a tool for research assessment. These limitations include: A) citation distributions within journals are highly skewed [1-3]; B) the properties of the Journal Impact Factor are field-specific: it is a composite of multiple, highly diverse article types, including primary research papers and reviews [1, 4]; C) Journal Impact Factors can be manipulated (or "gamed") by editorial policy [5]; and D) data used to calculate the Journal Impact Factors are neither transparent nor openly available to the public [4, 6, 7].

## News About DORA

- Why we are not ready for radical changes in science publishing - [click for article](#)
- Nobel Laureate Schekman Offers NIH His First Post-Prize Talk - [click for article](#)
- Editorial - "Dear DORA" - [click for article](#)
- Science publishing: The golden club - [click for article](#)
- DORA has been translated into Japanese - [click for article \(PDF\)](#)
- Time To Change How Research is Assessed - [click for article](#)



ADVERTISEMENT



**nature** JOHN NASH

**SPECIAL** Master of games and equations

Access the Special online

ADVERTISEMENT

Image credit: Robert P. Matthews/Princeton Univ/Getty

nature Impact Factor score 41.456\*

Home | News & Views

Archive > Volume

Advanced search

Facebook Twitter

£/\$/€ **44**

**Ranked no.1** interdisciplinary science journal\*  
Subscribe at this rate for a **limited time only**

**Subscribe**

\*2014 Journal citation report (Thomson Reuters, 2015)  
Terms and conditions apply.



James Wilsdon

08 July 2015

PDF Rights & Permissions



**US vaccine researcher sentenced to prison for fraud**

The case of Dong-Pyou Han illustrates the uneven

Metrics evoke a mixed reaction from the research community. A commitment to using data and evidence to inform decisions makes many of us sympathetic to, even enthusiastic about, the prospect of granular, real-time analysis of our own activities. If scientists cannot take full

HOME > | METRICS: HOW TO HANDLE THEM RESPONSIBLY

## Metrics: how to handle them responsibly

Amid concerns about the growing use – and abuse – of quantitative measures in universities, a major new review examines the role of metrics in the assessment of research, from the REF to performance management

JULY 9 2015

BY PAUL JUMP  
FOLLOW AUTHOR ON PAULJUMP



PAGE 1 OF 3



SOURCE: REX

Follow us on Twitter at #HEFCEmetrics



# The Metric Tide

## Headline findings



Across the research community, the description, production and consumption of 'metrics' remains contested and open to misunderstandings.

# COMMENT

**SUSTAINABILITY** Data needed to drive UN development goals **p.432**



**CONSERVATION** Economics and environmental catastrophe **p.434**

**GEOLOGY** Questions raised over proposed Anthropocene dates **p.436**

**HISTORY** Music inspired Newton to add more colours to the rainbow **p.438**



## The Leiden Manifesto for research metrics

Use these ten principles to guide research evaluation, urge **Diana Hicks, Paul Wouters** and colleagues.

Data are increasingly used to govern science. Research evaluations that were once bespoke and performed by peers are now routine and reliant on metrics<sup>1</sup>. The problem is that evaluation is now led by the data rather than by judgement. Metrics have proliferated: usually well intentioned, not always well informed, often ill applied. We risk damaging the system with the very tools designed to improve it, as evaluation is increasingly implemented by organizations without knowledge of, or

advice on, good practice and interpretation.

Before 2000, there was the Science Citation Index on CD-ROM from the Institute for Scientific Information (ISI), used by experts for specialist analyses. In 2002, Thomson Reuters launched an integrated web platform, making the Web of Science database widely accessible. Competing citation indices were created: Elsevier's Scopus (released in 2004) and Google Scholar (beta version released in 2004). Web-based tools to easily compare institutional research productivity and impact

were introduced, such as InCites (using the Web of Science) and SciVal (using Scopus), as well as software to analyse individual citation profiles using Google Scholar (Publish or Perish, released in 2007).

In 2005, Jorge Hirsch, a physicist at the University of California, San Diego, proposed the *h*-index, popularizing citation counting for individual researchers. Interest in the journal impact factor grew steadily after 1995 (see 'Impact-factor obsession').

Lately, metrics related to social usage ▶

Peer review, despite its flaws and limitations, continues to command widespread support across disciplines. Metrics should support, not supplant expert judgement.



## INFORMING RESEARCH CHOICES: INDICATORS AND JUDGMENT

The Expert Panel on Science Performance and Research Funding



Council of Canadian Academies  
Conseil des académies canadiennes

Government of Canada  
Gouvernement du Canada

Inappropriate indicators create perverse incentives. There is legitimate concern that some quantitative indicators can be gamed, or can lead to unintended consequences.

Previous post

[Upsides and downsides of openness — the view from TEDGlobal](#)

Next post

[Mexico's new president aims high on science](#)

NATURE NEWS BLOG

## Record number of journals banned for boosting impact factor with self-citations

29 Jun 2012 | 19:53 BST | Posted by Richard Van Noorden | Category: Science communication

More research journals than ever are boosting their impact factors by self-citation.

Every year, Thomson Reuters, the firm that publishes the impact-factor rankings, takes action against the most extreme offenders by [banning them from the latest lists](#). It lets them in again, suitably chastened, a couple of years later.

And this year, the apparent game playing has reached an all-time high. Thomson Reuters has excluded 51 journals from its 2011 list, [published yesterday](#); 28 of the banned are new offenders, says Marie McVeigh, director of the firm's annual *Journal Citation Reports (JCR)*, and the others remain blacklisted from last year. The full list is available [here](#) for subscribers to *JCR*.

That's a substantial increase on previous years: 34 journals were excluded from the 2010 lists, compared to only 26 in 2009, 20 in 2008 and just 9 in 2007.

Almost all of those banned are excluded because of excessive self-citation, although three journals — *Cell Transplantation*, *Medical Science Monitor* and *The Scientific World Journal* — apparently worked together to cite each other and thus raise impact factors. That "cartel" was originally reported by [Phil Davis on The Scholarly Kitchen](#), and he has today posted a [follow-up article](#) on that ban. McVeigh says that this incident, which she calls "an anomaly in citation stacking", is the only one of its kind that she has found.



Indicators can only meet their potential if they are underpinned by an open and interoperable data infrastructure.

ORCID



Our correlation analysis of the REF2014 results at output-by-author level has shown that individual metrics cannot provide a like-for-like replacement for REF peer review.

# The Metric Tide

Correlation analysis of REF2014 scores and metrics

Supplementary Report II to the Independent Review of the Role of Metrics in Research Assessment and Management

July 2015



Within the REF, it is not currently feasible to assess the quality of research outputs using quantitative indicators alone, or to replace narrative impact case studies and templates.

## Search REF Impact Case Studies

Browse the index below or search all Case Studies using keywords [e.g. "NHS"].

Learn about advanced search options [here](#).

### Browse the index

Submitting Institution

Unit of Assessment

Summary Impact Type

Research Subject Area

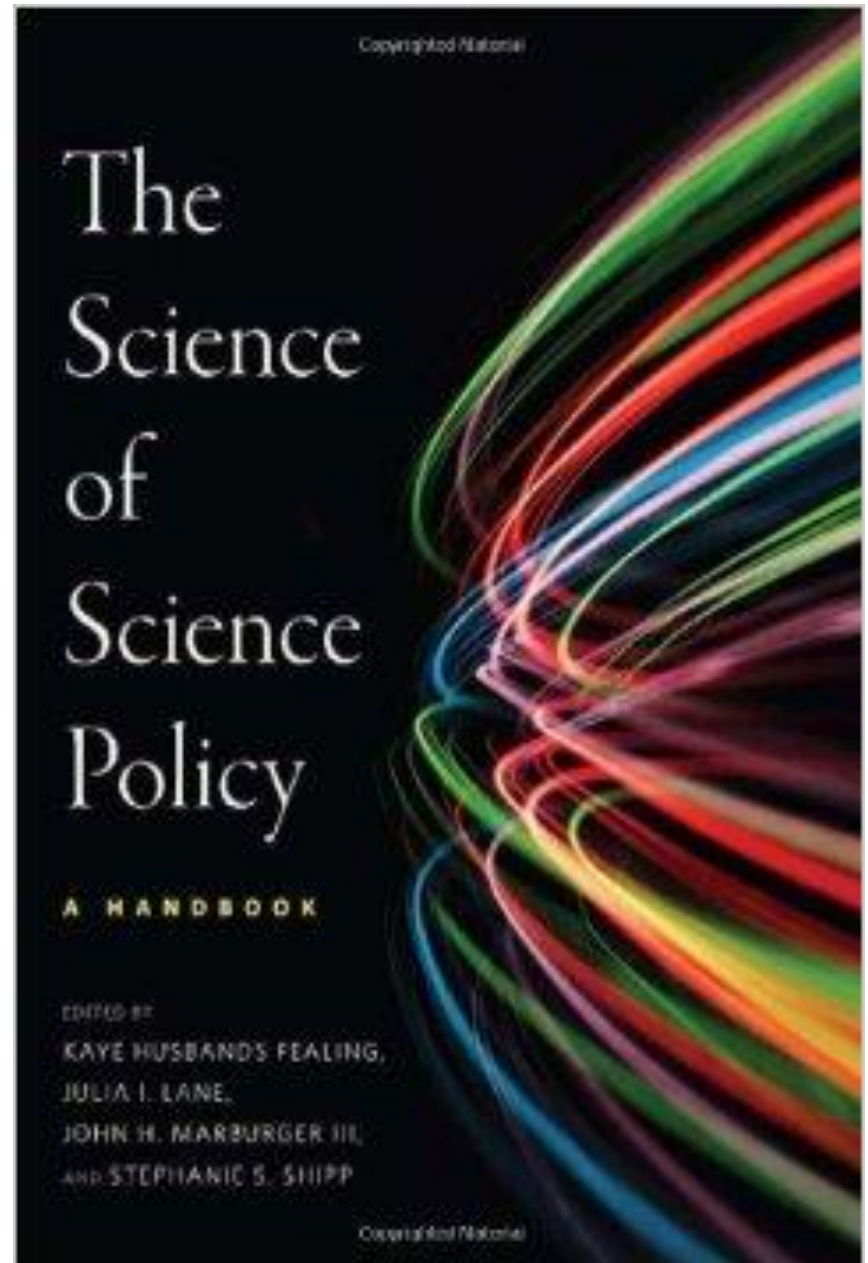
Impact U

### Submitting Institution

<a href="#">East</a>	(454)	<a href="#">East Midlands</a>	(441)
<a href="#">Anglia Ruskin University</a>	(32)	<a href="#">Bishop Grosseteste University</a>	(6)



There is a need for more research on research. The study of research systems – sometimes called the ‘science of science policy’ – is poorly funded in the UK.



# Responsible metrics

Responsible metrics can be understood in terms of:

- **Robustness:** basing metrics on the best possible data in terms of accuracy and scope;
- **Humility:** recognizing that quantitative evaluation should support – but not supplant – qualitative, expert assessment;
- **Transparency:** keeping data collection and analytical processes open and transparent, so that those being evaluated can test and verify the results;
- **Diversity:** accounting for variation by field, using a variety of indicators to reflect and support a plurality of research & researcher career paths;
- **Reflexivity:** recognizing the potential & systemic effects of indicators and updating them in response.



Follow us on Twitter at #HEFCEmetrics



# The Metric Tide

## Recommendations



The research community should develop a more sophisticated and nuanced approach to the contribution and limitations of quantitative indicators.



## We need a measured approach to metrics

*Quantitative indicators of research output can inform decisions but must be supported by robust analysis, argues James Wilsdon.*

Metrics evoke a mixed reaction from the research community. A commitment to using data and evidence to inform decisions makes many of us sympathetic to, even enthusiastic about, the prospect of granular, real-time analysis of our own activities. If scientists cannot take full advantage of the possibilities of big data, then who can?

Yet we only have to look at the blunt use of metrics such as journal impact factors, *h*-indices and grant-income targets to be reminded of the pitfalls. Some of the most precious qualities of academic culture resist simple quantification, and individual indicators can struggle to do justice to the richness and plurality of our research. Too often, poorly designed evaluation criteria are distorting behaviour and determining careers. At their worst, metrics can contribute to what Rowan Williams, the former Archbishop of Canterbury, calls a “new barbarity” in our universities. Metrics hold real power: they are constitutive of values, identities and livelihoods.

Since April 2014, I have chaired an independent review of the use of research metrics for the UK government. This week, we publish the results ([gn.nature.com/smbaix](http://gn.nature.com/smbaix)).

They will feed into how British funding bodies will design the next round of research assessment in universities, which is used to allocate around £1.6 billion (US\$2.5 billion) of funding each year. And they will be of interest to any scientist who feels the rising tide of metrics lapping at their ankles. For the research community still has the ability and opportunity — and now a serious body of evidence — to influence how this tide washes through higher education and research.

One certainty is that the lure — and so the fear — of metrics will continue. There are growing pressures to audit and evaluate public spending on higher education and research, and policy-makers want more strategic intelligence on research quality and impact. Institutions need to manage and develop their strategies for research, and at the same time compete for prestige, students, staff and resources. Meanwhile, there is a massive increase in the availability of real-time big data on research uptake, and in the capacity of tools to analyse them.

In a positive sense, wider use of quantitative indicators, and the emergence of alternative metrics for societal impact, could support the transition to a more open, accountable and outward-facing research system. Yet only a minority of the scientists we consulted supported the increased use of metrics. It is clear that across the research community, the description, production and consumption of metrics remains contested and open to misunderstanding.

Our conclusion is that metrics should support, not supplant, expert judgement. Peer review is not perfect, but it is the best form of academic governance we have, and it should

remain the main basis by which to assess research papers, proposals and individuals.

Quantitative indicators can meet their potential only if they are underpinned by an open and interoperable data infrastructure. How underlying data are collected and processed — and the extent to which they remain open to interrogation — is crucial. Without the right identifiers, standards and semantics, we risk developing metrics that are not contextually robust or properly understood.

Universities, funders and publishers need to harmonize their systems of data capture. And they need to make it easier to find and assess fragmented information about research — particularly about funding. If metrics are to be reliable, and not add administrative burden, the priority for the community must be the widespread introduction of unique identifiers, such as ORCID tags, for individuals and research works.

It is tempting to boil down complex judgements to simple scores and numbers, but there is legitimate concern that some quantitative indicators can be gamed, or lead to unintended consequences. Personnel managers and recruitment or promotion panels should be explicit about the criteria they use for decisions about academic appointments and promotions. These criteria should be founded in expert judgement and may reflect both the academic quality of outputs and wider contributions to policy, industry or society.

Such decisions will sometimes be usefully guided by metrics, if the measures are relevant to the criteria in question and are used responsibly. Article-level citation metrics can be useful indicators of academic impact as long as they are interpreted in the light of disciplinary norms and

with due regard to their limitations. Journal-level metrics, such as impact factors, should not be used in this way. To reduce the likelihood of abuse, publishers should stop their unhealthy emphasis on the journal impact factor as a promotional tool.

The research community needs to develop a more sophisticated and nuanced approach to metrics. (Even using the term metrics is a problem, because it implies precision and specificity. ‘Indicators’ is better.) Discussion is crucial, and I invite *Nature’s* readers to share good and bad uses of metrics at our new blog [www.ResponsibleMetrics.org](http://www.ResponsibleMetrics.org). Borrowing from the *Literary Review’s* ‘Bad Sex in Fiction’ award, every year we will award a ‘Bad Metric’ prize to the most egregious example of an inappropriate use of quantitative indicators in research management. Sadly, I imagine there will be plenty to choose from. ■

James Wilsdon is professor of science and democracy at the University of Sussex, UK, and chair of the Independent Review of the Use of Metrics in Research Assessment & Management. e-mail: [j.wilsdon@sussex.ac.uk](mailto:j.wilsdon@sussex.ac.uk)

THERE IS LEGITIMATE CONCERN THAT SOME QUANTITATIVE INDICATORS CAN BE GAMED.

➔ [NATURE.COM](http://NATURE.COM)  
Discuss this article  
online at:  
[gn.nature.com/tdjyrc](http://gn.nature.com/tdjyrc)

At an institutional level, HEI leaders should develop a clear statement of principles on their approach to research management and assessment, including the role of indicators.

## UCL signs San Francisco Declaration of Research Assessment

20 January 2015

UCL has signed the [San Francisco Declaration on Research Assessment \(DoRA\)](#), which acknowledges weaknesses in the use of the Journal Impact Factor (JIF) as a measure of quality, since this measure relates to journals as a whole and not to individual articles. Recognising that research results in outputs other than journal articles, DoRA also attempts to identify new routes to research evaluation.

Universities who sign DoRA should:

- › be explicit about the criteria used to reach hiring, tenure and promotion decisions, clearly highlighting, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published
- › for the purposes of research assessment, consider the value and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.

Researchers should:

- › make assessments based on scientific content rather than publication metrics, when involved in committees making decisions about funding, hiring, tenure, or promotion
- › wherever appropriate, cite primary literature in which observations are first reported rather than reviews in order to give credit where credit is due
- › use a range of article metrics and indicators on personal/supporting statements, as evidence of the impact of individual published articles and other research outputs
- › challenge research assessment practices that rely inappropriately on JIF, and promote and teach best practice that focuses on the value and influence of specific research outputs.

Research managers and administrators should champion these principles and the use of responsible metrics within their institutions.

The screenshot shows the ARMA website. At the top left is the ARMA logo, followed by the text 'Association of Research Managers and Administrators'. A search bar is on the top right. A navigation menu includes 'Home', 'News', 'Events', 'Professional Development', 'Resource Library', 'Membership', and 'About Us'. The 'About Us' page content includes a sidebar with links to 'Governance', 'Executive Office', 'Partners & Sponsors', 'Sustainable ARMA', and 'Consultancy Services'. The main content area features the heading 'About Us', a paragraph describing ARMA's membership, a section for 'Our Mission', and a section for 'Our Strategic Priorities'. A diagram on the right shows three overlapping circles labeled 'Professional Excellence', 'Individual Excellence', and 'International Excellence', with a larger circle below them labeled 'The composition of practice'. At the bottom of the diagram is the text 'Enabling a sustainable ARMA'.

ARMA  
Association of Research Managers  
and Administrators

Home News Events Professional Development Resource Library Membership About Us

**About Us**

- Governance
- Executive Office
- Partners & Sponsors
- Sustainable ARMA
- Consultancy Services

## About Us

ARMA is the professional association for research managers and administrators in the UK. We currently have over 2000 individual members from around 220 organisations, ranging from universities and funding bodies to the National Health Service and independent research institutions.

### Our Mission

To enhance the profession of research management and administration, and to facilitate excellence in research through identifying, establishing and exchanging good practice in research management and administration.

### Our Strategic Priorities

Our [Strategic Plan](#) guides our decision-making and actions on behalf of our members until 2018. It shapes the programmes we deliver, the services we provide and the management of our business and finances. It allows us to set appropriate operational targets, manage the Executive Office and ensure value for money for all.

Professional Excellence  
Individual Excellence  
International Excellence  
The composition of practice  
Enabling a sustainable ARMA



HR managers and recruitment or promotion panels in HEIs should be explicit about the criteria used for academic appointment and promotion decisions.



12, 2015

## imagine there's new metrics (it's easy if you try)

Academia has become obsessed with metrics. Institutions jostle for the "top" positions in international rankings, departments are evaluated nationally to identify the "best", and individuals are lined up against one another to find the "leaders".

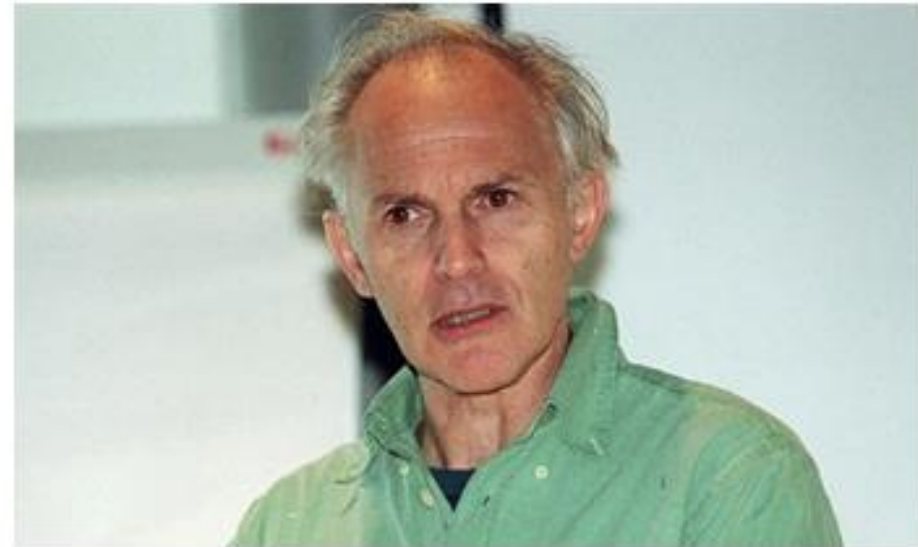
Let's take the international rankings (eg [THE](#), [QS](#), [SJ](#)) for example. These were established, apparently, to help students and staff identify the highest quality universities. The rankings would allow people to make informed decisions about where to study, teach and conduct research. It follows then that a higher rank will mean more students, especially international students, and this in turn means more money coming into the ~~business~~ university.

Individual researchers should be mindful of the limitations of particular indicators in the way they present their own CVs and evaluate the work of colleagues.

The h-index, or the academic equivalent of the stag's antlers

Philip Ball

It was meant to bring rigour to the tricky question of who deserves a grant or a post, but is the h-index's numerical score simplistic?



📷 Nobel laureate chemist Harry Kroto ranks a lowly 264th on the h-index. Photograph: LEHTIKUVA OY/REX FEATURES LEHTIKUVA OY/REX FEATURES/LEHTIKUVA OY/REX FEATURES

Many scientists worry that theirs isn't big enough. Even those who sniff that size isn't everything probably can't resist taking a peek to see how they compare with their rivals. The truly desperate can google for dodgy techniques to make theirs bigger.

I'm talking about the **h-index**, a number that supposedly measures the quality of a researcher's output. And if the schoolboy double entendres seem puerile, there does seem to be something decidedly male about the notion of a number that rates your prowess and ranks you in a league table. Given that, say, the 100 chemists with the highest h-index are all male, whereas one in four postdoctoral chemists is female, the h-index does seem to be the academic equivalent of a stag's antlers.

Like HEIs, research funders should develop their own context-specific principles for the use of quantitative indicators in research assessment and management.

HOME > | WELLCOME WARNING ABOUT METRICS MORASS

## Wellcome warning about metrics morass

Altmetrics forum weighs the value of impact data from blogs, 'likes', web traffic. Paul Jump reports

OCTOBER 2 2014



Researchers' creativity could be undermined by too many new metrical approaches to research evaluation, the director of the Wellcome Trust has warned.

Jeremy Farrar told a conference in London last week that so-called altmetrics - research metrics that



Data providers,  
analysts & producers  
of university rankings  
and league tables  
should strive for  
greater transparency  
and interoperability  
between different  
measurement  
systems.

ELLEN  
HAZELKORN



Rankings and  
the Reshaping of  
Higher Education

*The Battle for World-Class Excellence*

2ND EDITION



# Publishers should reduce emphasis on journal impact factors as a promotional tool, and only use them in the context of a variety of journal-based metrics that provide a richer view of performance.

## Dora the Brave

Bernd Pulverer

**The San Francisco Declaration on Research Assessment (DORA) points out that using the Journal Impact Factor as a proxy measure for the value or quality of specific research and individual scientists leads to biased research assessment. How can we resist misusing metrics?**

If you notice any particularly fidgety journal editors this month don't worry—this is merely a symptom of the imminent release of the next round of the dreaded, dreadful Journal Impact Factors (JIFs). Editors are concerned, because the JIF directly impacts their journal, as it influences if researchers choose to publish their research. JIF has a number of flaws, but one entirely outside an editor's control is noise: a few citations to a single paper can displace a journal in the IF rank list pecking order. Indeed, the JIF would appear to be elaborated to the astonishing significance of three decimal places precisely to minimize the number of ties in journal ranking tables—even if this is at the expense of statistical significance (see ASCB post "A False Sense of Precision").

Matters are worse for journals just below an arbitrary IF threshold set by research assessment policies. A few years ago, when this journal dipped below 10, its editors were on occasion invited back by senior faculty to discuss submission of their work once the JIF had returned to a level deemed relevant by their institution. The only immunity to such JIF excesses appears to be to sport a well-recognized journal name in lieu of perceived JIF deficiencies. Indeed, the remarkable influence of brand recognition is borne testament by the rapid proliferation of journal families around a number of well-recognized names.

As always, there will be winners and losers in this year's JIF league tables—but do these numbers reflect real differences in the quality and interest of the science published in the affected journals?

### The power of JIF

Journal editors are understandably concerned about the stranglehold of JIF over their journals, but a far bigger concern is its influence on research itself. The JIF has reached such dominance that it influences the publication strategies of journals, hiring at institutions and even how researchers cite; worse, it steers the research itself. Since JIF does not measure the absolute value of research, it can side-line smaller research communities, while over-emphasizing fashionable research.

The use of journal name as a guarantor for research deserving of institutional or funder support preceded that of JIF, but both derive from the same need to predict the quality and importance of the research. The JIF is one of a number of attempts to provide a quantitative, universal metric that promises a quality judgment on the over 25,000 journals and the over 2 million papers published annually in the biosciences. The initial *raison d'être* for JIF was to aid librarians, who now assess their holdings based on more diverse information including web access. The unabated influence of JIF on science lies elsewhere: its overuse in research assessment. To be sure, the JIF is not per se more flawed than other metrics, and it can and has in fact served as a first step to move countries mired in publication volume-based assessment and cronyism to more rational policies. The JIF's continuing influence may be down to the fact that the resulting journal rankings are—apart from a number of notable inconsistencies—generally in line with the performance that scientists intuitively expect of the journals they know well. On average, JIF and journal name will correlate with the quality and interest of research published in a given journal. The problem arises if a specific JIF value or journal name is a precondition to place a grant or faculty position—at that point the tail is wagging the dog.

The reliance of research assessment on metrics is undoubtedly accentuated by the challenges posed by increasing specialization and growth of the biosciences. A single number that promises to be predictive of future research performance across fields is enticing, even if it compares apples to oranges. The alternative of peer-based qualitative research assessment would require incentives for scientists to invest the considerable time and effort required for reading research papers, such as including someone's qualities as a referee in their own research assessment.

### The trouble with JIF

JIF is patently ill-suited for the assessment of individuals, as it in no way predicts citations to a specific paper in a journal. However, there are also inherent flaws in the JIF that limit its utility for the assessment of journal performance. Apart from the misleading extension of the JIF's significance to three decimal places, and the binning of journals into questionable subject-based league tables, one particularly troublesome aspect is that it is based on a mean (JIF = last year's citations to all papers published in the preceding two years/citable papers published in those years). Given the skewed nature of the citation profiles of scientific journals, presentation of the median, which indicates that a paper has a probability of 50% or higher of getting that number of citations, would be more appropriate. A journal with a low median may still sport a high impact factor based on high citing outliers. Fig. 1 illustrates typical citation distributions—here for this journal. It is immediately obvious that the distribution is not normal—journals publish papers with a wide range of citations; 20% papers in a journal can account for 80% of its total citations. Thus, the median and mean are quite divergent for many journals—illustrated in Fig. 2 for this journal. DORA

There is a need for greater transparency and openness in research data infrastructure. Principles should be developed to support open, trustworthy research information management.

Home » Blog, Featured, Headline

## Principles for Open Scholarly Infrastructures

23 FEBRUARY 2015

13 COMMENTS

*infrastructure* |ˈɪnfrastrʌktʃə| (noun) – the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise. – *New Oxford American Dictionary*

*Everything we have gained by opening content and data will be under threat if we allow the enclosure of scholarly infrastructures. We propose a set of principles by which Open Infrastructures to support the research community could be run and sustained.* – Geoffrey Bilder, Jennifer Lin, Cameron Neylon

Cite as "Bilder G, Lin J, Neylon C (2015) Principles for Open Scholarly Infrastructure-v1, retrieved [date], <http://dx.doi.org/10.6084/m9.figshare.1314859>"

Over the past decade, we have made real progress to further ensure the availability of data that supports research claims. This work is far from complete. We believe that data about the research process itself deserves exactly the same level of respect and care. The scholarly community does not own or control most of this information. For example, we could have built or taken on the infrastructure to collect bibliographic data and citations but that task was left to private enterprise. Similarly, today the metadata generated in scholarly online discussions are increasingly held by private enterprises. They do not answer to any community board. They have no obligations to continue to provide services at their current rates, particularly when that rate is zero.

We do not contest the strengths of private enterprise: innovation and customer focus. There is a lot of exciting innovation in this space, much it coming from private, for profit interests, or public-private partnerships. Even publicly funded projects are under substantial pressures to show revenue opportunities. We believe we risk repeating the mistakes of the past, where a lack of community engagement lead to a lack of community control, and the locking up of community resources. In particular our view is that the underlying data that is generated by the actions of the research community should be a community resource – supporting informed decision making for the community as well as providing as base for private enterprise to provide value added services.

The UK research system should take full advantage of ORCID as its preferred system of unique identifiers. ORCID iDs should be mandatory for all researchers in the next REF.

## INDUSTRY TRENDS

### ORCID consortium to improve UK research visibility

24 June 2015

 Tweet  34  Share

ORCID, a researcher identifier solution which enables a wide range of improvements to the scholarly communications ecosystem, will now be offered to UK higher education institutions through a national consortium arrangement operated by Jisc, a UK charity promoting the use of technology within education and research.

The agreement, negotiated by Jisc Collections, will enable universities to benefit from reduced ORCID membership costs and enhanced technical support. This is aimed at accelerating adoption and provide a smoother path to ORCID integration for UK universities – and, ultimately, to help transform the management, re-use, and efficiency of the UK research output by improving the integration of research systems and processes, and enhancing data quality.

More than 50 UK universities have expressed an interest in joining an ORCID consortium in 2015, with a further 22 saying they intend to join at a later stage.

Rachel Bruce, deputy chief innovation officer at Jisc, said: 'Previously it has not been possible to easily associate valuable research outputs - be they patents or papers - with their authors, collaborators and institutions. This has led to extremely



The use of digital object identifiers (DOIs) should be extended to cover all research outputs.



The screenshot shows the top of a Figshare article page. At the top left is the Figshare logo, a colorful circular pattern of dots. To its right is a search bar with the text "search figshare (titles, tags, authors, etc.)" and a magnifying glass icon. Below the search bar is a red button with a white magnifying glass icon. To the right of the search bar is a small red button with the text "Br". Below the search bar is a red link that says "← Back to articles list". The main content area has a light gray background. At the top of this area is the heading "All research outputs should be citable." Below the heading are three circular icons: a teal circle with "179 views", a green circle with "8 shares", and a gray circle with "likes coming soon". To the right of these icons is a paragraph of text: "As of today, all **figshare** content will have its own DOI. Research objects need to be citable in order to be usable. DOI stands for 'Digital Object Identifier'. DOI links work wherever they appear on the world-wide web. As defined by the International DOI Foundation: 'A DOI provides a means of persistently identifying a piece of intellectual property on a digital network and associating it with related current data in a structured extensible way' We are proud to be partnering with the **California Digital Library** and **DataCite** for this." Below the text are two logos: the University of California CDL logo (University of California, CDL, California Digital Library) and the DataCite logo (DataCite, International DOI Foundation). Below the logos is a paragraph of text: "The University of California Curation Center (UC3) at CDL offers DataCite DOIs and other identifiers via the **EZID service**, a service UC3 developed to support easy identifier creation and maintenance for educational, non-profit, governmental and commercial clients. DataCite is an international organisation which aims to:"


Further investment in research information infrastructure is required to improve the interoperability of research management systems.



The community needs a mechanism to carry forward this agenda. We propose a Forum for Responsible Metrics, to bring together key players to work on data standards, openness, interoperability & transparency.



Scottish Funding Council  
Promoting further and higher education



This site aims to provide a forum for debating responsible uses of metrics in higher education & research.

It builds on the UK's Independent Review of the Role of Metrics in Research Assessment and Management which published its final report *The Metric Tide* on 9 July 2015.

9TH JULY 2015

## Skewering the impact factor

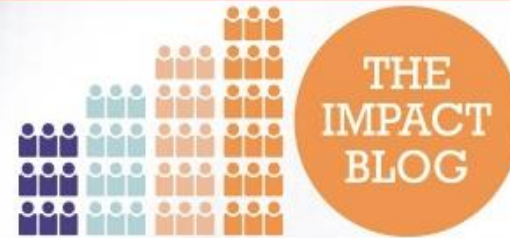
Sometimes it's the little things that count. Which is why I have started asking journals to publish their citation distributions alongside their

9TH JULY 2015

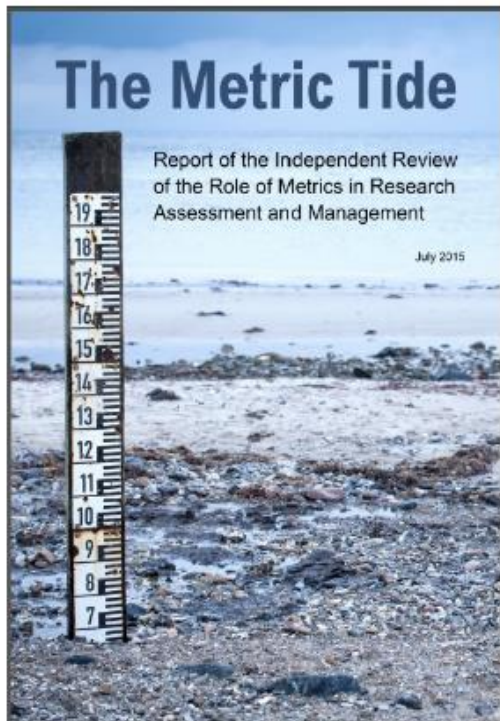
## The Metric Tide - report now published

Today the Independent Review of the Role of Metrics in Research Assessment and Management publishes its findings, available [here](#). Our report *The*





- Home
- Latest
- About
- Research Book
- HEFCEmetrics**
- Resources
- LSE Comment
- Popular
- Search



## The Metric Tide: Report of the Independent Review of the Role of Metrics in Research Assessment and Management

Download the [Full PDF](#) and [Executive Summary](#)

This report starts by tracing the history of metrics in research management and assessment, in the UK and internationally. It looks at the applicability of metrics within different research cultures, compares the peer review system with metric-based alternatives, and considers what balance might be struck between the two. It charts the development of research management systems within institutions, and examines the effects of the growing use of quantitative indicators on different aspects of research culture, including performance management, equality, diversity, interdisciplinarity, and the 'gaming' of assessment systems. Finally, it examines the role that metrics played in REF2014, and outlines scenarios for their contribution to future exercises.



This work is licensed under a [Creative Commons Attribution 3.0 Unported License](#) unless otherwise stated.



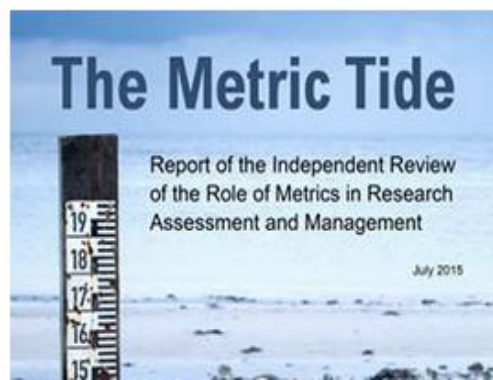
[Digital content](#)[Network & IT services](#)[Advice](#)[R&D](#)[News](#) > [Data infrastructure key to the quality and impact of UK research](#)

News

# Data infrastructure key to the quality and impact of UK research

9 July 2015

Jisc welcomes the publication of 'The Metric Tide' - a report on the independent review of the role of metrics in research assessment and management, chaired by Professor James Wilsdon.



With our ethos of supporting open and interoperable data infrastructure to make research easier for universities, Jisc strongly supports the report's recommendations. In particular we commend its emphasis on identifiers being central to a more reliable, less burdensome and transparent research information management system

Most read

Related

[National consortium for ORCID set to improve UK research visibility and collaboration](#)

[Jisc to retire Jorum and refresh its open educational resources offer](#)

[The Open University named 'Digital Innovators' in leadership awards](#)

[Rolls-Royce first company to join supercomputing initiative that breaks down barriers between industry and academia](#)

[Data infrastructure key to the](#)



# Science, values and the limits of measurement

Metrics play a growing role in managing research. But to understand their limitations, we need to draw on the humanities.

Cameron Neylon

Tuesday 14 July 2015 09.44 BST



Shares 284  
Comments 5



Last week, the independent review of metrics in research assessment published its final report 'The Metric Tide'.  
Photograph: Shutterstock

There is a particular form of proof that is applied both by mathematicians and by critics of using metrics in research assessment. Proof by contradiction seeks to prove something, say that the square root of two is an irrational number, by first assuming its opposite and then proceeding to demonstrate an internal contradiction. It follows that the assumption is proven untrue.

# FOLLOWERS OF THE APOCALYPSE



Uncategorized

## First the tide rushes in. Plants a kiss on the shore...

Written by [dkernohan](#) on July 10th, 2015. 4 Comments

I'm genuinely at a loss to describe how good James Wilsdon's report of the independent review of the role of metrics in research assessment and management ("[The Metric Tide](#)") is. Something that could so easily have been a clunky and breathless paean to the oversold benefits of big data is nuanced, thoughtful and packed with evidence. Read it. Seriously, take it to the beach this summer. It's that good.

It also rings true against every aspect of the academic experience that I am aware of – a real rarity in a culture of reporting primarily with an ear on the

### PURITY-TRUTH-BEAUTY

Learning, policy, creativity, (un)civilisation and online life

"Barely comprehensible" - Stephen Downes

"it's always about the LOLs with you" - Martin Weller

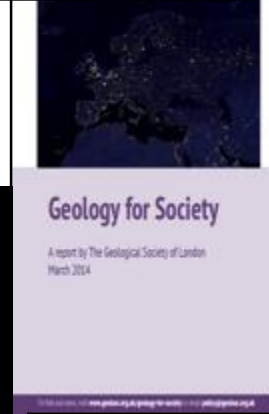
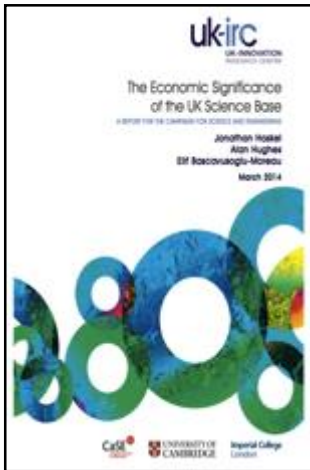
"It is time for you to rethink your mooc hatred." - George Siemens

"Why does it always have to be about money with you... don't you care about learning?" - Dave Cormier

"I made that joke 15 minutes ago" - Pat Lockley



# Another small piece in the evidence jigsaw...



Follow us on Twitter at #HEFCEmetrics



# The Metric Tide

*Join the conversation*

*@ResMetrics &*

*[www.responsiblemetrics.org](http://www.responsiblemetrics.org)*