

# Credit where credit is due

SciFri, Neil Chalmers Seminar Room,  
Natural History Museum  
26 May 2017

Dr Danny Kingsley  
Office of Scholarly Communication  
Cambridge University  
**@dannykay68**

# Sci Fri promotional blurb

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Did you hear the one about how Economics researchers surveyed said they would be prepared to give a quarter of a thumb to get published in a particular journal? It would be funny if it were not true. What has happened to science? Perverse incentives are causing an avalanche of problems in science, not least the reproducibility crisis. Things are so bad the UK Government has started an enquiry into research integrity. This talk will look at the reward structure in science, how it works and the issues it is causing. Opening up all aspects of the scientific process and increasing transparency will not only improve the veracity of the scientific record but will also allow reward where it is due.

# Something is wrong

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## **Your right arm for a publication in AER?**

Arthur Attema and Werner Brouwer and J van Exel

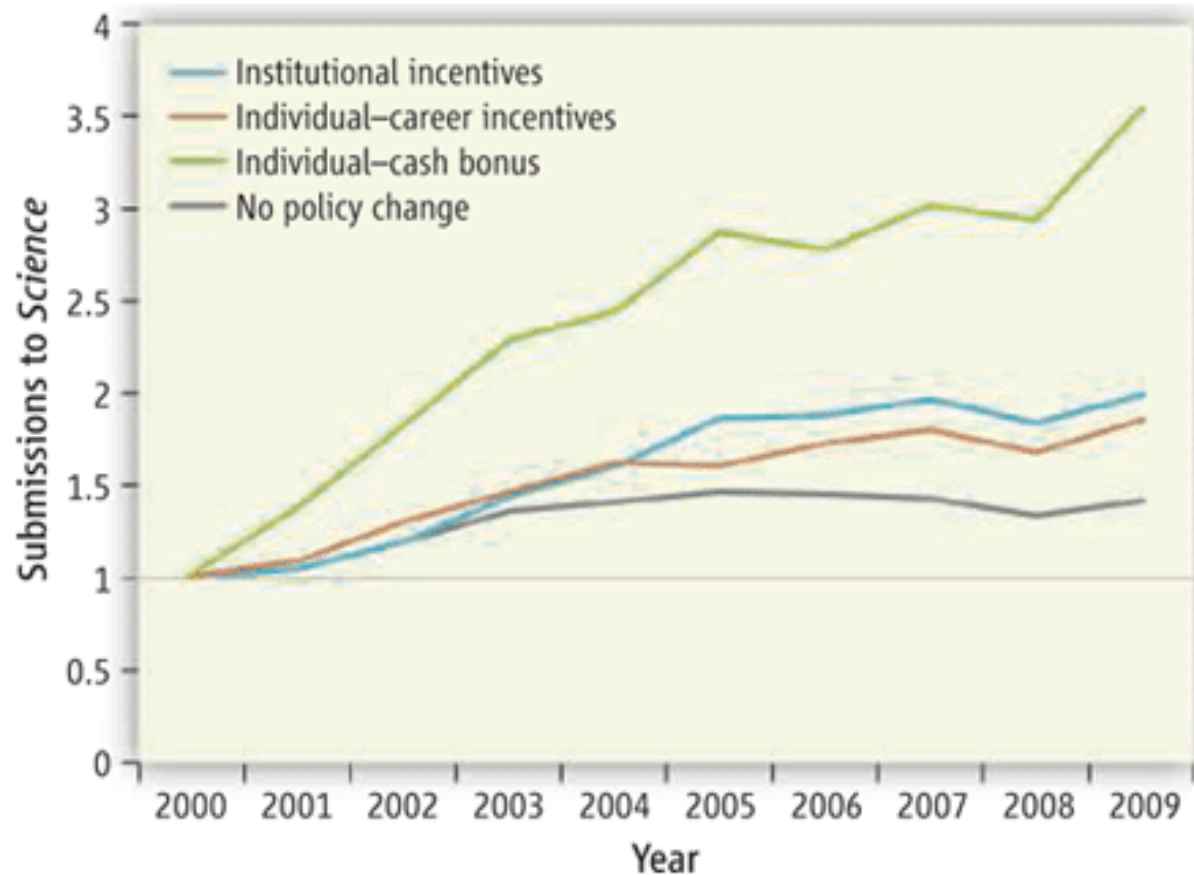
Erasmus University Rotterdam, Erasmus University Rotterdam,  
Erasmus University Rotterdam

31. January 2012

**ABSTRACT.** The time tradeoff (TTO) method is popular in medical decision making for valuing health states. We use it to elicit economists' preferences for publishing in top economic journals and living without limbs. The economists value the journals highly, and have a clear preference between them, with *American Economic Review* (AER) the most preferred. Their responses imply they would sacrifice more than half a thumb for publishing in AER. The TTO results are consistent with ranking and willingness to pay results, and indicate that preferences for journals are neither guided by influence factors, nor by expectations of a resulting salary rise.

[https://mpra.ub.uni-muenchen.de/36801/1/MPRA\\_paper\\_36801.pdf](https://mpra.ub.uni-muenchen.de/36801/1/MPRA_paper_36801.pdf)

# Money talks



Franzoni C(1), Scellato G, Stephan P., Science policy. Changing incentives to publish. Science. 2011 Aug 5;333(6043):702-3. doi: 10.1126/science.1197286



# University incentives worldwide

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John Liu CC BY 2.0 via Wikimedia Commons

# India

- Cash award for publishing papers
  - To further promote research, the institute has started a program to award cash of Rs 10,000 to any full time student researcher of IITK who publishes a paper in a journal listed by the ISI Web of Science. In the case of more than one author, the prize money shall be shared by all the authors. A maximum of two awards are given during a degree course. This initiative was started in April 2000
    - <https://www.iitk.ac.in/dora/cash-award-for-publishing-papers>
- Faculty Award Incentive for Research Publication (FAIR Publication)
  - Started 1 January 2017
    - <https://manipal.edu/mu/directorate-of-research/policies/incentive-policy/fair-publication-faculty-award-incentive-for-research-publicatio.html>

## V. Maximum Cash Incentive:

a. Original research articles, review articles and full length conference papers (published in Scopus/ Web of Science indexed journals only) qualify for the maximum award incentive as per the cap provided:

Journal Impact Factor	First Author (a)	Corresponding Author (b)	Faculty Co Authors (c)	Student Co Authors*(d)	Top 10% Journals by SNIP/SJR**	Maximum Cash Incentive (Per paper)
Less than 0.1	3000	3000	1500	1500	1500	10500
More than 0.1 up to 1	6000	6000	3000	3000	3000	21000
More than 1 & up to 5	12000	12000	6000	6000	6000	42000
More than 5 & up to 10	18000	18000	9000	9000	9000	63000
More than 10 & up to 20	24000	24000	12000	12000	12000	84000
More than 20	36000	36000	18000	18000	18000	126000

# Pakistan

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- Office of Research Innovation and Commercialisation.  
Promotion Of Research Award
  - “Any Researcher who publishes a full length research article in either “Science” or “Nature” will be awarded a cash prize of 0.5 million. In addition, a full length research publication that appears in journals having equal or higher impact factor than the lowest impact factor of either of these two journals ( “Sciences” or “ Nature”), will also be considered for the award.”
    - <http://ww3.comsats.edu.pk/ORIC/IFAwards.aspx>
- Research Publications Policy ( 19 January 2016)
  - “Revised Cash Awards Policy for Publication of Research Papers / Books For Faculty & Students”
    - <https://www.bahria.edu.pk/cash-award-policy-on-research-publications/>

**Policy Statement:**

Cash Award will be given to the research publication in the following categories:

1. ISI Indexed with Impact Factor Journal Publication	50,000/-
2. ISI Indexed without Impact Factor Journal Publication	25,000/-
3. Book Publication (subject to the verification from HEC)	25,000/-
4. HEC Recognized local/Pakistani Journal	10,000/-

# Malaysia

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- Terms and conditions for payment of incentives for publications indexed in ISI-Web-Of-Science (WoS) (2014-2016)
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  - [https://umexpert.um.edu.my/file/notice/TERMS AND CONDITIONS FOR PAYMENT OF INCENTIVES 2014-2016.pdf](https://umexpert.um.edu.my/file/notice/TERMS_AND_CONDITIONS_FOR_PAYMENT_OF_INCENTIVES_2014-2016.pdf)

# Phillipines

## Categories of the Awards

Type of Publication	Cash Incentive
1. Peer-reviewed <sup>1</sup> research paper or literary/creative work (short story, creative non-fiction or essay, play, or poetry <sup>2</sup> ) published in a journal indexed in the Institute for Scientific Information (ISI) and/or Scopus <sup>3</sup>	PhP 50,000.00
2. Peer-reviewed book <sup>4</sup> , including literary/creative single-author novel or anthology (short stories, creative non-fiction or essays, plays, or poetry), published by a reputable international publisher	PhP 50,000.00
3. Peer-reviewed book, including literary/creative single-author novel or anthology (short stories, creative non-fiction or essays, plays, or poetry), published by a reputable national publisher	PhP 30,000.00
4. Peer-reviewed research paper or literary/creative work appearing in an international <sup>5</sup> journal, monograph, or anthology, or as a chapter in a book	PhP 20,000.00
5. Peer-reviewed research paper or literary/creative work appearing in a national journal, monograph, or anthology, or as a chapter in a book	PhP 10,000.00

## • Research Incentive Scheme

- <http://www.ifsu.edu.ph/wp-content/uploads/2016/04/PG69s2015-Research-Incentive-Scheme.pdf>

incentives depending on circulation level categorized as follows:

Categories	Cash Incentives (PhP)			
	ISI/Scopus Indexed Journal	CHED-Recognized Journal	Other Refereed Journals with Impact Factor (IF)	
			With IF of 3.5 & Above	With IF of less than 3.5
E-journals/ books with national/ international circulation	30,000.00	20,000.00	10,000.00	5,000.00
Printed journals/ books/ regular	20,000.00	10,000.00	5,000.00 regardless of Impact Factor	

1

magazines with national/ international circulation			
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Notes:

- [http://www.xu.edu.ph/images/offices/research\\_and\\_social\\_outreach/tripod\\_units/xu\\_press/docs/guidelines\\_pubawards.pdf](http://www.xu.edu.ph/images/offices/research_and_social_outreach/tripod_units/xu_press/docs/guidelines_pubawards.pdf)

# And a plaque!

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## Type 1- General Paper Reward:

The papers published in journals which are *listed in Web of science (WoS) or Science Citation Index (SCI)/SCI-Expanded or Social Sciences Citation Index (SSCI) or Scopus database* are rewarded according to the following table. Impact factor is calculated according to Thomson Reuters (ISI). The maximum value for this reward is QR 15,000.

No	Journals Impact Factor	Rewards (QR)
1	Indexed papers in journals with no impact factor or with Impact Factor of 0.1-0.99	3000*
2	Articles in journals with Impact Factor of 1.0	4000

***\*This is flat reward per paper applied only in the case of Humanities, Islamic Studies, and Social Sciences. Only publications in the approved College's Journal list will be considered***

## Type 2 - Publication in Nature or Science Journal:

Award for publication in *Nature Journal or Science journal*. The value of this reward is QR 50,000 in addition to a plaque recognizing the efforts.

- Qatar
  - [http://www.qu.edu.qa/offices/research/academic/research\\_reward.php](http://www.qu.edu.qa/offices/research/academic/research_reward.php)





# Is there a common theme here?

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CURRENCY EXCHANGE © IMAGES MONEY (CC BY 2.0) VIA FLICKR

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3. Peer-reviewed book, including literary/creative single-author novel or anthology (short stories, creative non-fiction or essays, plays, or poetry), published by a reputable national publisher	PhP 30,000.00
4. Peer-reviewed research paper or literary/creative work appearing in an international <sup>5</sup> journal, monograph, or anthology, or as a chapter in a book	PhP 20,000.00
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# Bloody impact factors

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Jiménez-Contreras E, Delgado López-Cózar E, Ruiz-Pérez R, Fernández VM., **Impact-factor rewards affect Spanish research**. *Nature*. 2002 Feb 14;415(6873):726-9. doi: 10.1038/417898b

Huggett S, **Impact factors: Cash puts publishing ethics at risk in China**, *Nature*. 2012 Oct 18;490(7420):342. doi: 10.1038/490342c.

The number of scientific papers published in China in recent years has increased exponentially (see [go.nature.com/8fjhdt](http://go.nature.com/8fjhdt)). There are concerns that these numbers are being inflated by a payment scheme offered by some Chinese institutions to boost publication in journals with high impact factors (J. Shao and H. Shen *Learned Publ.* 24, 95–97; 2011 <http://dx.doi.org/10.1087/20110203> ).

# Let's talk about JIF

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Impact Factor for 2015 is

- Number of *citations* in 2014, of (some) articles published in 2012-2013 divided by:
  - Number of *articles published* in the journal in 2012-2013
- In 2016 *Nature* has a JIF of 41.456. This is supposed to mean that over the past 2 years, *Nature* articles have been cited, on average, about 41 times each

# Issues with the JIF

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- Only a selection of journals
- Some disciplines badly represented
- English language bias
- North American bias
- Timeline
- Measuring the vessel, not the contents!
- Uneven distribution.
  - Argument that we should be making non-citation levels available [10.1186/1471-2288-4-14](https://doi.org/10.1186/1471-2288-4-14)

# Journals banned from the JIF list

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Image Danny Kingsley

- Journals are removed because of:
  - Self-citation
  - Citation stacking – where journals cite each other
  - Requirements to cite from within the journal
- 2013 – 66 journals
- 2012 – 51 journals
- 2011 – 34 journals

<http://blogs.nature.com/news/2013/06/new-record-66-journals-banned-for-boosting-impact-factor-with-self-citations.html>



# Backlash

Science Home News Journals Topics Careers

SHARE



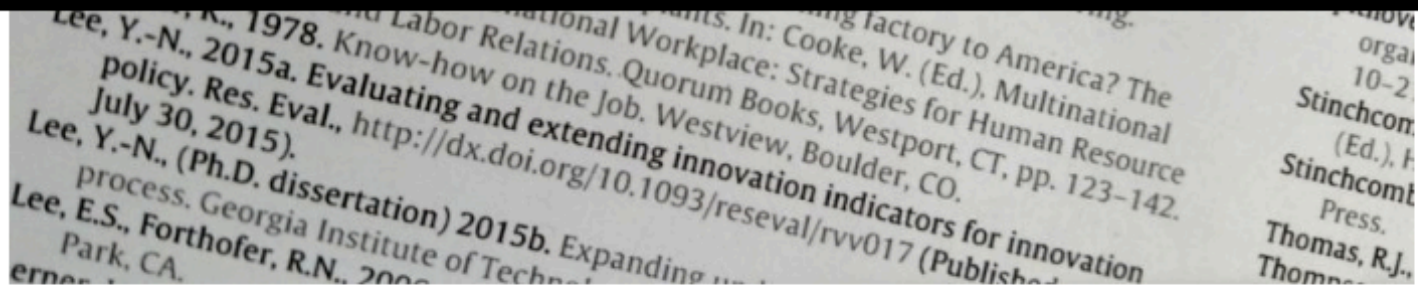
11K



8



397



Citation lists are key to calculating journal impact factors.

David Malakoff

## Hate journal impact factors? New study gives you one more reason

By **John Bohannon** | Jul. 6, 2016 , 4:30 PM

Scientists have a love-hate relationship with the journal impact factor (JIF), the measurement used to rank technical journals by prestige. They have come to use it not only for deciding where to submit research papers, but for judging their peers, as well as influencing who wins

<http://www.sciencemag.org/news/2016/07/hate-journal-impact-factors-new-study-gives-you-one-more-reason>

SHARE



11K



8



Lee, Y.-N., 1978. and Labor Relations. In: Cooke  
policy. Res. Eval., http://dx.doi.org/10  
July 30, 2015).  
Lee, Y.-N., (Ph.D. dissertation) 2015  
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Lee, E.S., Forthofer, R.N., 2000  
Park, CA.

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<http://www.sciencemag.org/news/2016/07/hate-journal-impact-factors-new-study-gives-you-one-more-reason>


# Backlash

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EDITORIAL

## The Impact Factor Game

The PLoS Medicine Editors

Published: June 6, 2006 • <http://dx.doi.org/10.1371/journal.pmed.0030291>

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16 Citation

111,068 View

90 Share

Article

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Why Current Publication Practices May Distort Science

Subject Areas 

It is time to find a better way to assess the scientific literature

**Citation:** The PLoS Medicine Editors (2006) The Impact Factor Game. PLoS Med 3(6): e291. doi:10.1371/journal.pmed.0030291

**Published:** June 6, 2006

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<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0030291>

OPEN ACCESS

EDITORIAL

## The Impact Factor Game

The PLoS Medicine Editors

Published: June 6, 2006 • <http://dx.doi.org/10.1371/journal.pmed.0030291>

Article

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Increased Responsibility and  
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**Published:** June 6, 2006

**Copyright:** © 2006 The PLoS Medicine Editors. 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.

# But measuring JIF is easy!

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Image: Peter CC-BY-SA



# It never works out the way you think

TABLE 1. GROWING PERVERSE INCENTIVES IN ACADEMIA

<i>Incentive</i>	<i>Intended effect</i>	<i>Actual effect</i>
"Researchers rewarded for increased number of publications."	"Improve research productivity," provide a means of evaluating performance.	"Avalanche of" substandard, "incremental papers"; poor methods and increase in false discovery rates leading to a "natural selection of bad science" (Smaldino and McElreath, 2016); reduced quality of peer review
"Researchers rewarded for increased number of citations."	Reward quality work that influences others.	Extended reference lists to inflate citations; reviewers request citation of their work through peer review
"Researchers rewarded for increased grant funding."	"Ensure that research programs are funded, promote growth, generate overhead."	Increased time writing proposals and less time gathering and thinking about data. Overselling positive results and downplay of negative results.
Increase PhD student productivity	Higher school ranking and more prestige of program.	Lower standards and create oversupply of PhDs. Postdocs often required for entry-level academic positions, and PhDs hired for work MS students used to do.
Reduced teaching load for research-active faculty	Necessary to pursue additional competitive grants.	Increased demand for untenured, adjunct faculty to teach classes.
"Teachers rewarded for increased student evaluation scores."	"Improved accountability; ensure customer satisfaction."	Reduced course work, grade inflation.
"Teachers rewarded for increased student test scores."	"Improve teacher effectiveness."	"Teaching to the tests; emphasis on short-term learning."
"Departments rewarded for increasing U.S. News ranking."	"Stronger departments."	Extensive efforts to reverse engineer, game, and cheat rankings.
"Departments rewarded for increasing numbers of BS, MS, and PhD degrees granted."	"Promote efficiency; stop students from being trapped in degree programs; impress the state legislature."	"Class sizes increase; entrance requirements" decrease; reduce graduation requirements.
"Departments rewarded for increasing student credit/contact hours (SCH)."	"The university's teaching mission is fulfilled."	"SCH-maximization games are played": duplication of classes, competition for service courses.

Edwards, Marc A., and Siddhartha Roy. 2017. Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hypercompetition. *Environmental Engineering Science* **34**(1): 51-61. <http://online.liebertpub.com/doi/pdf/10.1089/ees.2016.0223>

# This is becoming more common

## Retraction Watch

Tracking retractions as a

### A new record: Major publisher retracting more than 100 studies from cancer journal over fake peer reviews

with 17 comments

Springer is [retracting 107 papers](#) from one journal after discovering they had been accepted with fake peer reviews. Yes, 107.

To submit a fake review, someone (often the author of a paper) either makes up an outside expert to review the paper, or suggests a real researcher — and in both cases, provides a fake email address that comes back to someone who will invariably give the paper a glowing review. In this case, Springer, the publisher of *Tumor Biology* through 2016, told us that an investigation produced “clear evidence” the reviews were submitted under the names of real researchers with faked emails. Some of the authors may have used a third-party editing service, which may have supplied the reviews. The [journal is now published by SAGE](#).

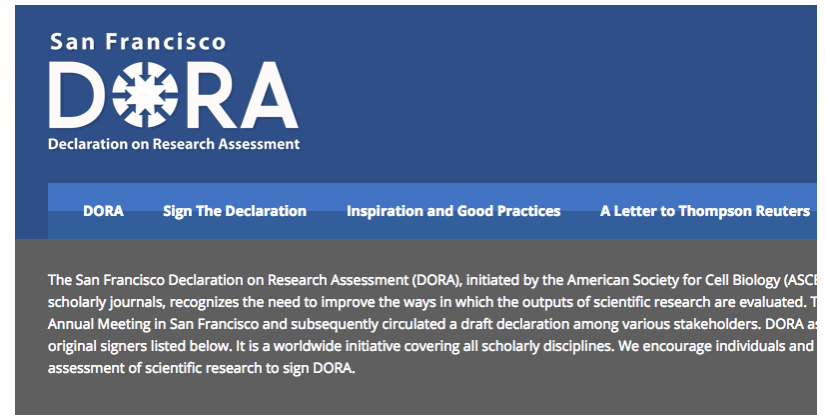


The retractions follow another sweep by the publisher last year, when *Tumor Biology* [retracted 25 papers](#) for compromised review and other issues, mostly authored by researchers based in Iran. With the latest bunch of retractions, the journal has now retracted the most papers of any other journal indexed by Clarivate Analytics' Web of Science, formerly part of Thomson Reuters. In 2015, its impact factor

<http://retractionwatch.com/2017/04/20/new-record-major-publisher-retracting-100-studies-cancer-journal-fake-peer-reviews/>

# Community action

- Themes
  - **Eliminate the use of journal-based metrics**, such as Journal Impact Factors, in funding, appointment, and promotion considerations;
  - The need to **assess research on its own merits** rather than on the basis of the journal in which the research is published; and
  - The need to **capitalize on the opportunities provided by online publishing**
  - >12,500 individuals & >900 organisations



Download the  
Declaration (PDF)

Download the DORA  
Logo (PDF)

Download the DORA  
Poster (PDF)

**San Francisco Declaration on Research  
Assessment**

<http://www.ascb.org/dora/>



# We are stuck

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The insistence on the need to publish novel results in high impact journals is creating a multitude of problems with the scientific endeavour

# Problem - reluctance to share data

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My data contains personal/sensitive information	My data is too complicated	People may misinterpret my data	My data is not very interesting
Commercial funder doesn't want to share it	We might want to use it in another paper	People will contact me to ask about stuff	Data Protection/ National Security
It's too big	People will see that my data is bad	I want to patent my discovery	It's not a priority and I'm busy
I don't know how	I'm not sure I own the data	Someone might steal/ plagiarise it	My funder doesn't require it

# Incompatible!

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# ‘Someone might steal/plagiarise it’

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‘A second concern held by some is that a new class of research person will emerge — **people who had nothing to do with the design and execution of the study but use another group’s data for their own ends**, possibly stealing from the research productivity planned by the data gatherers, or even use the data to try to disprove what the original investigators had posited. There is concern among some front-line researchers that the system will be taken over by what some researchers have characterized as “**research parasites.**”’

# Solution – reward data sharing

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- REgistry of REsearch Data REpositories

<http://www.re3data.org/>



- Joint Declaration of Data Citation Principles

<https://www.force11.org/group/joint-declaration-data-citation-principles-final>



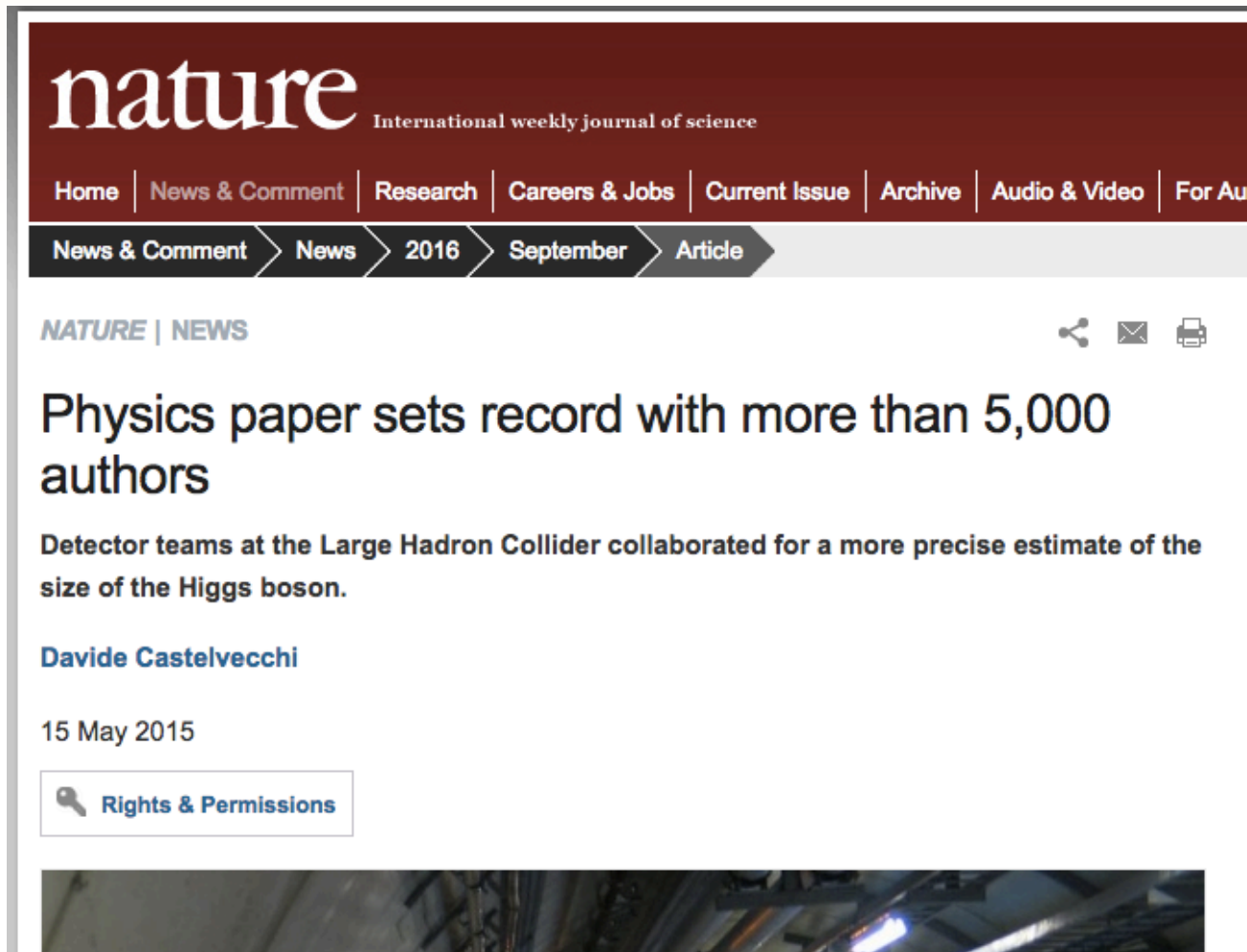
# Problem: Hyperauthorship

24 of the 33 pages of this paper listed the over 5,000 authors (nine pages are the paper itself)

The screenshot shows the APS Physics website interface. At the top, there is a navigation bar with the APS physics logo, links for Journals, Help/Feedback, a search bar, and a Log in button. Below this is a dark green header with the text "PHYSICAL REVIEW LETTERS" and a secondary navigation menu with links for Highlights, Recent, Accepted, Collections, Authors, Referees, Search, Press, and About. The main content area features three tabs: "Featured in Physics", "Editors' Suggestion", and "Open Access". The article title is "Combined Measurement of the Higgs Boson Mass in  $pp$  Collisions at  $\sqrt{s} = 7$  and 8 TeV with the ATLAS and CMS Experiments". The authors are listed as "G. Aad *et al.* (ATLAS Collaboration, CMS Collaboration)" and the publication details are "Phys. Rev. Lett. **114**, 191803 – Published 14 May 2015". There is a "Physics" logo and a link to "See Viewpoint: A More Precise Higgs Boson Mass". On the right side, there is a circular badge with the number "579" and social media sharing icons for Twitter, Facebook, and a "More" button. At the bottom, there is a navigation bar with links for Article, References, Citing Articles (110), PDF, HTML, and Export Citation. The word "Issue" is partially visible at the bottom right.

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.114.191803>

# Storm of protest



The image is a screenshot of a web page from the journal Nature. The header features the 'nature' logo in white on a dark red background, with the tagline 'International weekly journal of science' below it. A navigation bar contains links for Home, News & Comment, Research, Careers & Jobs, Current Issue, Archive, Audio & Video, and For Authors. Below this is a breadcrumb trail: News & Comment > News > 2016 > September > Article. The main content area has the sub-header 'NATURE | NEWS' and social media icons. The article title is 'Physics paper sets record with more than 5,000 authors'. The summary states: 'Detector teams at the Large Hadron Collider collaborated for a more precise estimate of the size of the Higgs boson.' The author is 'Davide Castelvecchi' and the date is '15 May 2015'. A 'Rights & Permissions' button is visible. At the bottom, there is a partial view of a photograph showing industrial equipment, likely part of the Large Hadron Collider.

**nature** International weekly journal of science

Home | News & Comment | Research | Careers & Jobs | Current Issue | Archive | Audio & Video | For Authors

News & Comment > News > 2016 > September > Article


NATURE | NEWS


Physics paper sets record with more than 5,000 authors

Detector teams at the Large Hadron Collider collaborated for a more precise estimate of the size of the Higgs boson.

Davide Castelvecchi

15 May 2015

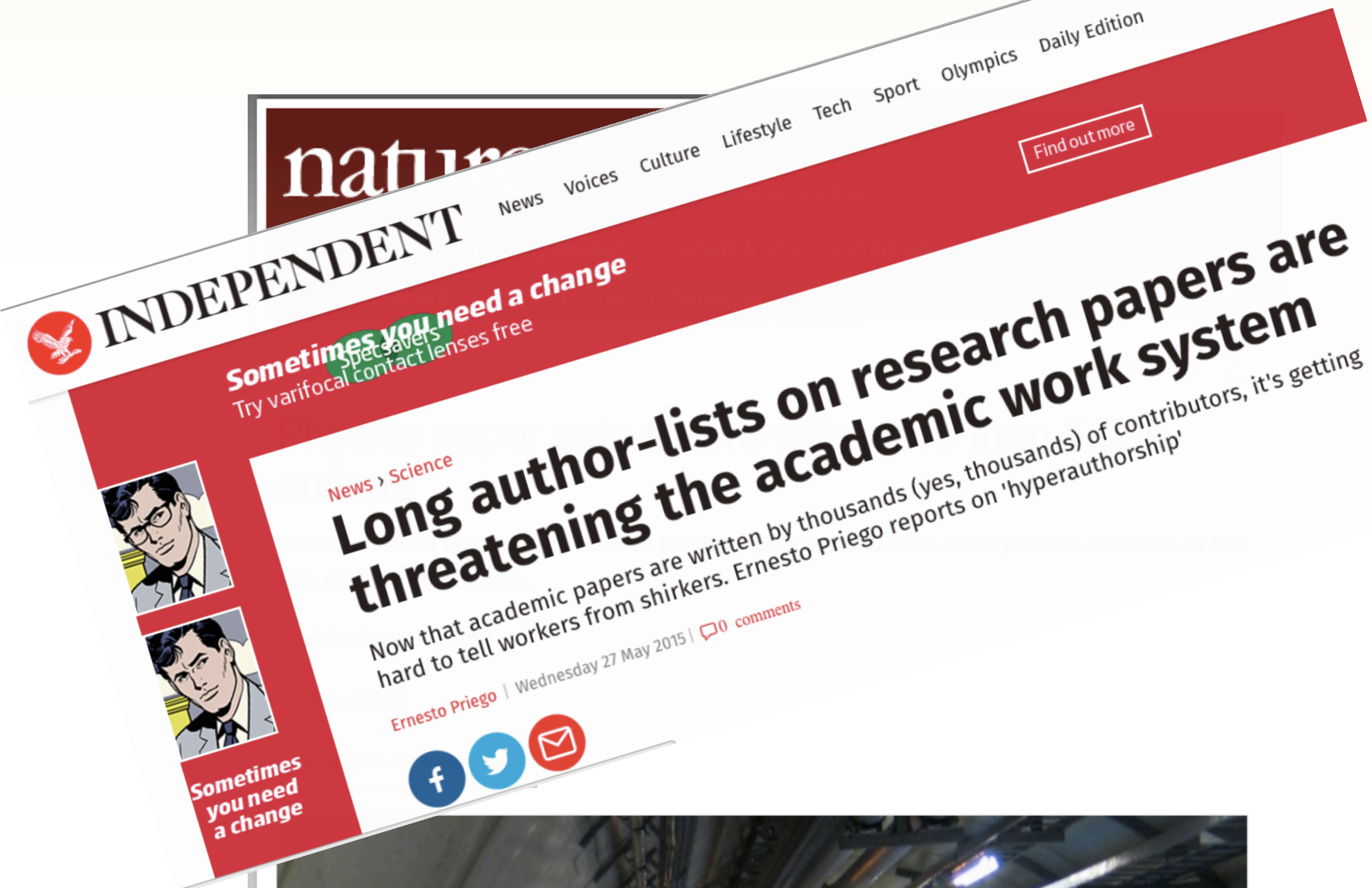
 Rights & Permissions



<http://www.nature.com/news/physics-paper-sets-record-with-more-than-5-000-authors-1.17567>



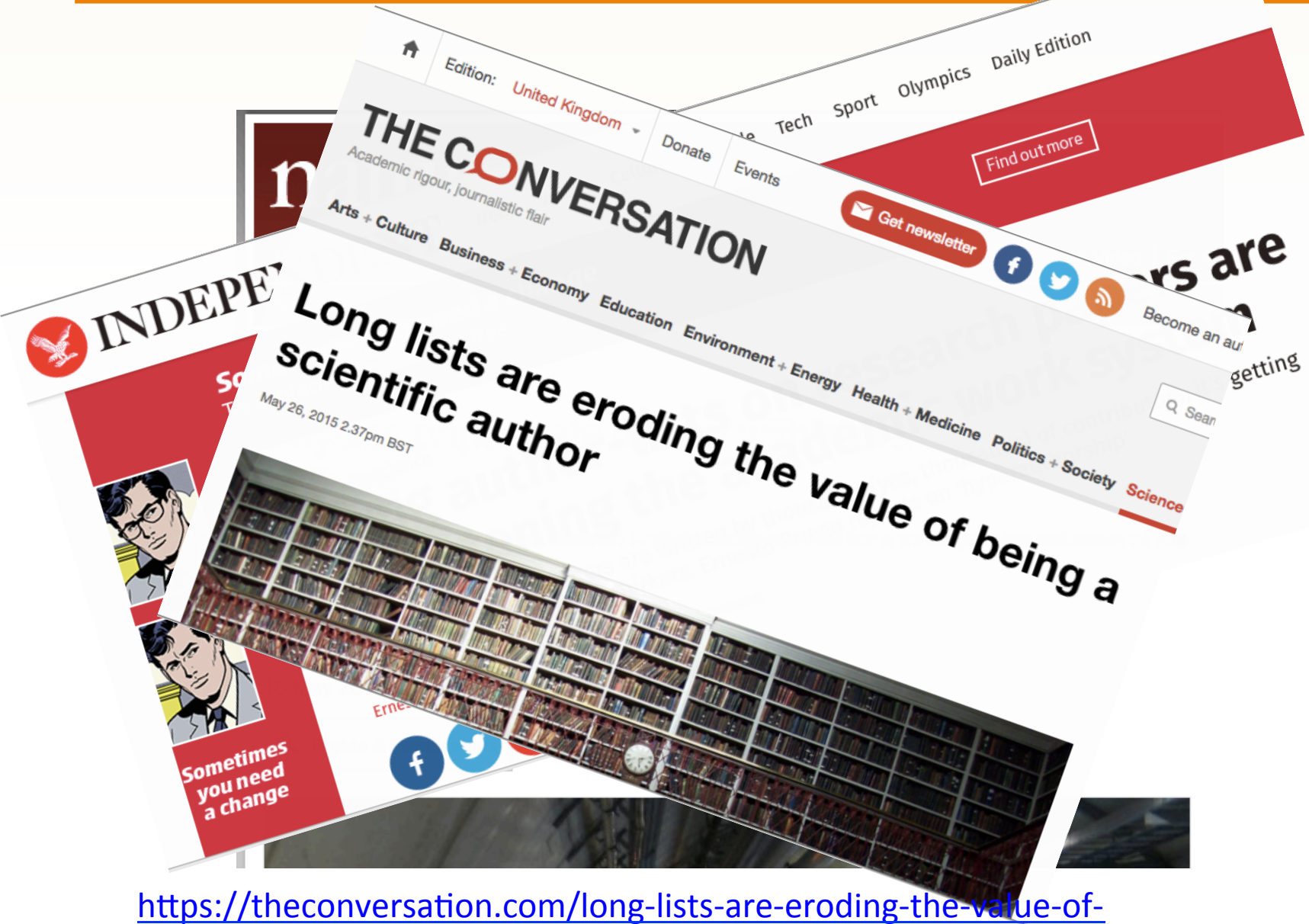
# Storm of protest



<http://www.independent.co.uk/news/science/long-author-lists-on-research-papers-are-threatening-the-academic-work-system-10279748.html>



# Storm of protest



<https://theconversation.com/long-lists-are-eroding-the-value-of-being-a-scientific-author-42094>

# Storm of protest



<https://www.timeshighereducation.com/news/mass-authorship-destroying-credibility-papers>

# Speaking of other ways of measuring...

This Altmetrics score of 579 is “in the top 5% of all research outputs scored by Altmetric”

The screenshot shows the APS physics website for the article "Combined Measurement of the Higgs Boson Mass in  $pp$  Collisions at  $\sqrt{s} = 7$  and 8 TeV with the ATLAS and CMS Experiments". A red arrow points from the text above to the Altmetrics score of 579, which is circled in red. The article is categorized as "Featured in Physics", "Editors' Suggestion", and "Open Access". The authors are G. Aad *et al.* (ATLAS Collaboration, CMS Collaboration), published in Phys. Rev. Lett. **114**, 191803 on May 14, 2015. A link to a viewpoint article is provided. The page also includes navigation links for Article, References, Citing Articles (110), PDF, HTML, and Export Citation.

APS physics Journals ▾ Help/Feedback Journal, vol, page, DOI, etc. 🔍 Log in

PHYSICAL REVIEW LETTERS

Highlights Recent Accepted Collections Authors Referees Search Press About

Featured in Physics Editors' Suggestion Open Access

Combined Measurement of the Higgs Boson Mass in  $pp$  Collisions at  $\sqrt{s} = 7$  and 8 TeV with the ATLAS and CMS Experiments

G. Aad *et al.* (ATLAS Collaboration, CMS Collaboration)  
Phys. Rev. Lett. **114**, 191803 – Published 14 May 2015

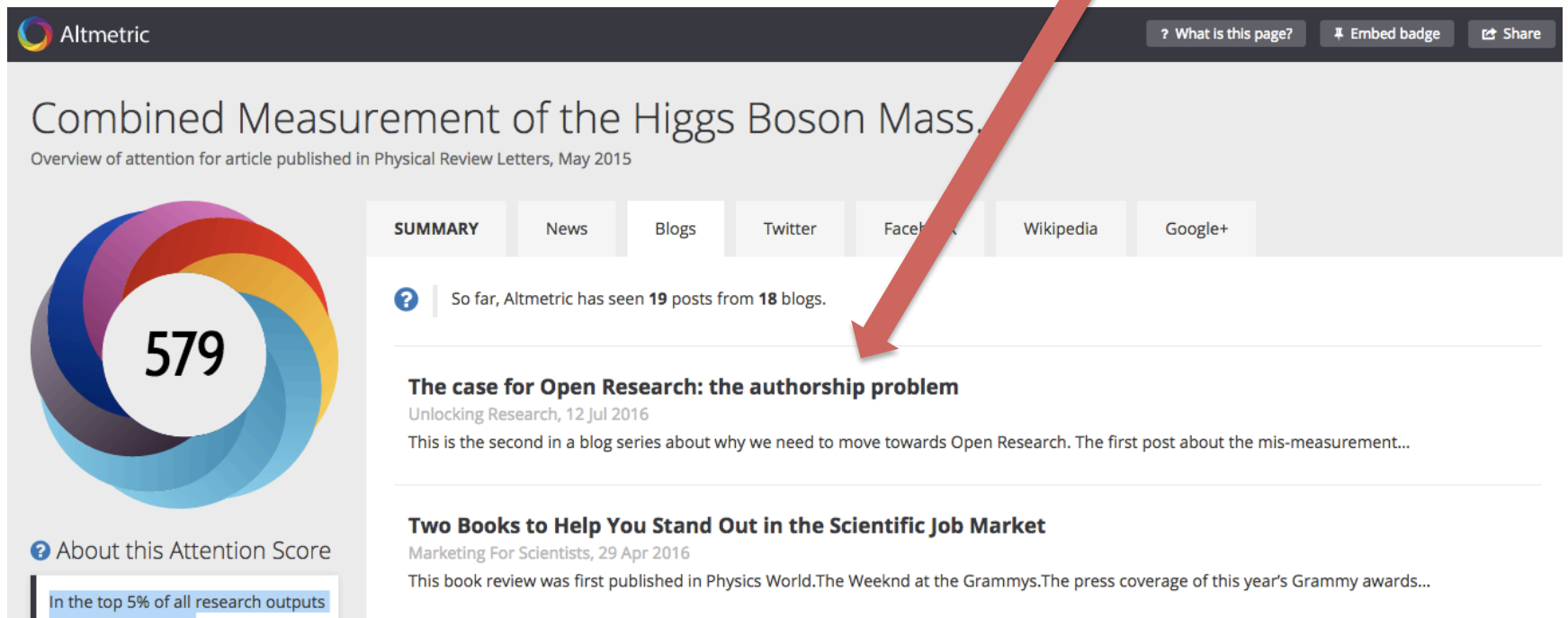
PhysiCS See Viewpoint: [A More Precise Higgs Boson Mass](#)

Article References Citing Articles (110) PDF HTML Export Citation

Issue

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.114.191803>

# Blogged because of author list!



<https://aps.altmetric.com/details/3997327/blogs>

# Problem: Reproducibility

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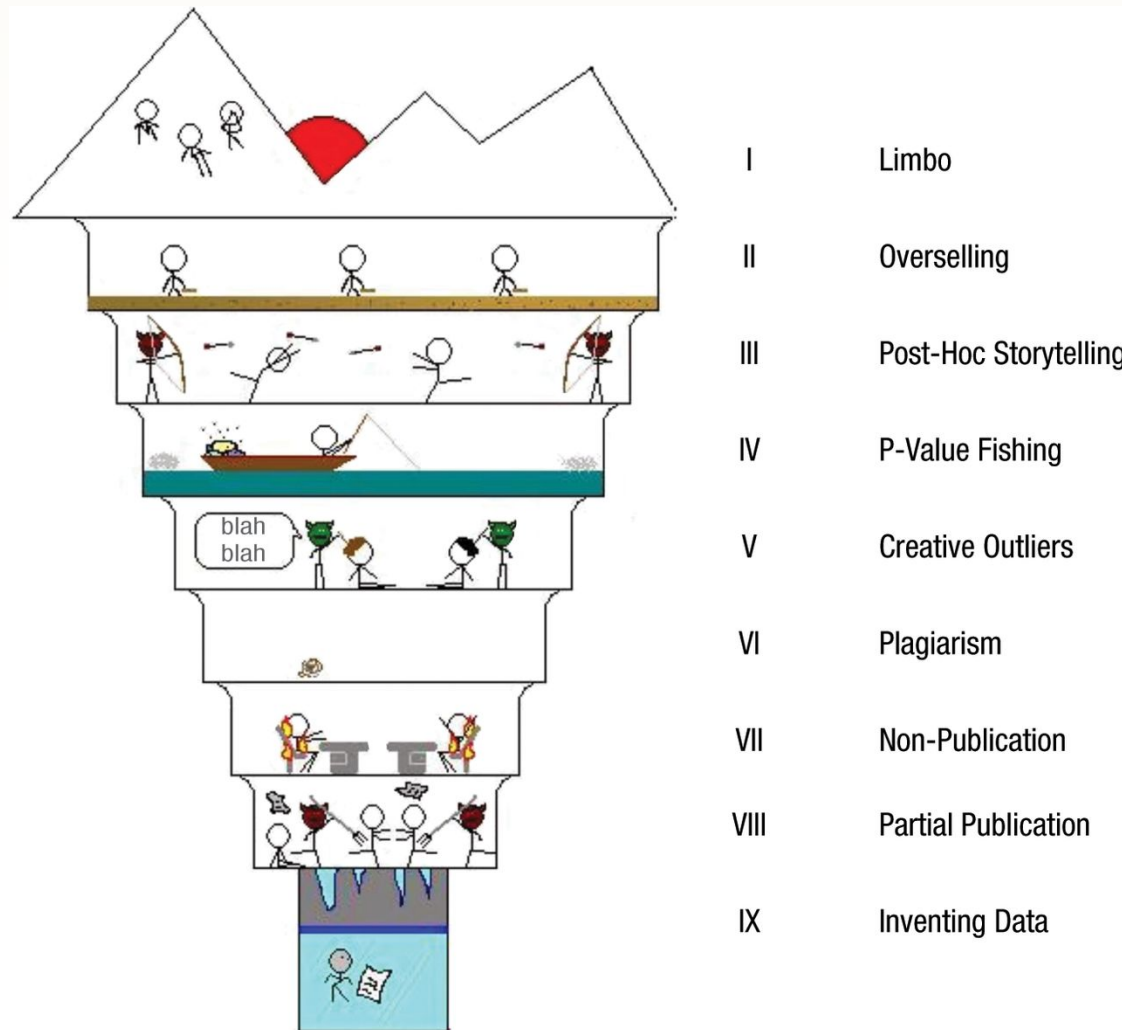


Scientists are very rarely rewarded for being right, they are rewarded for publishing in certain journals and for getting grants.



# The nine circles of scientific hell

(with apologies to Dante and xkcd)



**Neuroskeptic Perspectives on Psychological Science**  
2012;7:643-644

Perspectives on  
Psychological  
**SCIENCE**



# Oh dear

plos.org create account sign in

**PLOS** MEDICINE Browse Publish About Search Q advanced search

OPEN ACCESS

ESSAY

## Why Most Published Research Findings Are False

John P. A. Ioannidis

Published: August 30, 2005 • <http://dx.doi.org/10.1371/journal.pmed.0020124>

Article	Authors	Metrics	Comments	Related Content
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64,355 Save 2,253 Citation

1,764,159 View 9,644 Share

Download PDF Print Share

CrossMark

**Abstract**

Modeling the Framework for False Positive

**Abstract**

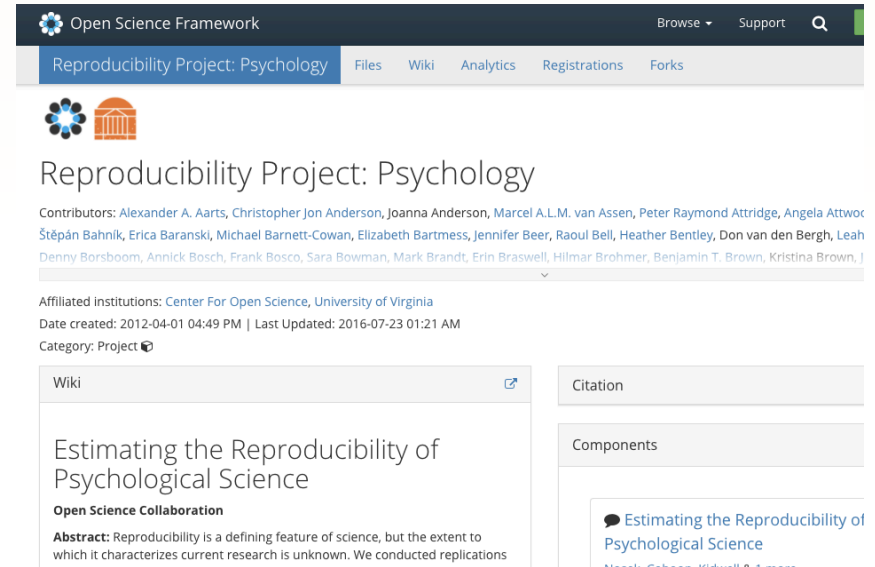
“Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true.”

<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0020124>

# Reproducibility project

Conducted replications of 100 experimental and correlational studies published in three psychology journals using high-powered designs and original materials when available.

- Replication effects = half the magnitude of original effects (substantial decline)
- 97% of original studies had significant results
- 36% of replications had significant results

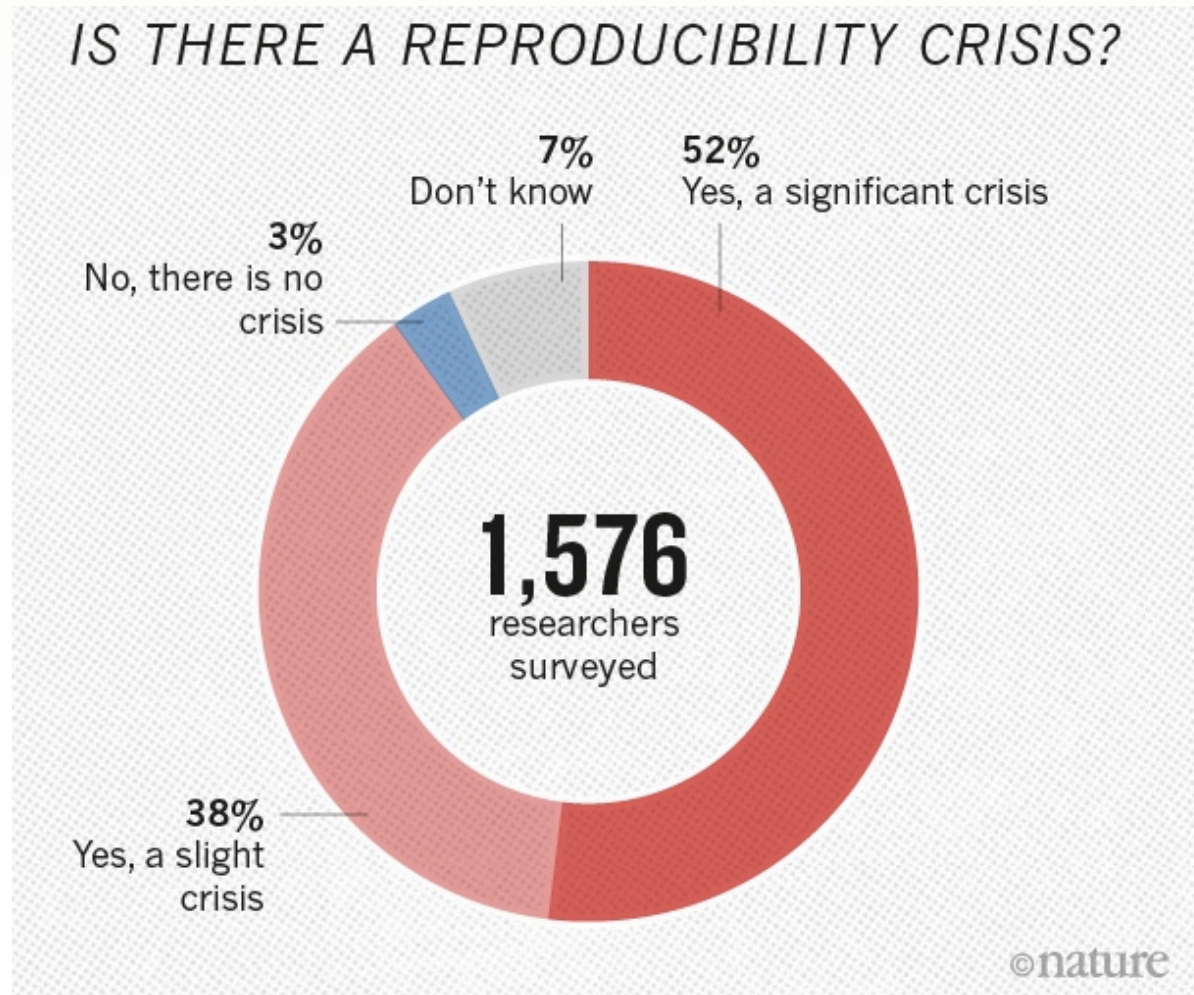


The screenshot shows the Open Science Framework (OSF) interface. At the top, there's a navigation bar with "Open Science Framework" and links for "Browse", "Support", and a search icon. Below this, a sub-navigation bar for "Reproducibility Project: Psychology" includes links for "Files", "Wiki", "Analytics", "Registrations", and "Forks". The main content area features the project title "Reproducibility Project: Psychology" with a list of contributors: Alexander A. Aarts, Christopher Jon Anderson, Joanna Anderson, Marcel A.L.M. van Assen, Peter Raymond Attridge, Angela Attwood, Štěpán Bahník, Erica Baranski, Michael Barnett-Cowan, Elizabeth Bartmess, Jennifer Beer, Raoul Bell, Heather Bentley, Don van den Bergh, Leah Denny Borsboom, Annick Bosch, Frank Bosco, Sara Bowman, Mark Brandt, Erin Braswell, Hilmar Brohmer, Benjamin T. Brown, Kristina Brown, and others. It also lists the affiliated institution as the Center For Open Science, University of Virginia, and provides the date created (2012-04-01 04:49 PM) and last updated (2016-07-23 01:21 AM). The category is listed as "Project". On the right, there are sections for "Citation" and "Components". The "Wiki" section on the left shows a page titled "Estimating the Reproducibility of Psychological Science" with an abstract that states: "Reproducibility is a defining feature of science, but the extent to which it characterizes current research is unknown. We conducted replications of 100 experimental and correlational studies published in three psychology journals using high-powered designs and original materials when available. Replication effects were half the magnitude of original effects (substantial decline). 97% of original studies had significant results, while 36% of replications had significant results." The "Components" section on the right lists the main component: "Estimating the Reproducibility of Psychological Science" by Marcel A.L.M. van Assen et al.

<https://osf.io/ezcuj/>

# Crisis?

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*Nature*, **533**, 452–454 (26 May 2016) doi:10.1038/533452a  
<http://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970>

# Interest at highest level

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CC credit Jim Trodel



- Research Integrity Enquiry
  - UK Government Science and Technology Committee - Submissions closed 10 March 2017
  - <https://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/inquiries/parliament-2015/inquiry6/>

# Problem: Poor science

Downloaded from <http://rsos.royalsocietypublishing.org/> on November 7, 2016

ROYAL SOCIETY  
OPEN SCIENCE

[rsos.royalsocietypublishing.org](http://rsos.royalsocietypublishing.org)

Research



**Cite this article:** Smaldino PE, McElreath R.

2016 The natural selection of bad science.

*R. Soc. open sci.* **3**: 160384.

<http://dx.doi.org/10.1098/rsos.160384>

Received: 1 June 2016

Accepted: 17 August 2016

**Subject Category:**

Psychology and cognitive neuroscience

**Subject Areas:**

theoretical biology/computer modelling  
and simulation/statistics

## The natural selection of bad science

Paul E. Smaldino<sup>1</sup> and Richard McElreath<sup>2</sup>

<sup>1</sup>Cognitive and Information Sciences, University of California, Merced, CA 95343, USA

<sup>2</sup>Department of Human Behavior, Ecology, and Culture, Max Planck Institute for  
Evolutionary Anthropology, Leipzig, Germany

PES, 0000-0002-7133-5620; RME, 0000-0002-0387-5377

Poor research design and data analysis encourage false-positive findings. Such poor methods persist despite perennial calls for improvement, suggesting that they result from something more than just misunderstanding. The persistence of poor methods results partly from incentives that favour them, leading to the natural selection of bad science. This dynamic requires no conscious strategizing—no deliberate cheating nor loafing—by scientists, only that publication is a principal factor for career advancement. Some normative methods of analysis have almost certainly been selected to further publication instead of discovery. In order to improve the culture of science, a shift must be made away from correcting misunderstandings and towards rewarding understanding. We support this argument with empirical evidence and computational modelling. We first present a 60-year meta-analysis of statistical power in the behavioural sciences and show that power has not improved despite repeated demonstrations of the necessity of increasing power. To demonstrate the logical consequences of structural



# Problem: Attrition crisis?

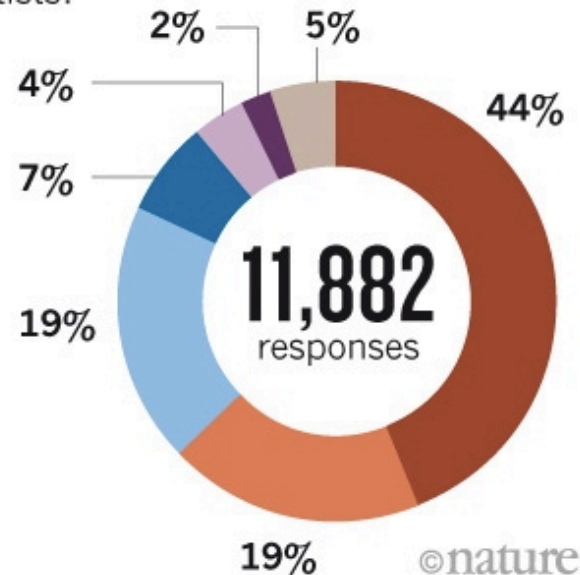
## FIGHT FOR FUNDING

The biggest challenge facing early-career scientists is the struggle to get grants, *Nature's* readers say.

### Poll question:

What do you think is the biggest challenge facing early-career scientists?

- The fight for funding
- Lack of work-life balance
- Progression judged too heavily on publication record
- Admin and bureaucracy
- Lack of clear targets
- Discrimination
- Other



Hard work, little reward: Nature readers reveal working hours and research challenges, Nature News, 4 November 2016,  
<http://www.nature.com/news/hard-work-little-reward-nature-readers-reveal-working-hours-and-research-challenges-1.20933>



# To recap

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- Reluctance to share data
  - (all disciplines)
- Hyperauthorship
  - (Physics)
- Reproducibility
  - (Psychology, Neuroscience, Pharmacology)
- Poor Science
  - (Sociology, economics, climate science also vulnerable)
- Attrition
  - (all disciplines)
- This all comes down to the reliance on publication of novel results in high impact journals

# Time for a change

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Image by Danny Kingsley

The whole outdated enterprise is kept alive for one main reason: the fact that employers and funders of researchers assess researchers primarily by where they publish. It's extraordinary to me and many others that the employers, mainly universities, outsource such an important function to an arbitrary and corrupt system.

[‘Richard Smith: Another step towards the post-journal world’](#) BMJ blog, 12 Jul, 16

# Solution

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Photo from Flickr – by Andy



We distribute dissemination across the research lifecycle and reward it

- *The Case for Open Research* - series of blogs  
July & August 2016  
[https://unlockingresearch.blog.lib.cam.ac.uk/?page\\_id=2#OpenResearch](https://unlockingresearch.blog.lib.cam.ac.uk/?page_id=2#OpenResearch)

# Disciplines

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Biomedical researchers	actively practice open research
Clinical researchers	practising open research
Population and public health researchers	experience challenges in data sharing that need addressing
Humanities researchers	have very little experience of data sharing and seemingly not much could motivate them to share their data
Social science researchers	little experience of data sharing and reuse and perceive minimal benefits from data sharing

Van den Eynden, Veerle et al. (2016) *Towards Open Research: practices, experiences, barriers and opportunities*. Wellcome Trust.

<https://dx.doi.org/10.6084/m9.figshare.4055448>

# All the rage

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arXiv.org

*PeerJ Preprints* -  
rapid communication  
& early findings

**SOCARXIV**  
open archive of the social sciences



**bioRxiv**  
beta  
THE PREPRINT SERVER FOR BIOLOGY

ACS Nano. 2016 Oct 25;10(10):9053-9054.

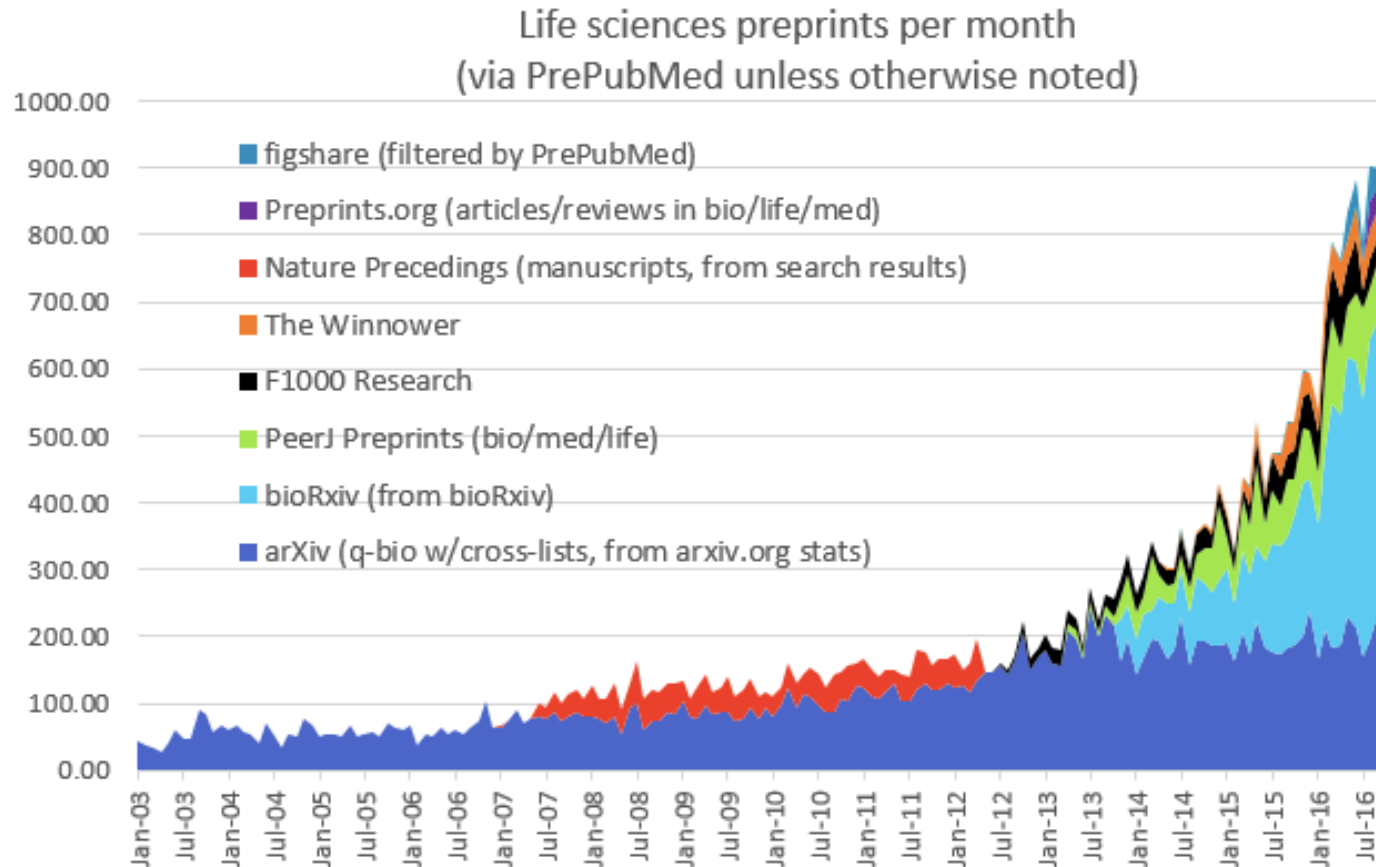
**ChemRXiv: A Chemistry Preprint Server.**

Kiessling LL, Fernandez LE, Alivisatos AP, Weiss PS.

PMID: 27776406 DOI: 10.1021/acsnano.6b07008

preprints

# Dramatic growth



Version 1 | [asapbio.org](http://asapbio.org)

<http://asapbio.org/preprint-info/biology-preprints-over-time>



# Governments

The image shows a screenshot of the European Commission's Open Science Policy Platform website. The header features the European Commission logo and the text "RESEARCH & INNOVATION Open Science". Below the header, there is a navigation bar with links: "Home", "Open Access", "European Open Science Cloud", and "Open Science Policy Platform". The main content area is titled "European Open Science Policy Platform" and "Open Science Policy Platform 1st Meeting, 19 September 2016". The text below the title states: "The Open Science Policy Platform met for the first time on 19 September 2016. The Open Science Policy Platform represents a new way of making policy: co-design and co-".

European Commission

RESEARCH & INNOVATION  
Open Science

European Commission > Research & Innovation > Open Science > Open Science Policy Platform

Home Open Access European Open Science Cloud Open Science Policy Platform

European Open Science Policy Platform

Open Science Policy Platform  
1st Meeting, 19 September 2016

The Open Science Policy Platform met for the first time on 19 September 2016. The  
Open Science Policy Platform represents a new way of making policy: co-design and co-

# Governments

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<http://www.chiefscientist.gov.au/wp-content/uploads/20160716-NRIR-Capability-Issues-Paper-16-July-version-proposed-final....pdf>

# Governments



The screenshot shows the ARC (African Research Cloud) website. The header features the ARC logo and the text "AFRICAN RESEARCH CLOUD". Below the header is a navigation bar with links: HOME, ABOUT, WHAT WE OFFER, NEWS, and CONTACT US. The main content area displays a news item titled "UCT and NWU sign MOU on ARC". The text of the article states: "The University of Cape Town and North West University have signed a Memorandum of Understanding for collaboration on the building and maintaining of the Africa Research Cloud (ARC). This is the first step of the ARC which is to be rolled out to all...". Below the article, there are two buttons: "University of Cape Town" and "UCT eResearch". A text box on the right side of the page reads: "To rise to the challenges of the new big data era, the research community must develop new infrastructure, tools and approaches that enable collaborative research among distributed teams around an ecosystem of big data. The ARC will be the solution for a network of South African, African and very likely non-African...". At the bottom, there is a date "19 September 2016" and a phrase "way of making policy: co-design and co-".

Australian Government

Nation Infra

ARC  
AFRICAN RESEARCH CLOUD

HOME ABOUT WHAT WE OFFER NEWS CONTACT US

**UCT and NWU sign MOU on ARC**

The University of Cape Town and North West University have signed a Memorandum of Understanding for collaboration on the building and maintaining of the Africa Research Cloud (ARC). This is the first step of the ARC which is to be rolled out to all...

University of Cape Town

UCT eResearch

19 September 2016. The way of making policy: co-design and co-

<http://www.arc.ac.za/>

# Governments



# Funders

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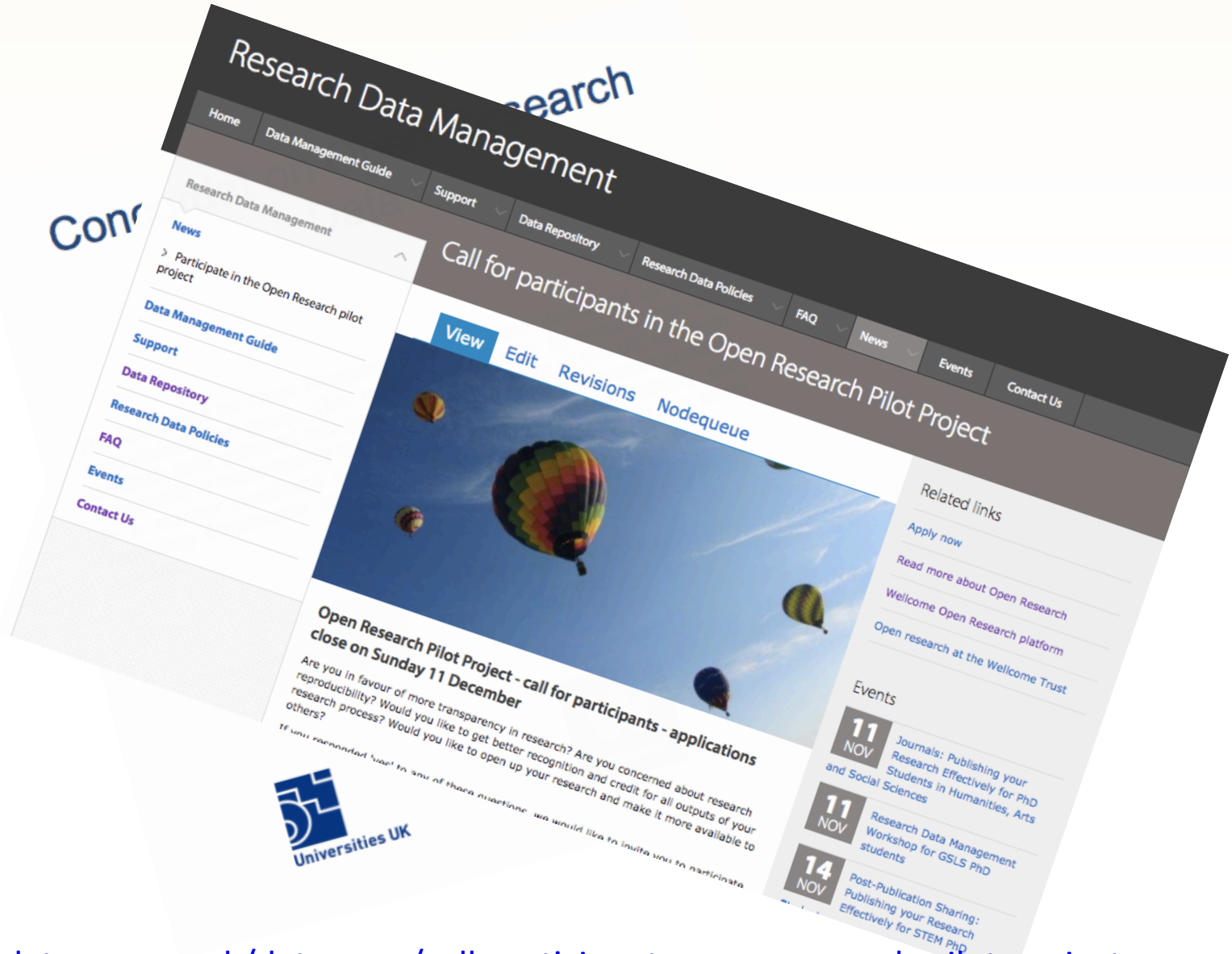
## Concordat on Open Research Data

The Concordat on Open Research Data has been developed by a UK multi-stakeholder group. This concordat will help to ensure that the research data gathered and generated by members of the UK research community is made openly available for use by others wherever possible in a manner consistent with relevant legal, ethical, disciplinary and regulatory frameworks and norms, and with due regard to the costs involved.





# Funders



<http://www.data.cam.ac.uk/datanews/call-participants-open-research-pilot-project>




# Funders



Can publish data sets, case reports, protocols, null & negative results  
[wellcomeopenresearch.org/](https://wellcomeopenresearch.org/)

# Community

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Home Con

**The 21st International  
Conference on Electronic  
Publishing**

Expanding Perspectives on Open Science:  
Communities, Cultures and Diversity in Concepts and  
Practices

**6 - 8 June, 2017**  
Curium Palace Hotel  
Limassol, Cyprus

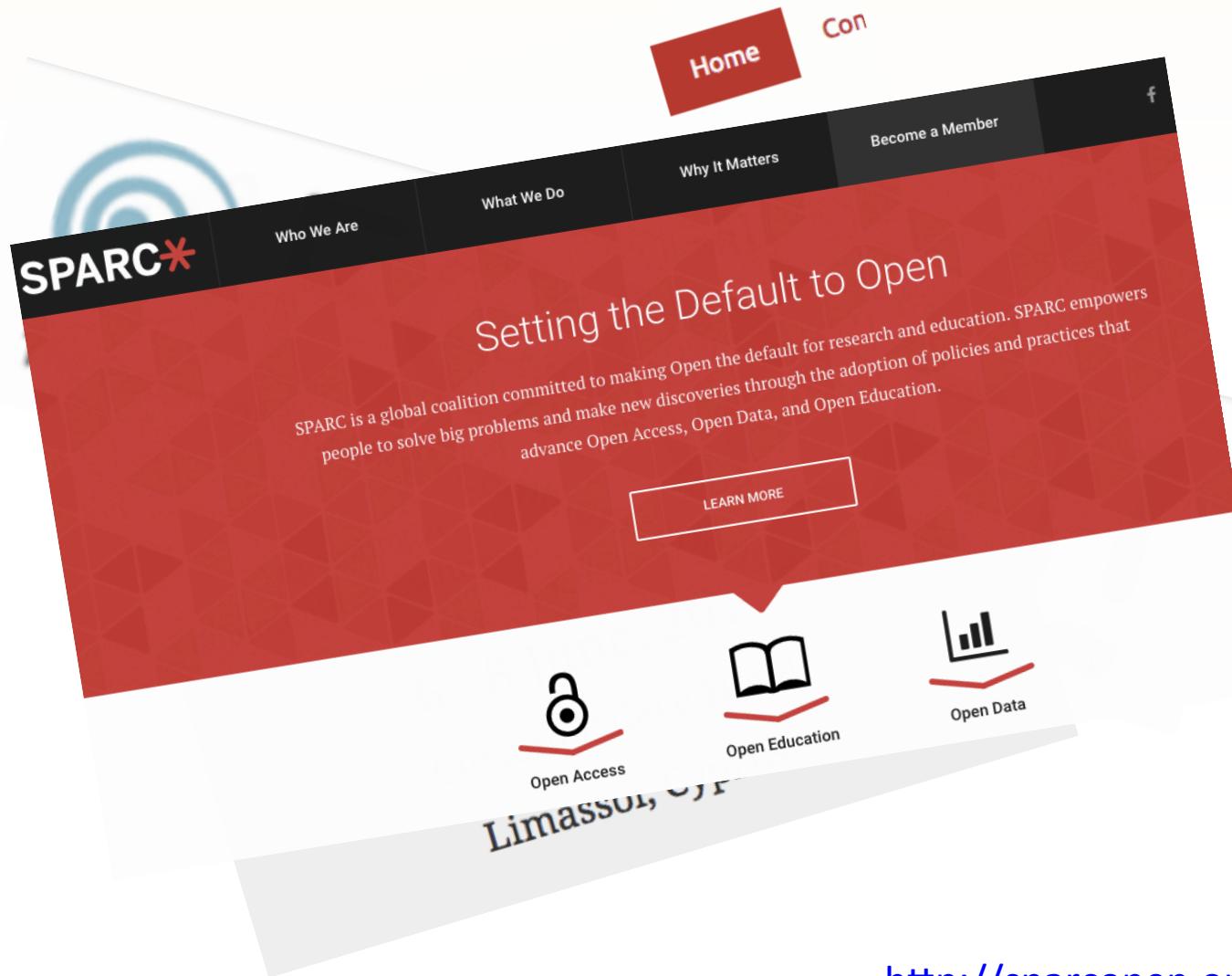
# Community

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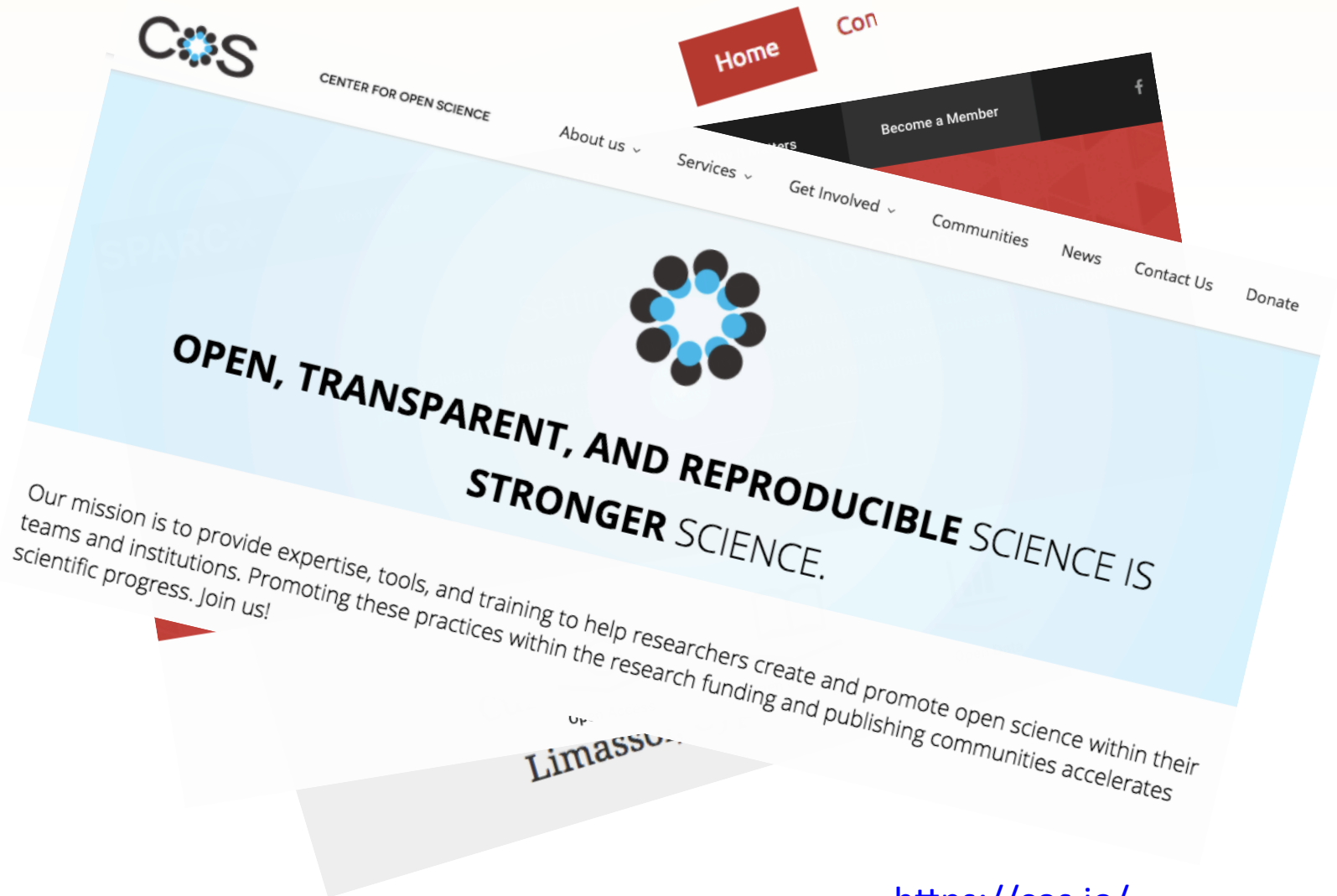
<https://www.force11.org/about>

# Community



<http://sparcopen.org/>

# Community



<https://cos.io/>

# Community

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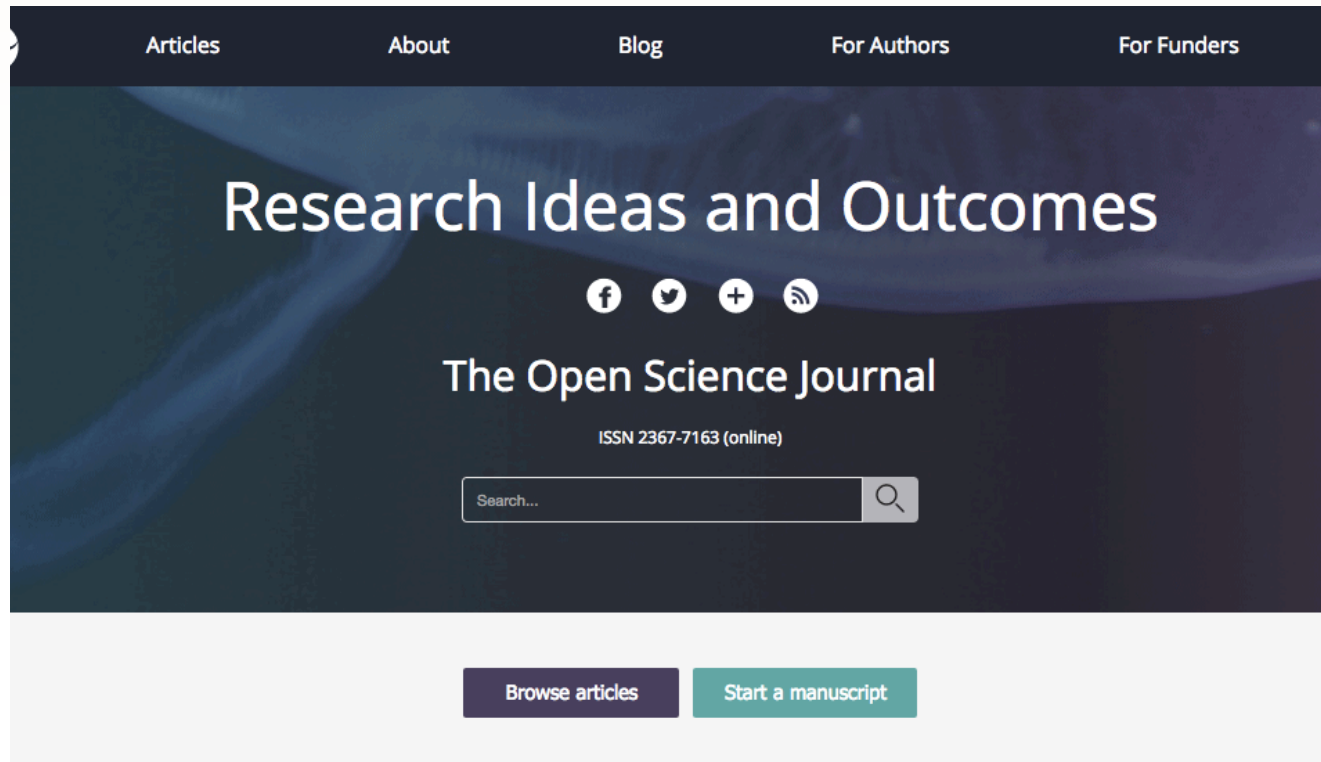


<http://www.opencon2016.org/>



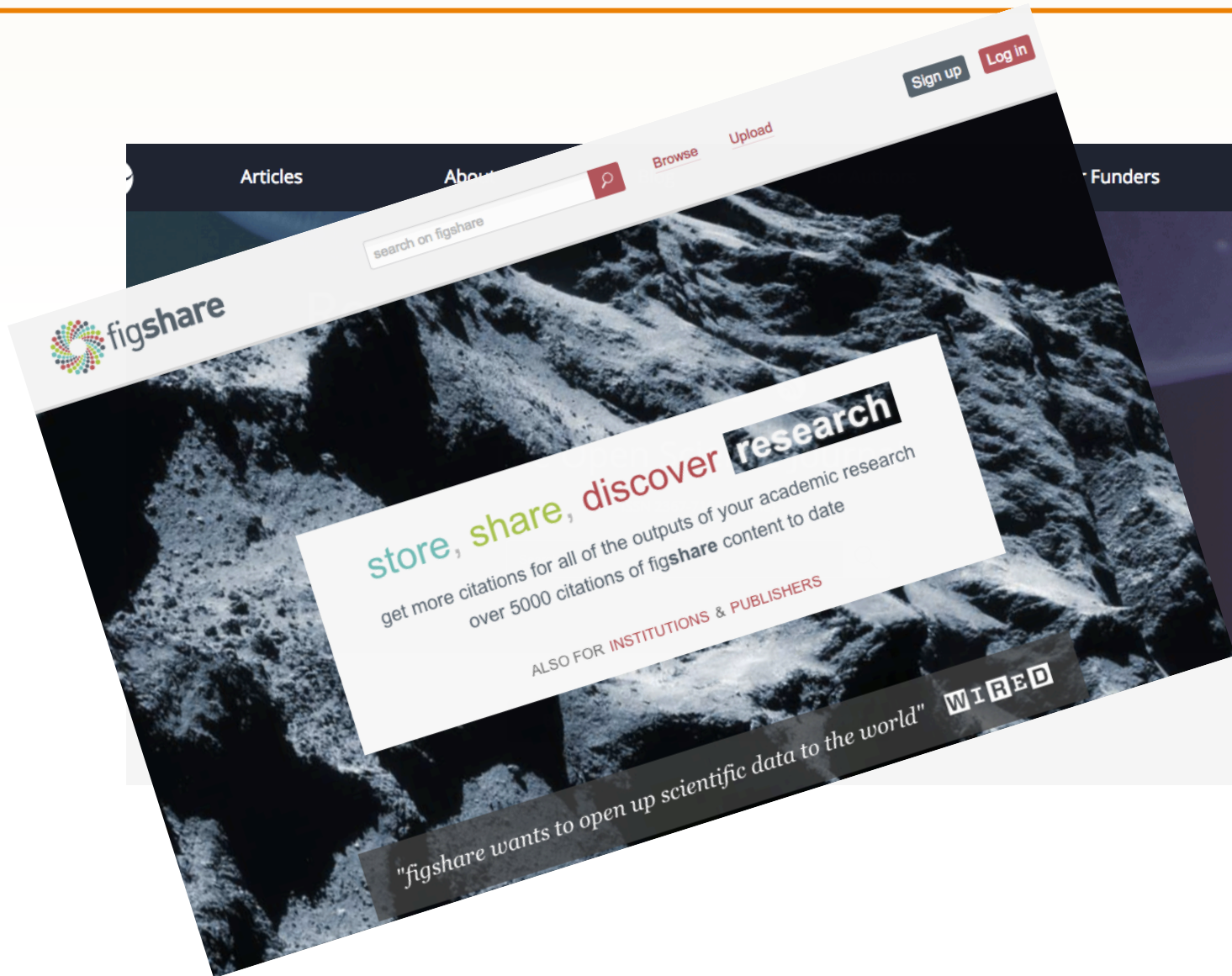
# Publishing options

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RIO Journal - <http://riojournal.com/>

# Publishing options



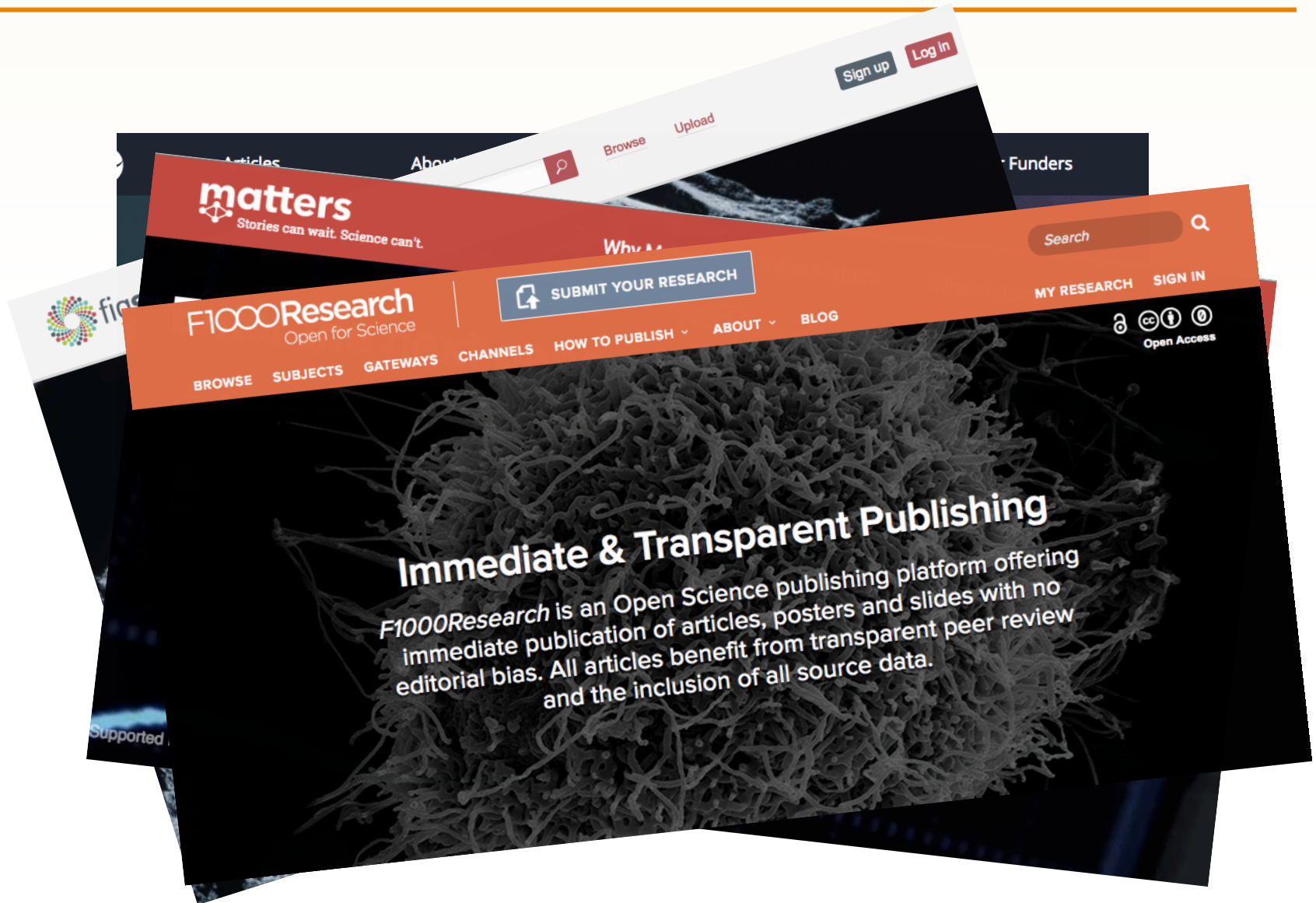
Figshare - <https://figshare.com/>

# Publishing options



Matters - <https://www.sciencematters.io/>

# Publishing options



F1000 - <https://f1000research.com/>



# Publishing options



Missing Pieces

<http://blogs.plos.org/everyone/2015/02/25/positively-negative-new-plos-one-collection-focusing-negative-null-inconclusive-results/>

# Publishing options

## Understanding Registered Reports



In 2013, the journal *Cortex* took a step forward in reforming the culture of scientific publishing. With the support of Chief Editor Sergio Della Sala, we became one of the first journals to offer Registered Reports – an empirical article designed to eliminate publication bias and incentivize best scientific practice. In contrast to conventional publishing, we provisionally accept for publication study protocols that are considered methodologically sound and address an important scientific question. Armed with this provisional acceptance of their work, authors can perform the research safe in the knowledge that the results themselves will not determine the article's publication. At the same time, readers of the final paper can feel more confident that the work is reproducible because the initial study predictions and analysis plans were independently reviewed.

The current issue of *Cortex* sees the first fruits of this labour: a [Registered Report](#) by Jona Sassenhagen and Ina Bornkessel-Schlesewsky from the [University of Marburg](#) and the [University of South Australia](#). Sassenhagen and Bornkessel-Schlesewsky pre-registered an innovative experiment for testing whether the P600, an electrophysiological waveform associated with language processing, is in fact an instance of the P3, a waveform associated with attention. Their results are consistent with this hypothesis – these waveforms, considered distinct by some previous studies, may, in fact, reflect the same underlying neural process.

→ as valuable

Registered Reports -

<https://www.elsevier.com/editors-update/story/peer-review/cortexs-registered-reports>



# Publishing options



GitHub-

<http://www.nature.com/news/democratic-databases-science-on-github-1.20719>

# Publishing options



PLOS Taxonomy of author contributions

<http://journals.plos.org/plosone/s/authorship/>

[utm\\_source=plos&utm\\_medium=blog&utm\\_campaign=plos-1607-credit#loc-author-contributions](http://journals.plos.org/plosone/s/authorship/?utm_source=plos&utm_medium=blog&utm_campaign=plos-1607-credit#loc-author-contributions)

# Lots of work to be done

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Image by Danny Kingsley

# Questions/Discussion

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Thanks!

**Dr Danny Kingsley**

Head of Scholarly Communication

University of Cambridge

**@dannykay68**