Why Open Science?

Credits: UNESCO

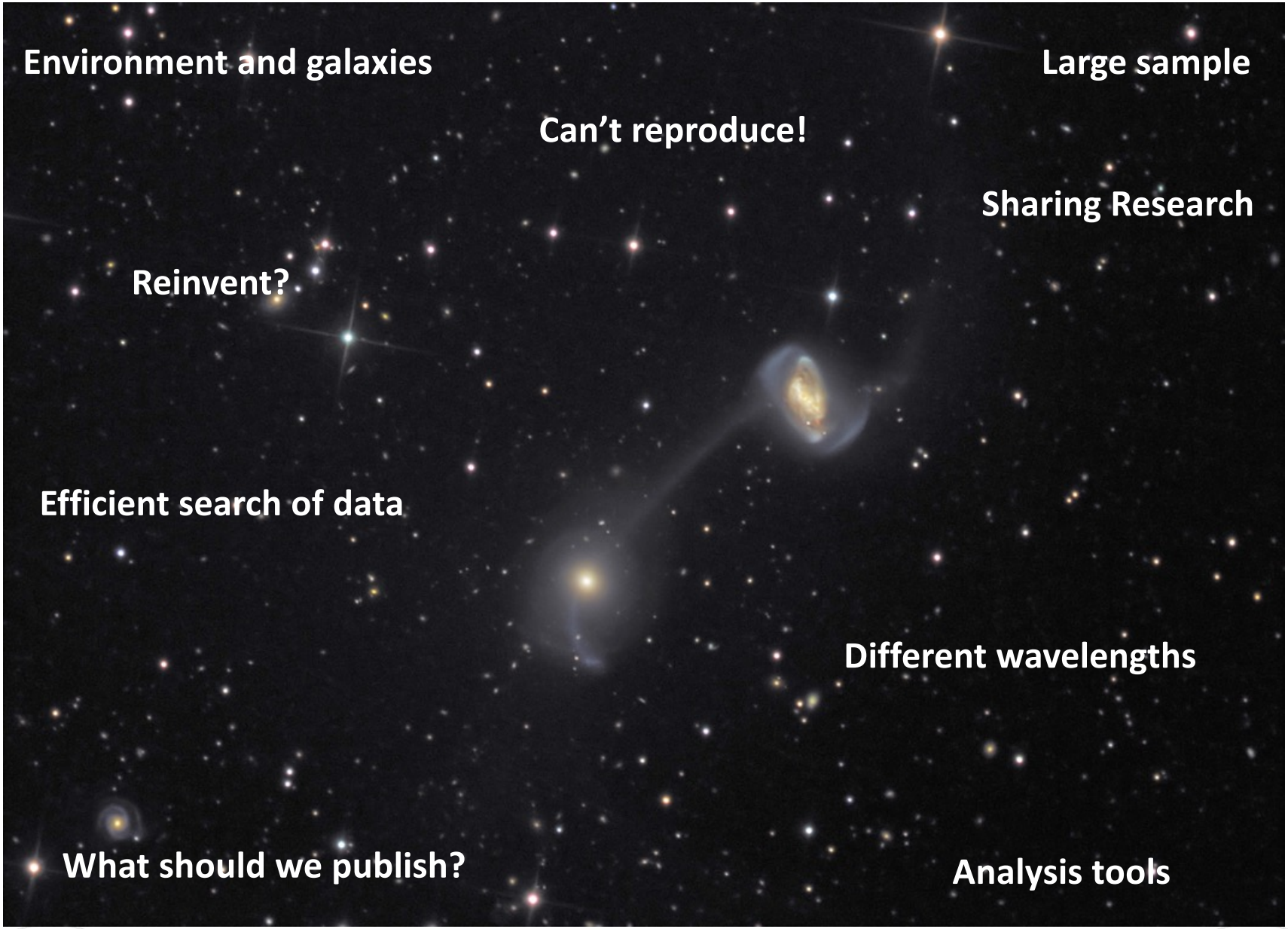
Lourdes Verdes-Montenegro

Susana Sánchez, Julián Garrido

IAA-CSIC

DOI: https://doi.org/10.5281/zenodo.6535369

Motivation



NGC 5216: Keenan's System by Winder/Hager

Motivation

slideshare

Motivation

ERC Scientific Seminar Series

Prof. Lourdes Verdes-Montenegro
Instituto Astrofísica Andalucía, Grananda, Spain
ERC Panel Chair

Love for science or 'academic prostitution'?

12 April 2013
11.00 to 12.30

European Research Council
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slideshare

June 2010

nature
International weekly journal of science

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Archive > Specials & supplements archive > Science Metrics

SPECIALS

See all specials

How to improve the use of metrics

Nature **465**, 870–872 (17 June 2010) | doi:10.1038/465870a

Research reverts to a kind of 'academic prostitution', in which work is done to please editors and referees rather than to further knowledge.

SCIENCE METRICS

The value of scientific output is often measured, to rank one nation against another, allocate funds between universities, or even grant or deny tenure. Scientometricians have devised a multitude of 'metrics' to help in these rankings. Do they work? Are they fair? Are they over-used? *Nature* investigates.

▾ Editorial ▾ Features ▾ Opinion ▾ From the archive

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SKAO

Artist impresion of the SKA Observatory telescopes.
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Follow-Up

EuroScience Open Forum (ESOF) July 2018:

- Session proposed to SKA Office for “Theme #3 Science policy ans transformation of research practice”, focused on reproducible science and new metrics in the era of Megascience infrastructures, accepted by SKAO, and submitted in collaboration

Outline

- Open Science, a new concept?
- Metrics + Economy = Academic prostitution
- Tools
- Is “Big Data science” possible without Open Science?
- Revised research assesments
- Impact
- Conclusions

Open Science, a new concept?

Open Science: a **new** concept?

- Too many **adjectives** for science:

  excellent, high quality, trustable, … Open

Open Science: a **new** concept?

- Too many **adjectives** for science:

  excellent, high quality, trustable, … Open

  - **Let's go back 1000 years in time…**

Scientific Reproducibility is a fundamental principle of the Scientific Method, a process pioneered by Ibn al-Haytham.
In the XIth century, he proposed that a hypothesis must be supported by experiments based on **confirmable procedures** or mathematical evidence.
Made special emphasis on reproducibility of results.

Ibn al-Haytham (965 – 1040)

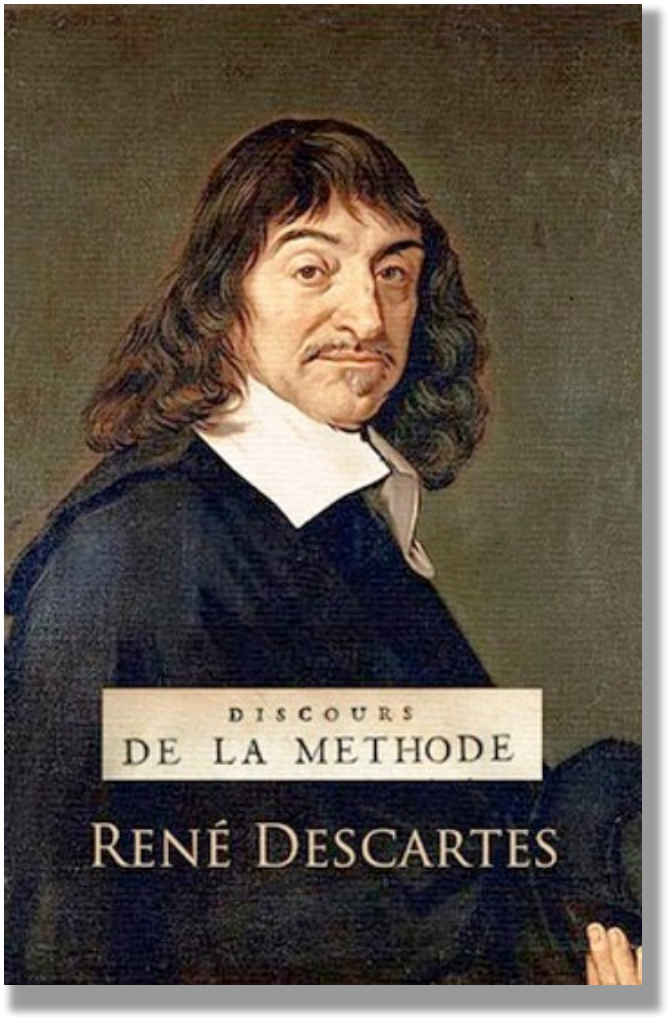
Open Science: a **new** concept?

- Too many **adjectives** for science:

  excellent, high quality, trustable, … Open

  - **Or let's go back 383 years in time…**

Descartes reminded us in the 17th century **that Scientific Reproducibility is a fundamental principle of the Scientific Method**, and laid the foundations for the Philosophy of Science



- Science = Scientific Method = Reproducible = Open!

Open Science: but then we already follow it, right?

- **We are scientists! We (want to) follow the Scientific Method!**

Open Science: but then we already follow it, right?

- **We are scientists! We (want to) follow the Scientific Method!**

Questionnaire on reproducibility (1500 scientists)

- 70% of researchers have tried and failed to reproduce another scientist's experiments
- > 50% have failed to reproduce their own ones!
  - Chemistry: 90% (60%)
  - Biology: 80% (60%)
  - Physics and engineering: 70% (50%)
  - Medicine: 70% (60%)
  - Earth and environmental science: 60% (40%)

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Aha!
So you don't empathise?

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Overly Honest Method
@OverlyHonestly

Maybe with this?

You can download our code from the URL supplied. Good luck downloading the only postdoc that can get it to run, though #OverlyHonestMethods

Open Science: then what happened since 1637?

- **Moving beyond the PDF**

40% Knowledge Burying in paper publication =

Rest **I**n **P**aper

(S. Bechhofer 2011, Research Objects: Towards Exchange and Reuse of Digital Knowledge)

http://www.clipartkid.com/rip-cliparts/

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In practice

Moving from narratives (last 300 yrs) to the actual output of research is not so easy

...indeed is not so easy

Big Data preservation & transfer	Primary (raw) data can not be accessed in an automatic way
Standarized catalogues	Processed data and images are only publicly available in the paper PDF
Findable code Repositories	There are some scripts for processing the data on a server somewhere, but no one remembers where
Software environment preservation	The code is in a public repository, but good luck trying to install/execute it.

FAIR:

Findable

Accesible

Interoperable

Reusable

See Jones et al. talk at SKA Science Meeting 2019

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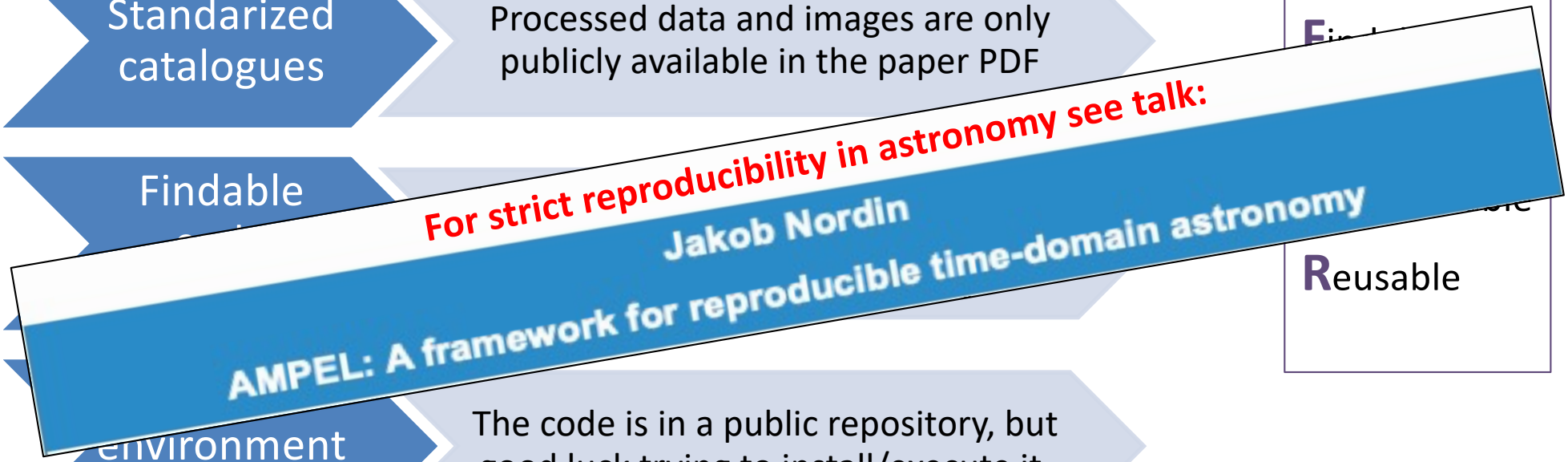

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- FAIR (www.go-fair.org) is a multi-disciplinary bottom-up initiative to make scientific data reusable.

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Findable

Accesible

Interoperable

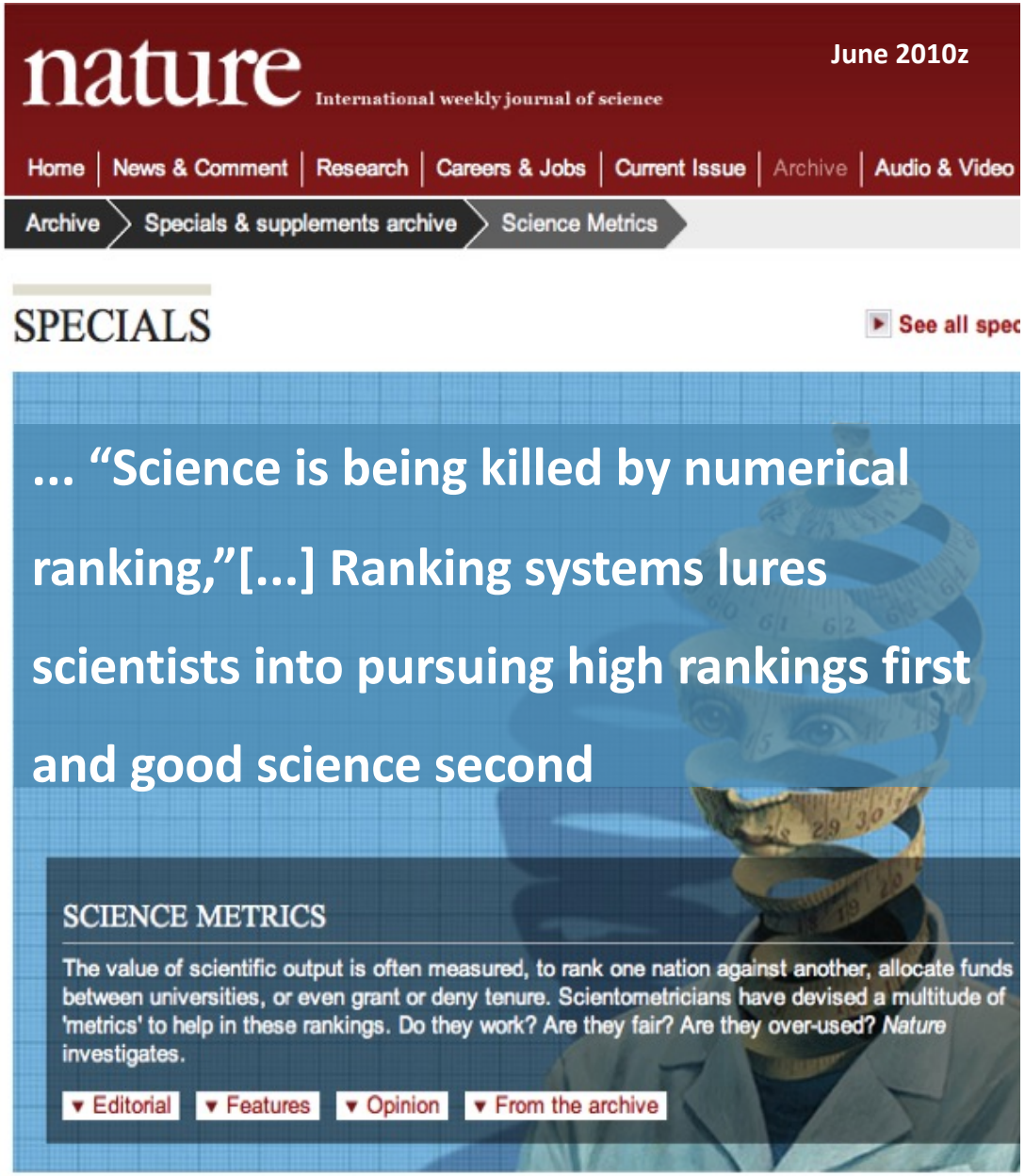
Reusable

- Effort is not always **rewarded**
- **Requires new advanced tools** to support scientists to fulfill FAIR

See Jones et al. talk at SKA Science Meeting 2019

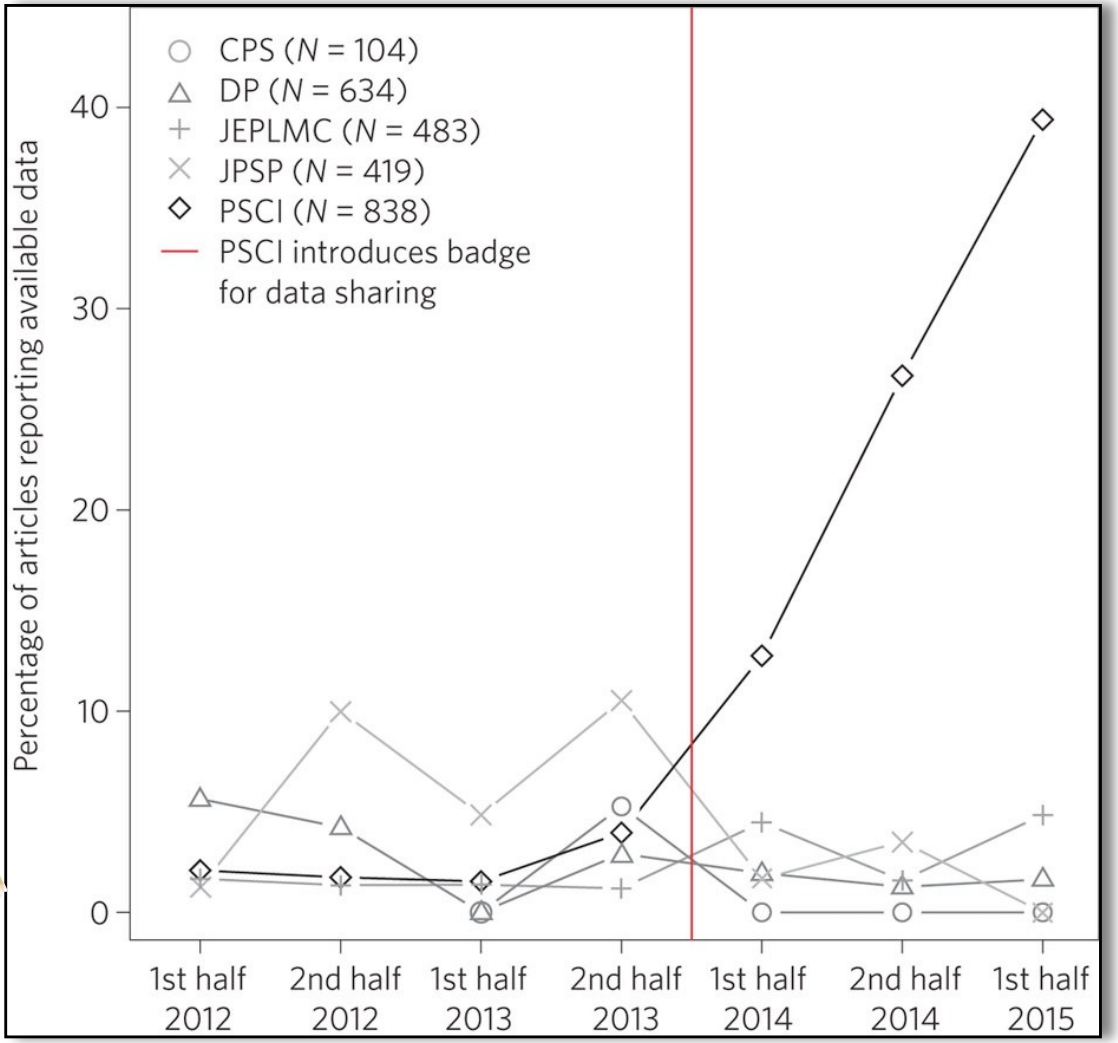
Metrics of Research
vs
Open Science

Current Metrics ≠ Open



Productivity seems to prevail over Discovery

Yes, we are sensitive to rankings



In January 2014, the journal Psychological Science (PSCI) introduced badges for articles with open data.

Metrics


nature
International weekly journal of science
Home | News & Comment | Research | Careers & Jobs | Current Issue | Archive | Audio & Video | Fo
Archive > Specials & supplements archive > Science Metrics
SPECIALS
See all specials
Metrics: A profusion of measures
Scientific performance indicators are proliferating — leading researchers to ask afresh what they are measuring and why. Richard Van Noorden surveys the rapidly evolving ecosystem.
Richard Van Noorden
... an author's h-index can reflect longevity as much as quality — and can never go down with age, even if a researcher drops out of science altogether.
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Metrics: citations

Is peer review any good?

(Casati et al 2009)

- Rankings of the review process vs impact (citations):
  Very little correlation

Reputation and Impact in Academic Careers

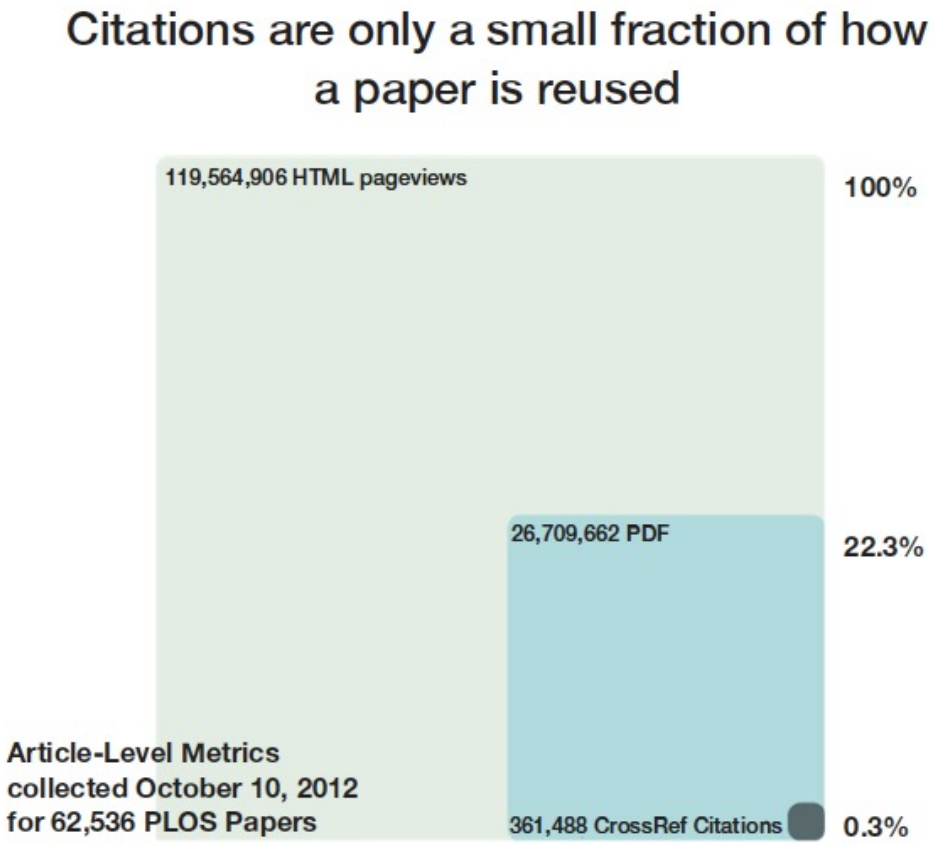
(Petersen et al PNAS 43, 111, 2014)

Goal: **role of social ties, author reputation, and the citation life cycle of papers**

- **Author reputation dominates in the initial phase of a papers citation life cycle** --> papers gain a significant early citation advantage if written by authors already having high reputations in the scientific community.

Metrics: citations

Citations represent less than 1% of usage for an article.



PLOS (Public Library of Science) (November 2012)

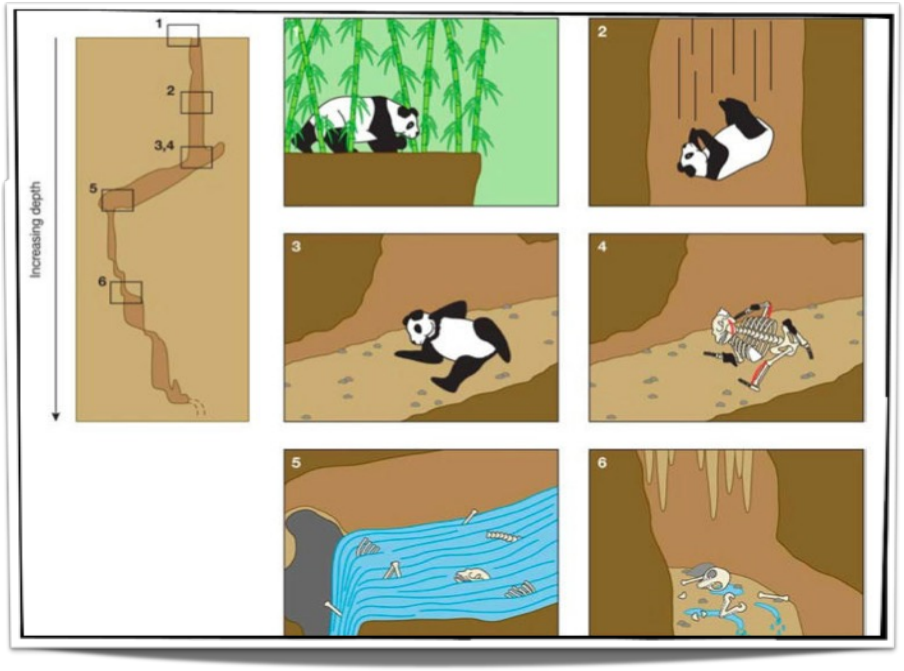
Richard Cave at the Charleston Conference 2012, Charleston

Metrics: citations

“Remains of Holocene giant pandas from Jiangdong Mountain (Yunnan, China) and their relevance to the evolution of quaternary environments in south-western China”

(by Jablonski et al. and published in Historical Biology)

“A quick look at the actual conversations about the paper reveal that **it was Figure 7, not the research content of the paper**, that attracted all of the attention”

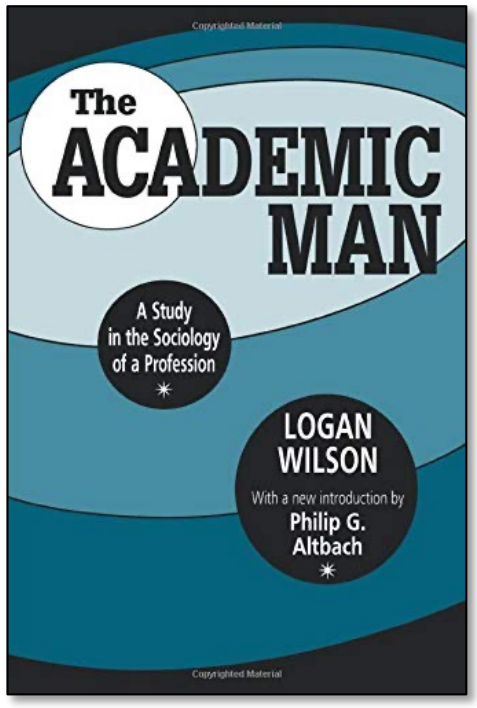


Jean Liu, 2013, Who loves Pandas?

Current Metrics ≠ Open

- "Publish or perish"

  Logan Wilson, "The Academic Man: A Study in the Sociology of a Profession", published in **1942**



- Open = advantage for competitors

- "Science works through micro improvements and multiple errors and failures until something finally Works. […] **We've become paralyzed with the notion that showing incremental improvements** and corrections **hurts** […] **our personal careers and science"**

(Who Killed the PrePrint, and Could It Make a Return? Jason Hoyt and Peter Binfield, Scientific American, 2013)

Caveat on current metrics

Can "excellence" kill Science?

Such metrics further **block innovation** because they **encourage scientists to work in areas of science that are already highly populated**, as it is only in these fields that large numbers of scientists can be expected to reference one's work, no matter how outstanding.

Science Editorial, 17 May 2013
By Bruce Alberts, Science Editor's in chief

Economy??

Economy and Science?

"Economics is about understanding how human beings behave when one or more resources are scarce"

Blog M Nielsen 2008, "The economics of scientific collaboration"

Economy and Science?

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Blog M Nielsen 2008, "The economics of scientific collaboration"

Bad influence in:

- **Candidates**: pushed to get funds
- **Funders**: expensive to get enough experts during enough time

Examples of **advices** to candidates:

- tittle of the Project counts 50%
- proposals circulated at the home institution

→ evaluators don't have time to read in detail proposals / are not experts

Economy + Science = Marketing

facebook

MARKETING for SCIENTISTS

HOW TO SHINE IN TOUGH TIMES

Marketing for Scientists

A 234 personas les gusta esta página · 3 personas

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Because sometimes unlocking the mysteries of the universe just isn't enough.

PROPOSAL WRITING FOR RESEARCH & INNOVATION PROJECTS

3 Days Training Course

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From the Fundamentals to Developing Winning Proposals

European Academy - Camille Herbert Gestion 3 de mayo de 2022, 13:25

PROPOSAL WRITING | European Academy

Para: Lourdes Verdes-Montenegro Atalaya,

Responder a: European Academy - Camille Herbert

Dear Colleague,

Following the constant launch of new calls and the intense competition among submitted applications, the skill of selling your idea to the funders along with the knowledge of the EU policy context, is equally important to the design of the project itself.

Reserve your seat

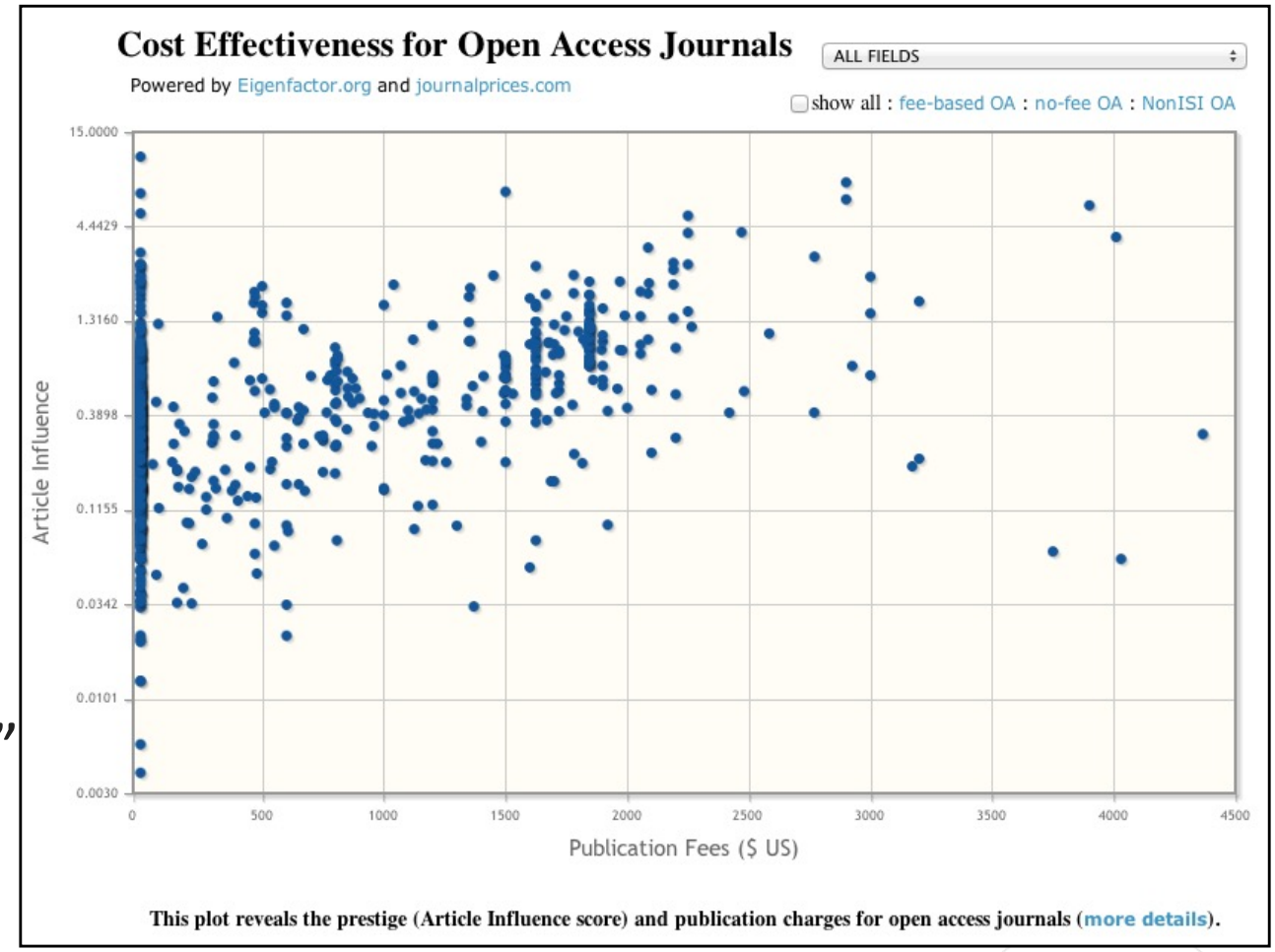
Economy?

"Opting for open access means considering costs, journal prestige and career implications"

S. Pincock, 2013. Nature, 495, 539

- Senior advice to young scientists: go to the most prestigious journal

- Countries with more economic resources set research "trends" (Alperin 2013, 2014)



Academic “Prostitution”

When that which benefits Science and Scientist do not coincide

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Attitudes

Evaluator of yearly review of FP7 EC STREP project:

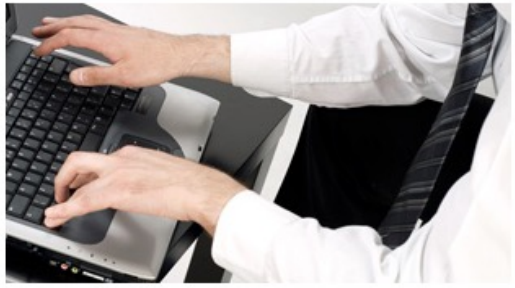
"There are people who are paying other researchers to get their papers cited, so as to increase their h-index"

Scientists Review Own Papers

In the latest effort to boost publication records, researchers are writing positive peer reviews for their work under other scientists' names.

By Jef Akst | October 3, 2012

0 Comments Like 1 Pin it +1 20 Link this Stumble Tweet this



At least four scientists have been cheating the peer review system in a whole new way: when submittin a paper to a scientific journal, they suggest reviewer with email addresses that track back to themselves; then they write a glowing review. So far, the ploy has succeeded in getting work published in *Experimental Parasitology*, *Pharmaceutical Biology*, and several other journals, including two in journals under the umbrella of publishing giant Elsevier, *The Chronicle of Higher Education* reported this week (September 30).

German Fascination With Degrees Claims Latest Victim: Education Minister

Tobias Schwarz/Reuters

Education Minister Annette Schavan, left, with Chancellor Angela Merkel on Saturday.

By NICHOLAS KULISH and CHRIS COTTRELL
Published: February 9, 2013

BERLIN — For 32 years, the German education minister's 351-page dissertation sat on a shelf at Heinrich Heine University in Düsseldorf gathering dust while its author pursued a successful political career that carried her to the highest circles of the German government.

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TWITTER
GOOGLE+
SAVE
E-MAIL
SHARE
PRINT
REPRINTS

Connect With Us on Twitter
Follow @nytimesworld for international breaking news and headlines.
Twitter List: Reporters and Editors

World

Enlarge This Image

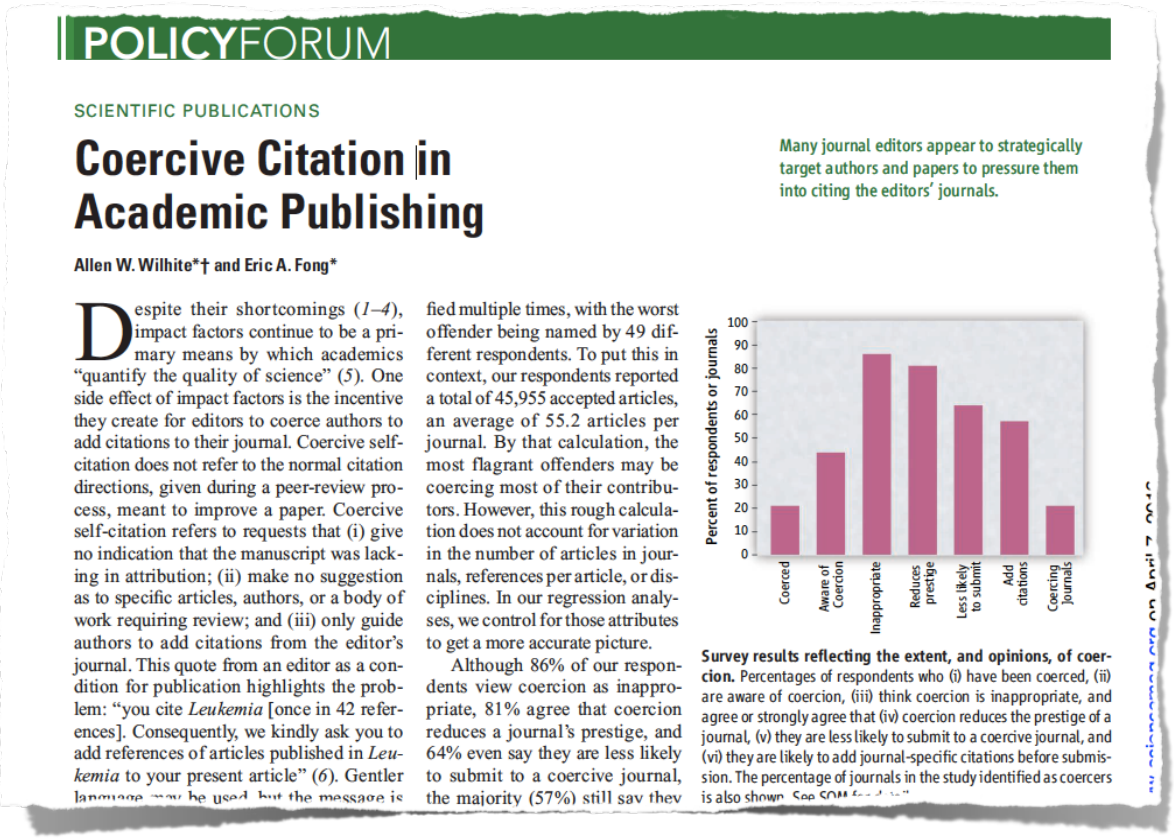
The academic work was a time bomb, however, and it exploded last year when an anonymous blogger published a catalog of passages suspected of having been lifted from other publications without proper attribution.

The university revoked the doctorate of the minister, Prof. Dr. Annette Schavan, on Tuesday (she retains the title pending appeal), and on Saturday she was forced to resign her cabinet post. It was the second time a minister had resigned from the government of Chancellor Angela Merkel over plagiarism in less than two years.

Read more in
https://www.datascienceblog.net/post/commentary/plagiarism-in-academia/

Editorial system

- Bias against “negative” findings
- Less transparecy for retraction papers



POLICYFORUM

SCIENTIFIC PUBLICATIONS

Coercive Citation in Academic Publishing

Allen W. Wilhite*† and Eric A. Fong*

Many journal editors appear to strategically target authors and papers to pressure them into citing the editors' journals.

Despite their shortcomings (*1*–*4*), impact factors continue to be a primary means by which academics "quantify the quality of science" (*5*). One side effect of impact factors is the incentive they create for editors to coerce authors to add citations to their journal. Coercive self-citation does not refer to the normal citation directions, given during a peer-review process, meant to improve a paper. Coercive self-citation refers to requests that (i) give no indication that the manuscript was lacking in attribution; (ii) make no suggestion as to specific articles, authors, or a body of work requiring review; and (iii) only guide authors to add citations from the editor's journal. This quote from an editor as a condition for publication highlights the problem: "you cite *Leukemia* [once in 42 references]. Consequently, we kindly ask you to add references of articles published in *Leukemia* to your present article" (*6*). Gentler language may be used, but the message is fied multiple times, with the worst offender being named by 49 different respondents. To put this in context, our respondents reported a total of 45,955 accepted articles, an average of 55.2 articles per journal. By that calculation, the most flagrant offenders may be coercing most of their contributors. However, this rough calculation does not account for variation in the number of articles in journals, references per article, or disciplines. In our regression analyses, we control for those attributes to get a more accurate picture.

Although 86% of our respondents view coercion as inappropriate, 81% agree that coercion reduces a journal's prestige, and 64% even say they are less likely to submit to a coercive journal, the majority (57%) still say they

Survey results reflecting the extent, and opinions, of coercion. Percentages of respondents who (i) have been coerced, (ii) are aware of coercion, (iii) think coercion is inappropriate, and agree or strongly agree that (iv) coercion reduces the prestige of a journal, (v) they are less likely to submit to a coercive journal, and (vi) they are likely to add journal-specific citations before submission. The percentage of journals in the study identified as coercers is also shown. See SOM

Several journals have adopted a practice of automatically rejecting any manuscript that has received two critical reports.

Unfortunately, such a policy virtually ensures that ***important new ideas are rejected****, whereas innovative papers are just the sort that we should most want to publish.*

Helmut A. Abt June 2013
ApJ Editor-in-Chief for 28 years, till 1999

Tools

Some reflexions (from 2013)

Shift the balance to the Methodology

- Clear hypothesis
- Data
- Formula
- Methods

Is it reproducible? is Science

Give less weight to the results: better quality

Astronomy a pioneer of Open/FAIR Data

IVOA (a case of study for the EC [1])

- Established in 2002
- Developing standards required to make data FAIR
- Open and Inclusive framework:
  - –Anyone can publish data / develop a VO tool

Pre-IVOA

- –Definition of the FITS format (1979)
- – Early precursors of remotely accessible data services:
  - IUE satellite database (1978-1996)
  - astronomical data centre (CDS) in the early 70's

[1] Turning FAIR into reality : final report and action plan from the European Commission expert group on FAIR dat, 2018, https://data.europa.eu/doi/10.2777/1524

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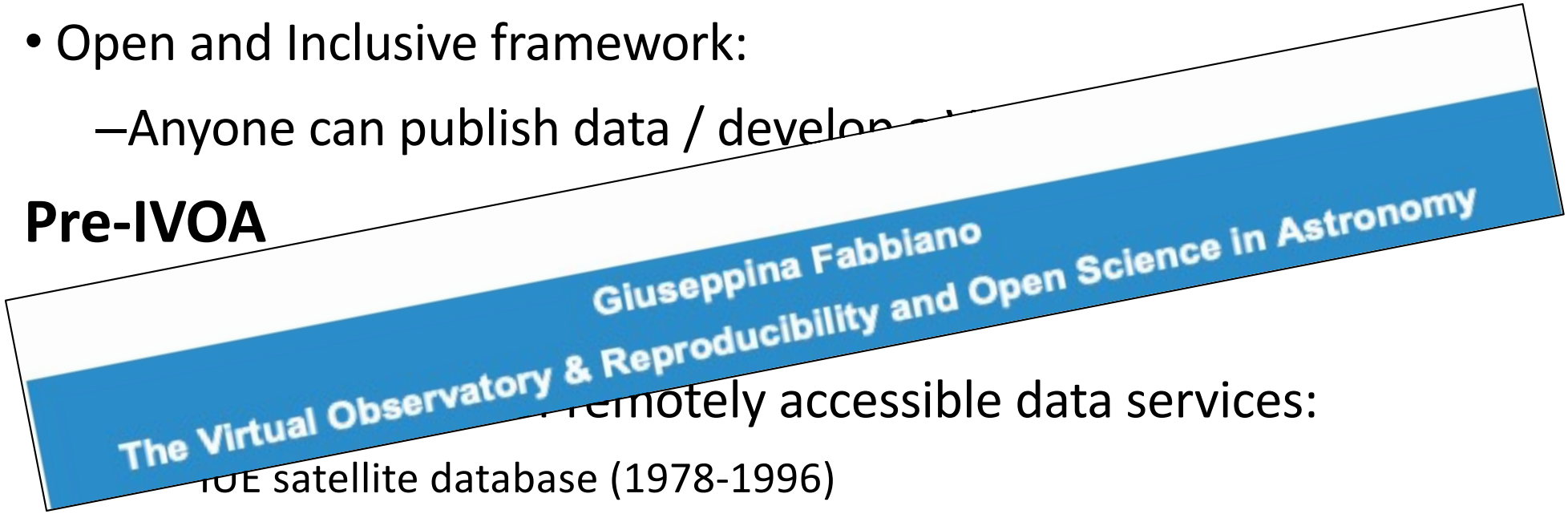

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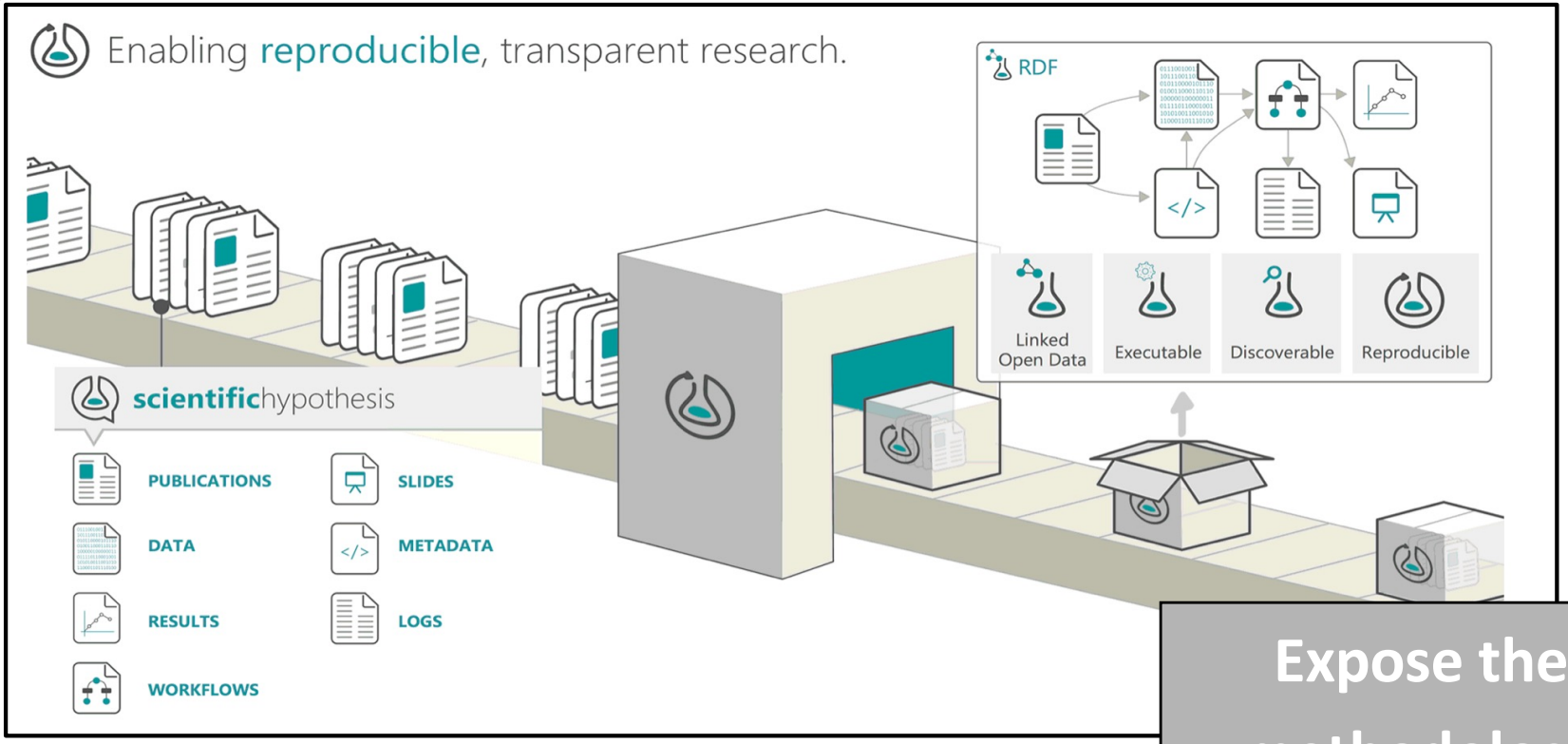
Opening all involved elements: Research Object

Workflow 4Ever

EU funded FP7 STREP Project
December 2010 – December 2013

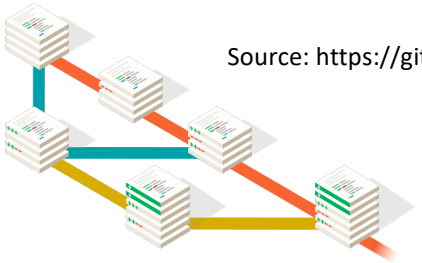
Coordinator of WP
"Astronomy Use Case"



Expose the methodology

- **input and output examples**
- **annotations** (human/machine readable)
- **metadata:** data + software versión + config. parameters, execution environment, description of main steps, etc
- **interoperability**

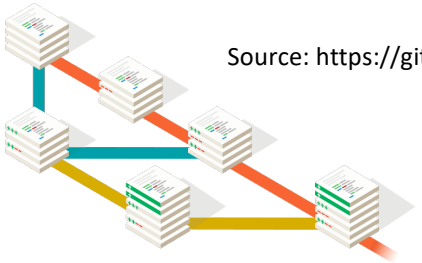
Git and GitHub. Understandable Software



Source: https://git-scm.com/

- **Git:** open source tools for version control
- **GitHub:** code hosting platform for version control & collaboration
  - Catalogue: “findable”
  - Documentation: “understandable”
  - Visualize code: “accessible”
  - Collaboration: “re-usable”

Git and GitHub. Understandable Software



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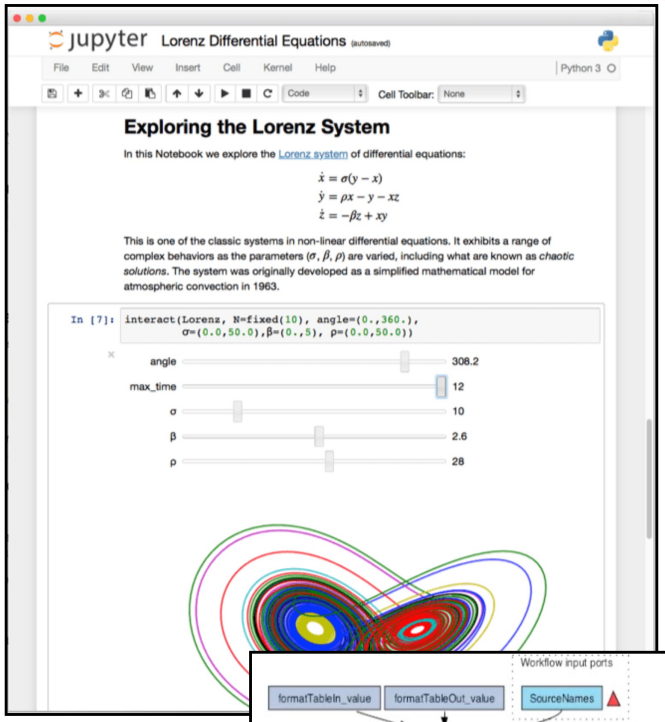
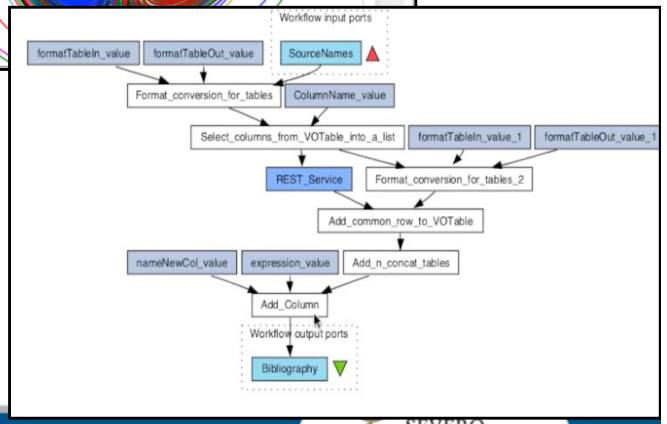
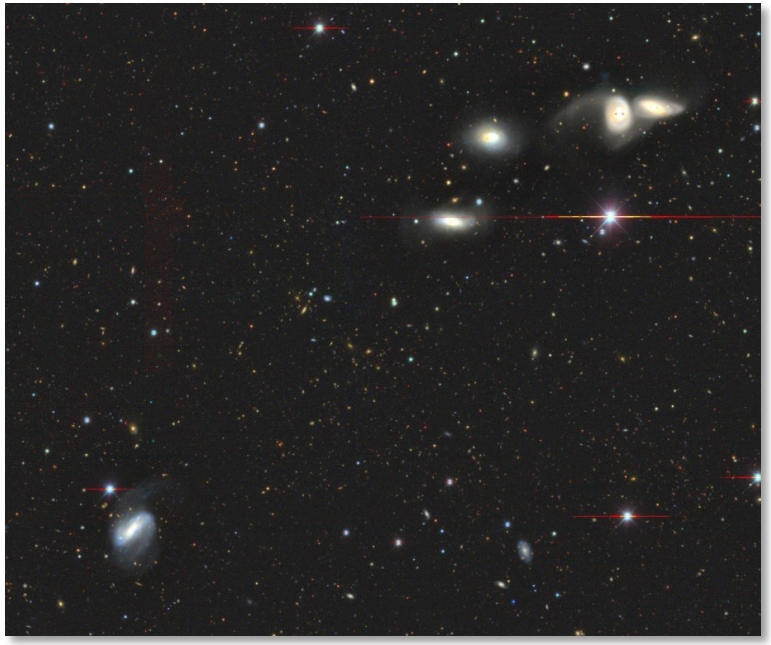




- **Open Notebooks:** https://doi.org/10.5281/zenodo.2631868
- **Scientific workflows:** networks of analytical steps […] including computationally intensive jobs on HPC (https://doi.org/10.1002/cpe.994)

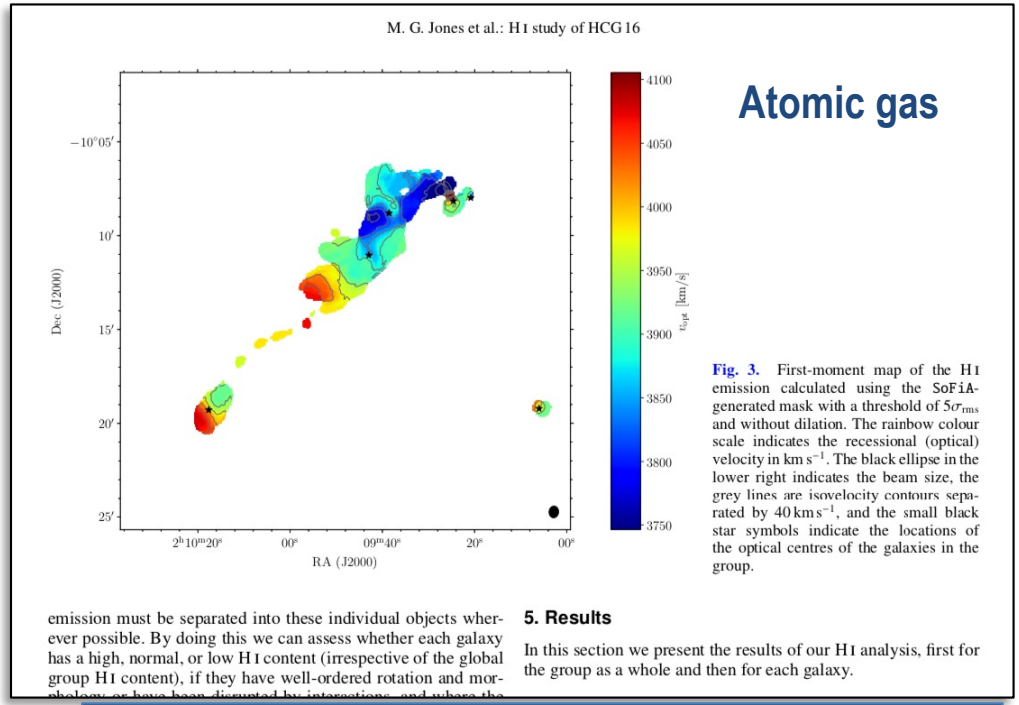
Specific example: Atomic gas in HCG 16

HCG 16 is complex compact group with starburst galaxies, AGN, tidal tails, etc.



Optical

M. G. Jones et al. A&A. 2019



Reproducible Notebooks

We identified a set of best practices and tools to enable end-to-end reproducibility of the scientific studies, from the initial data processing to the generation of the plots and figures of the paper.

Specific example: Atomic gas in HCG 16

HCG 16 is complex compact group with starburst galaxies, AGN, tidal tails, etc.

ps://hub.gke.mybinder.org/user/amiga-iaa-hcg-16-1tlh58to/notebooks/plot_scripts/Fig3-Moment1.ipyr 67%

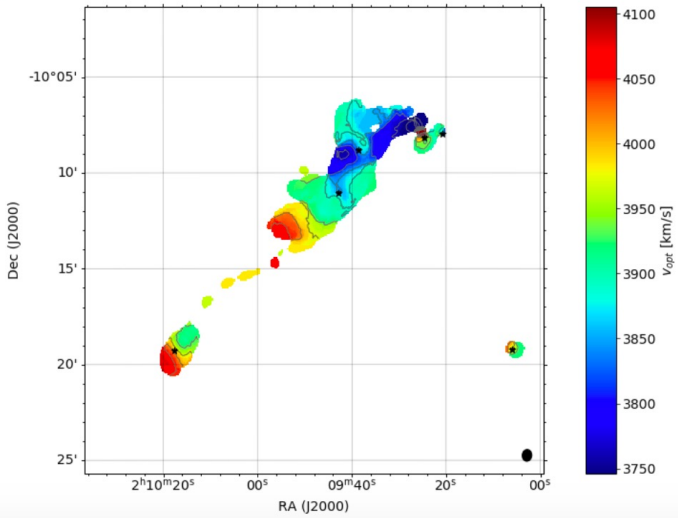
jupyter Fig3-Moment1 (autosaved) Visit repo Copy Binder link

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

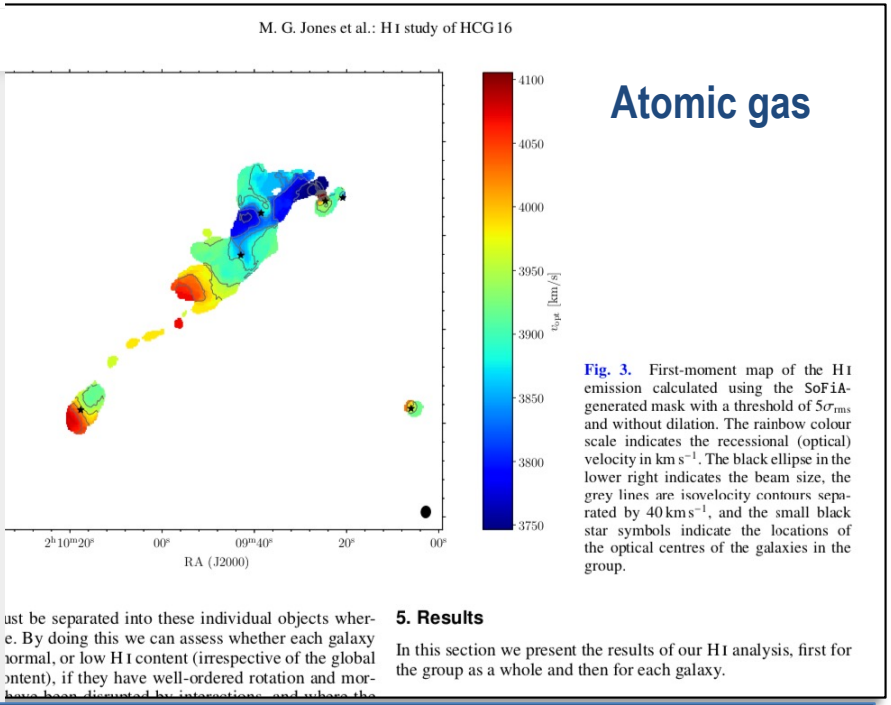
Run Code

```
mom1.show_markers(ra_hcg16d,dec_hcg16d,marker='*',c='k',s=50,label='HCG16d',zorder=3)
mom1.show_markers(ra_hcg16n,dec_hcg16n,marker='*',c='k',s=50,label='NGC848',zorder=3)
mom1.show_markers(ra_hcg16p,dec_hcg16p,marker='*',c='k',s=50,label='PGC8210',zorder=3)

#Add grid lines
mom1.add_grid()
mom1.grid.set_color('black')
mom1.grid.set_alpha(0.25)

#Add beam ellipse
mom1.add_beam()
mom1.beam.set_color('k')
mom1.beam.set_corner('bottom right')

#Make the colourbar
cmap = matplotlib.cm.jet
norm = matplotlib.colors.Normalize(vmin=v_opt(vel_min), vmax=v_opt(vel_max))
cbar = matplotlib.colorbar.ColorbarBase(ax2, cmap=cmap,norm=norm,orientation='vertical',label='$v_{opt}$ [km/s]')

#Save
if save_figs:
    fig.savefig('Fig3-HCG16_mom1.pdf',bbox_inches='tight')
```

```
/srv/conda/envs/notebook/lib/python3.6/site-packages/matplotlib/font_manager.py:1241: UserWarning: findfont: Font family ['serif'] not found. Falling back to DejaVu Sans.
  (prop.get_family(), self.defaultFamily[fontext]))
```



M. G. Jones et al. A&A. 2019



Reproducible Notebooks

We identified a set of best practices and tools to enable end-to-end reproducibility of the scientific studies, from the initial data processing to the generation of the plots and figures of the paper.

More tools for reproducible astronomy

Jorge Bruno Morgado
Reproducible science in the context of the SKA by the use of virtualization technologies

Alice Allen
Opening the computational box: software sharing and the ASCL

Mohammad Akhlaghi
Big data, big responsibility: long term preservation of data lineage with Maneage

Javier Moldon
A fully-reproducible workflow for the SKA Data Challenge 2 HI-FRIENDS solution

- The pipelines were evaluated following 29 reproducibility criteria covering different areas: being well documented, easy to install and to use, with an open license, accessible source code, following coding standards and containing code tests.

- Apart from complying with the SKAO reproducibility checklist, we suggested additional actions

Open Access

About Plan S

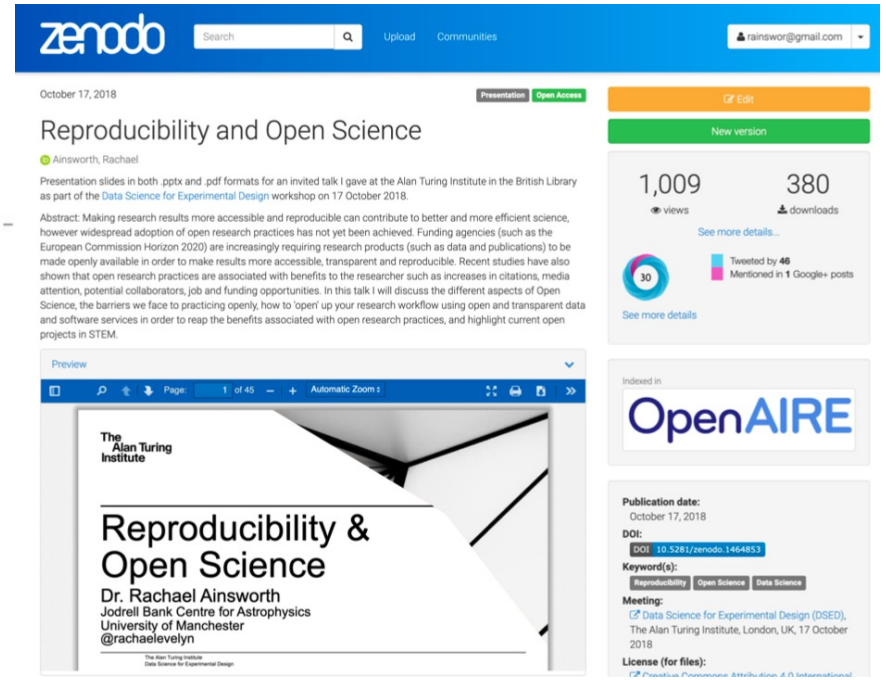
Plan S is an initiative for Open Access publishing that was launched in September 2018. The plan is supported by cOAlition S, an international consortium of research funding and performing organisations. Plan S requires that, from 2021, scientific publications that result from research funded by public grants must be published in compliant Open Access journals or platforms.

Open Repositories

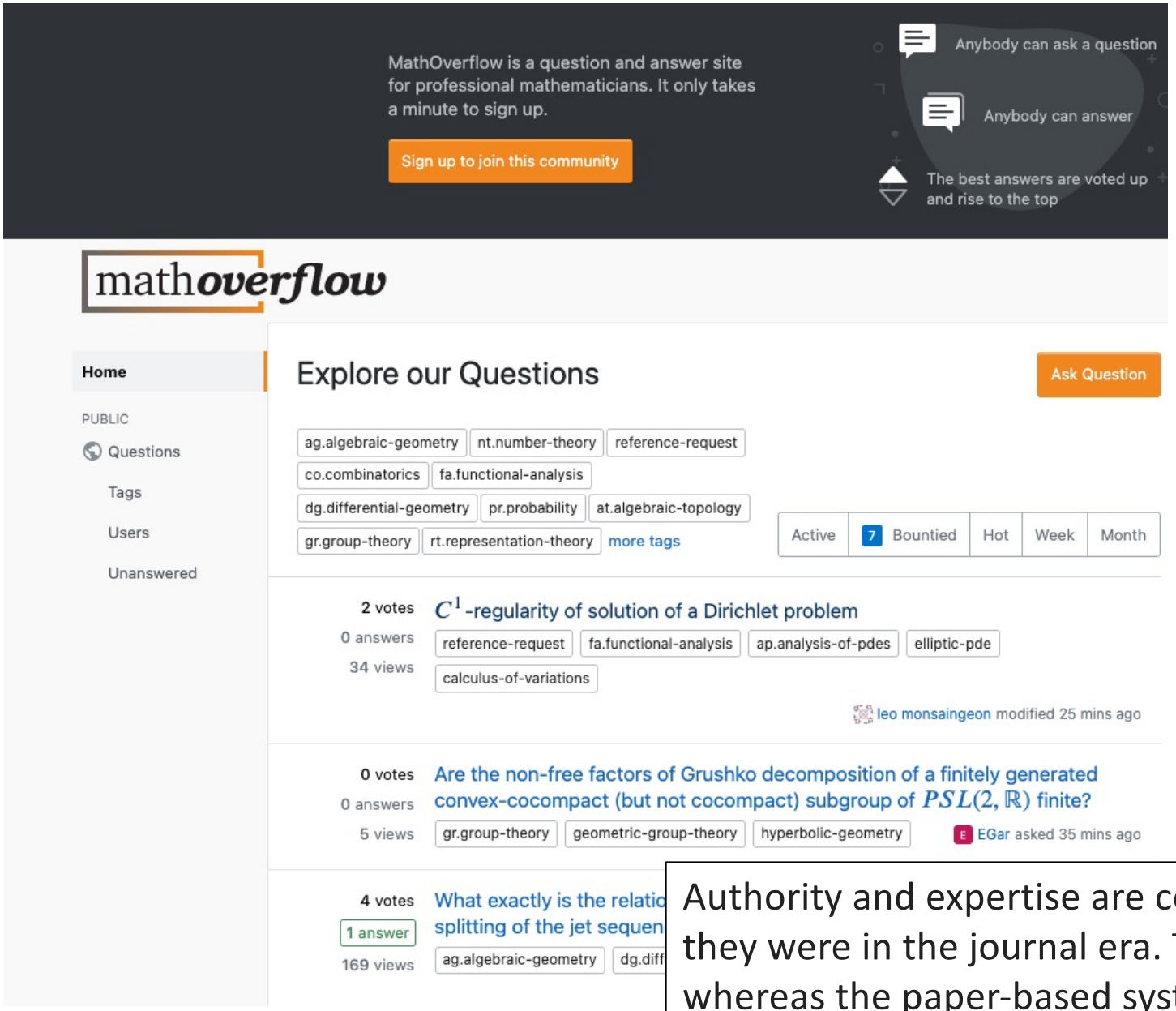
Share research outputs in Open Repositories such as Figshare & Zenodo

Catch-all repositories that enable researchers, scientists, projects & institutions to:

- Share research results in a wide variety of formats including text, datasets, audio, video & images across all fields of science
- Display their research results & get credited by making the research results citable & integrating them into existing reporting lines to funding agencies like the EU
- Easily access & reuse shared research results
- Archive your GitHub repository & make citable with Zenodo!



Other publication models



Authority and expertise are central in the Web era as they were in the journal era. The difference is that whereas the paper-based system used subjective criteria to identify authoritative voices, the Web-based one assesses **authority recursively from the entire community.**

J. Priem, 2013. Nature, 495, 437

JOURNAL OF NEGATIVE RESULTS IN BIOMEDICINE

UNOFFICIAL IMPACT FACTOR 1.10

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Open access, peer-reviewed, promotes discussion of results:

- unexpected, controversial, provocative and/or negative
- that challenge current models, tenets or dogmas.
- illustrate how commonly used methods and techniques are unsuitable for studying a particular phenomenon.

Not all will turn out to be of such groundbreaking significance.

However, we strongly believe that such "negative" observations and conclusions, based on rigorous experimentation and thorough documentation, ought to be published in order to be discussed, confirmed or refuted by others.

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Ceased to be published by BioMed Central as of 1st September 2017

However, we strongly believe that such "negative" observations and conclusions, based on rigorous experimentation and thorough documentation, ought to be published in order to be discussed, confirmed or refuted by others.

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Learn. Share. Discuss. Publish.

Reporting Research | Publishing Research | Promoting Research | Career Corner | Industry News | Get Published | Author

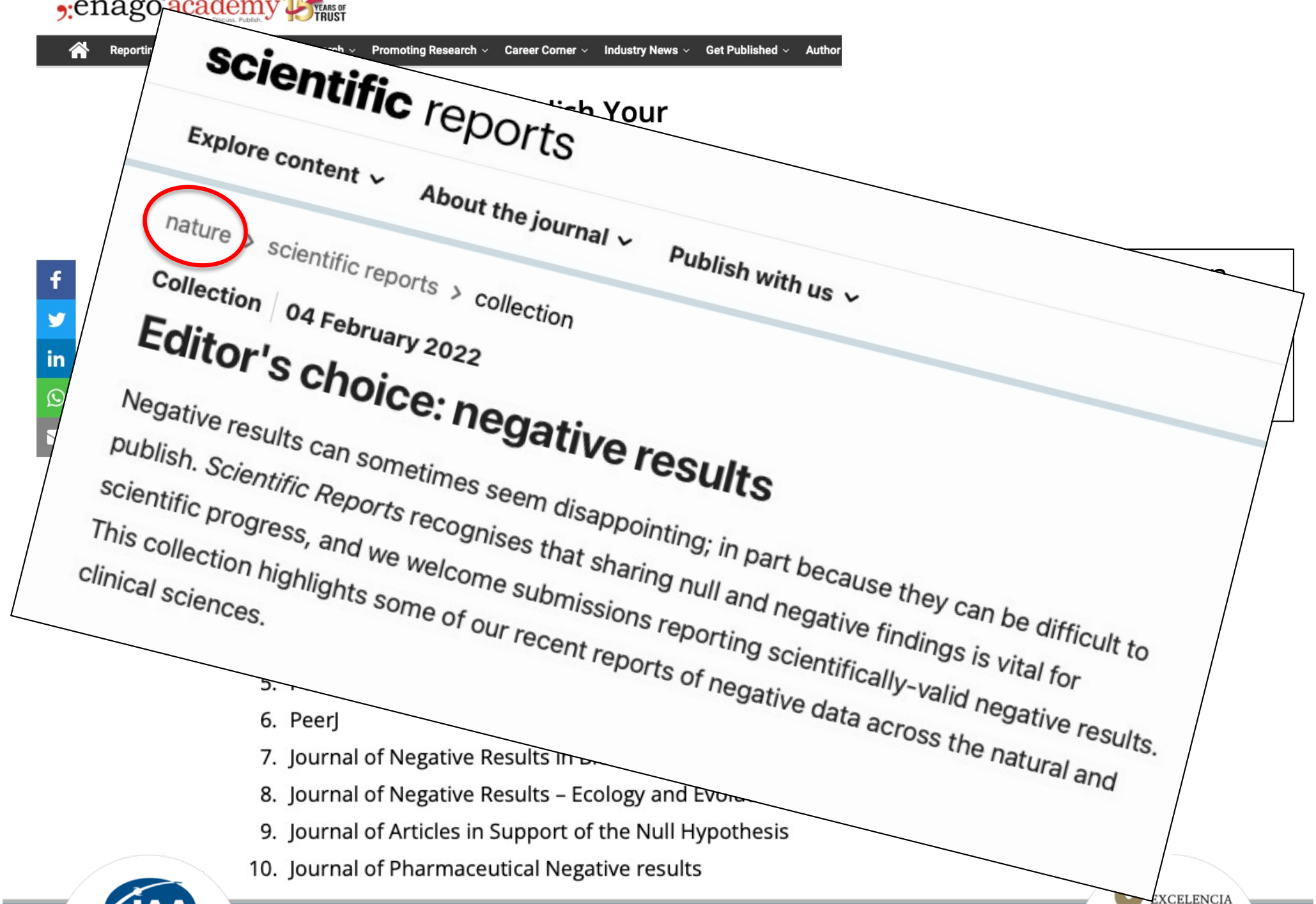
Top 10 Journals to Publish Your Negative Results

By Dr. Shweta Murud...

VIEWS 18,341 | PUBLISHED ON Sep 30, 2021 | READING TIME 4 Minutes

"Recently, there has been an optimistic change in trend with journals considering publication of negative results"

1. Positively Negative (PLOS One)
2. The Missing Pieces: A Collection of Negative; Null and Inconclusive Results (PLOS One)
3. The All Results Journals
4. ACS Omega (ACS Publications)
5. F1000Research
6. PeerJ
7. Journal of Negative Results in Biomedicine
8. Journal of Negative Results – Ecology and Evolutionary Biology
9. Journal of Articles in Support of the Null Hypothesis
10. Journal of Pharmaceutical Negative results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Industry News
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scientific reports
Explore content
About the journal
Publish with us
nature
scientific reports
collection
Collection
04 February 2022
Editor's choice: negative results
Negative results can sometimes seem disappointing; in part because they can be difficult to publish. Scientific Reports recognises that sharing null and negative findings is vital for scientific progress, and we welcome submissions reporting scientifically-valid negative results. This collection highlights some of our recent reports of negative data across the natural and clinical sciences.
6. PeerJ
7. Journal of Negative Results in
8. Journal of Negative Results – Ecology and Evol
9. Journal of Articles in Support of the Null Hypothesis
10. Journal of Pharmaceutical Negative results

Don't Publish. Release!

Professor Carole Goble FREng FBCS
University of Manchester, UK
carole.goble@manchester.ac.uk

Is NOT a release early, instead of peer review model.

Treat research as software:
release notes & version management

Research

Builds on prior work

Components:
data, codes, interpretation

Changes

Versions Forks

Is “Big Data science” possible without Open Science?

The Challenge: extraction of Scientific Knowledge

Huge and complex data volumes
Large teams distributed globally

A shared challenge for data-intensive research

Computing / storage / network / human resources will be needed:

Open Science & e-Science

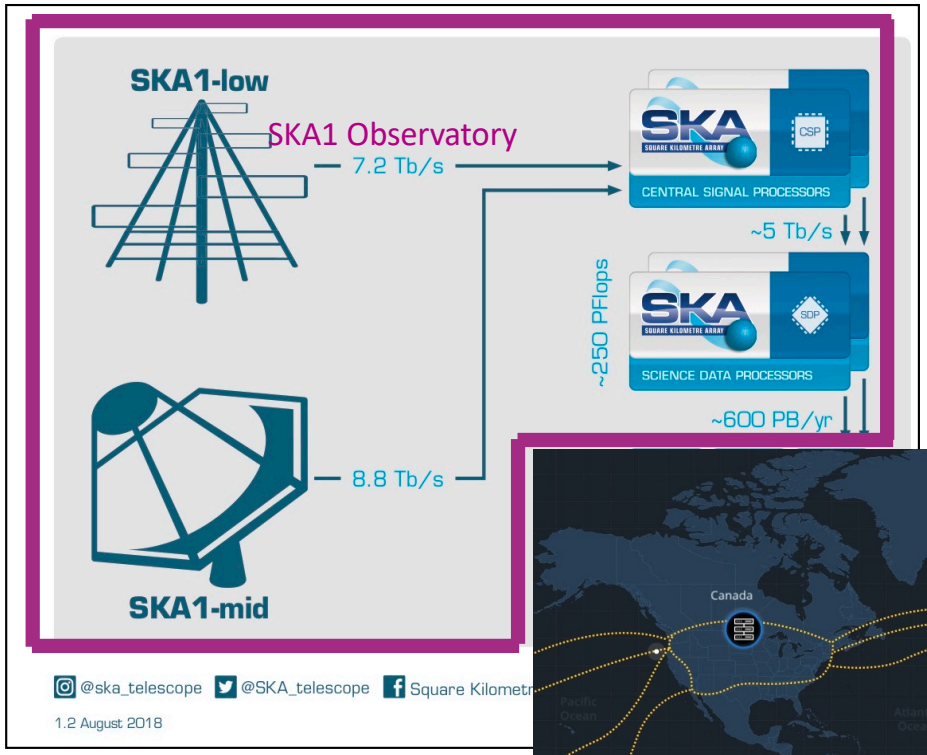
- Efficient exploitation of Distributed Computing Infrastructures
- Large international alliances of scientists
  - Tools to enhance scientific collaboration
  - Platforms to share data, methods and knowledge

Open Science is the Aim and also the Mean

The Square Kilometre Array "case"

Credits: SKA Observatory

SKA Fact sheets. August 2018. skatelescope.org



Credits: AENEAS project

The SKA Regional Centres, the core of the SKA Science

The Square Kilometre Array "case"

Credits: SKA Observatory

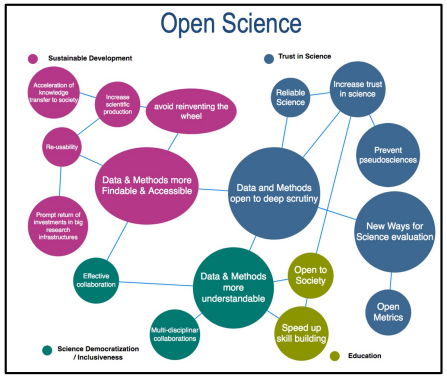
SKA Fact sheets. August 2018. skatelescope.org

Credits: AENEAS project

Global shift in research practices

The SKA Regional Centres, the core of the SKA Science

Key ingredients of the SRCs to support Open Science



access to project data

place for software analysis, visualisation

Science Gateway

Location agnostic platform

Workflows and provenance

Collaborative Science

Standards for data interoperability (IVOA)

Open to society

Reproducible Notebooks

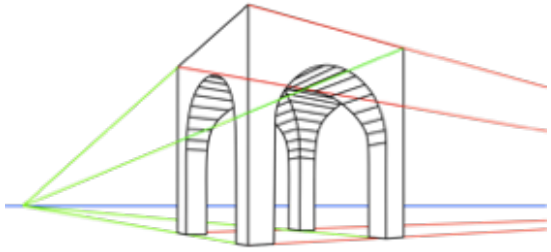
Citizen Science

New Metrics

User support and training

The challenge from different perspectives

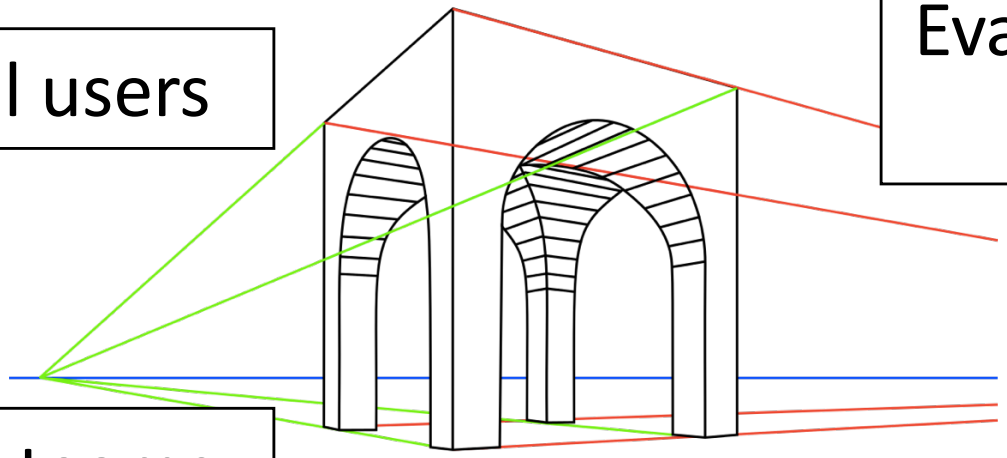
Implementation of Open, reproducible science is challenging, even more in this new framework:



new roles → **new perspectives**

Individual users

Evaluators/Funding agencies



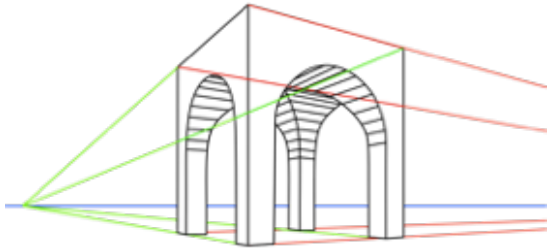
Publishers

Large teams

Service providers

Data to the desktop: “individual scientist”

About trust



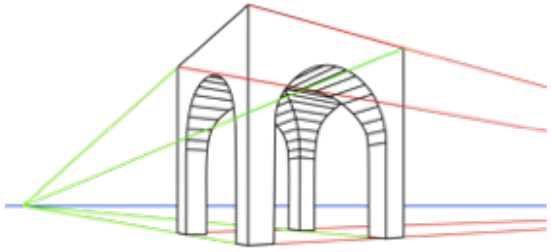
- I have the best code, which I know how to use and can do special things

- I do not trust any pipeline that you made
  - partly because I know better how to do it
  - partly because I read the news and there is a reproducibility crisis
  - well, and I can hardly reproduce the results of my own papers some years later...

- In general I want full control of the software and of the computational environment

Computation to data, providers perspective: Data Centres

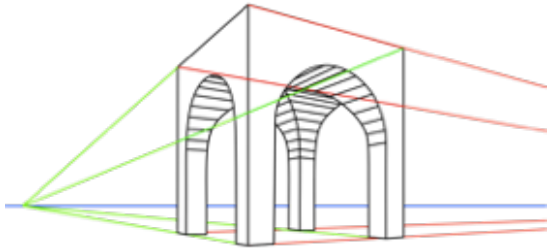
About technology



- We need to install your software in our platform. Can we trust it? Can we run it? Environment, dependencies, etc
- Hey, we are offering services to the community, computation + tools. We would be grateful if you allow us to share it with other users (with proper credit)
- Mmmm, sharing is great, but, **putting the software in the platform is not enough**: you need to provide the context for people to be able to rerun the software on the same or other data

Large alliances of scientists

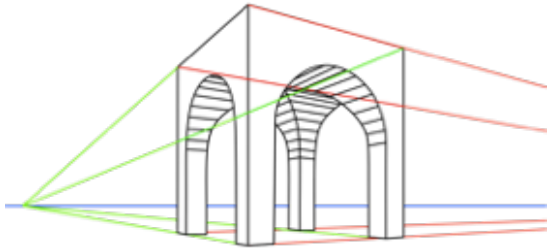
About metrics of research careers



- We have tools to generate Advanced Data Products, and we will put them there where the storage and computation is (Data Centres)
- But... we put effort on it, what would we gain if we make the ***additional effort* to make it reusable**? If we make it, then we will pave the way to competitors
- Well, maybe we will share in 4 yrs time (PhD typical time)

Large alliances of scientists

About metrics of research careers



- We have tools to generate Advanced Data Products, and
  them there where the storage and co
- But... we pu ke the
  ble? If we make it, then we will
  mpetitors
- Well, maybe we will share in 4 yrs time (PhD typical time)

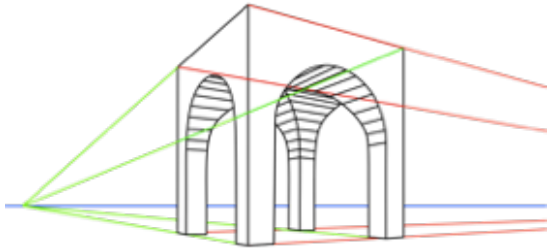
Looking forward to hear this talk:

Jelle de Plaa

How to make research accessible and reproducible in your institute

Publishers

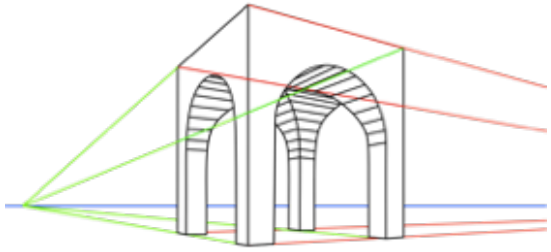
Publishing models



- Will we need **different profiles of referees** to evaluate the scientific discussion together with the data quality and the methods (aka. Reproducibility)?
- If the data and the methods (tools) will be in Data Centres, **will our referees need to become a "user" of the Data Centres** to be able to validate a paper?
- Will we be able to engage **so many referees** as may be needed?
- Will we need to validate the data, the tools, and the scientific analysis **separetely**?

Publishers

Publishing models



- Will we need **different profiles of referees** to evaluate the scientific discussion together with the methods (aka Reproducibility)?

See next talk:

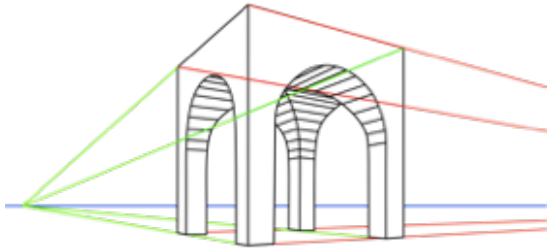
Chris Lintott

Open Science and Publishing, or How I Learned to Stop Worrying and Love (some of) Scientific Publishing.

- Will the Data Centres, **will become a "user" of the Data Centres** to be able to validate a paper?
- Will we be able to engage **so many referees** as may be needed?
- Will we need to validate the data, the tools, and the scientific analysis **separetely**?

Policy makers / funding agencies

Evaluation

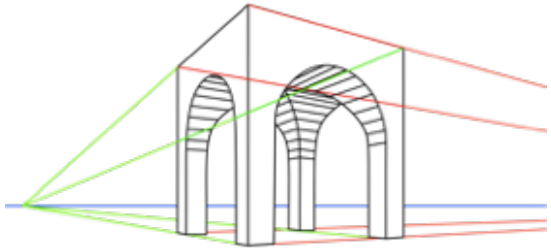


- How to measure reproducibility?
- How to weight it and/or aggregate with other indicators?

See later on "Revised research assesments"

Infrastructures/facilities

About being an example



- For scientific facilities, adoption of Open Science is both a need and a duty.

The SKA and Open Science

ENDORSED by the Council: Construction Proposal (CP) and Observatory Establishment and Delivery Plan (OEDP)

3. Impact of the SKA
3.3.2 Open SCience

Adoption of Open Science values

*"**Open Science**, based on the precept of making scientific research collaborative, transparent and accessible to all**, is rooted in SKA's foundational principles**. So is the related concept of scientific reproducibility, a fundamental aspect of the modern Scientific Method since the 17th century allowing independent teams to have access to methodology and tools to be able to confirm experiments and validate results."*

6. Observatory operations
6.1.2 Scientific success metrics

Reproducibility as a metric of success

*"Reproducibility of SKA science data products. This metric will measure how complete **the workflow description** is that is linked to each SKA data product. […] must reflect completeness of the **provenance information** for each data product and accessibility of the software used. This is related to how well SKA science data products **adhere to the FAIR principles** ."*

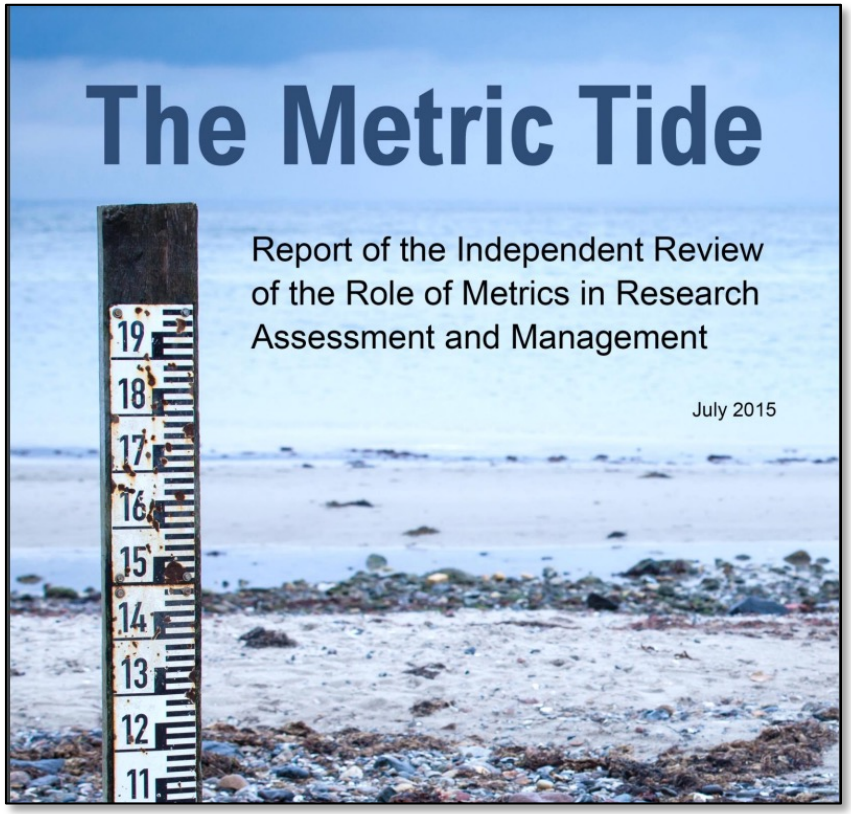
Revised research assessments

Remember: Open Science started bottom-up

with manifestos authored by large sections of the scientific community

(Altmetrics-2010, DORA-2012, Metric Tide - 2015, Leiden Manifesto-2015, Hong-Kong Principles – 2020)

(Astronomy = IVOA – 2002)



Wilsdon, J., et al. (2015). *The Metric Tide: Report of the Independent Review of the Role of Metrics in Research Assessment and Management*. DOI: 10.13140/RG.2.1.4929.1363

Almetrics

Introduction altmetrics: What, why and where? **2013**

Heather Piwowar

https://doi.org/10.1002/bult.2013.1720390404

altmetrics

Altmetrics is the creation and study of new metrics based on the Social Web for analyzing, and informing scholarship.

http://altmetrics.org/about/

Almetrics

Introduction altmetrics: What, why and where? **2013**

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http://altmetrics.org/about/

Ask Not What Altmetrics Can Do for You, But What Altmetrics Can Do for Developing Countries

by Juan Pablo Alperin

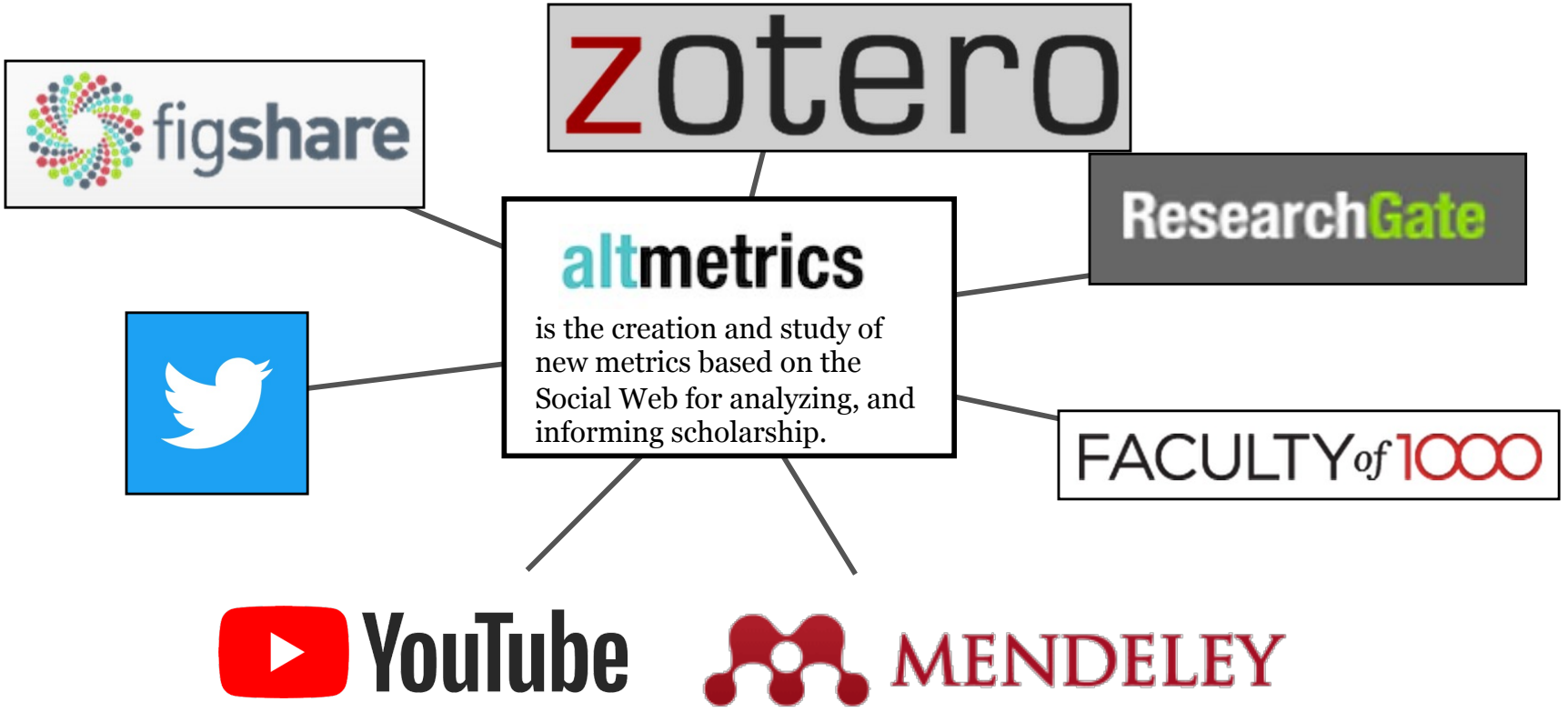
DOI:10.1002/BULT.2013.1720390407

- Traditional citation counting for evaluating scholarly impact unfairly **benefits those in North America and Euro**pe
- The current system **favors dominant journals and topics of interest** to the prevailing scientific community

Almetrics

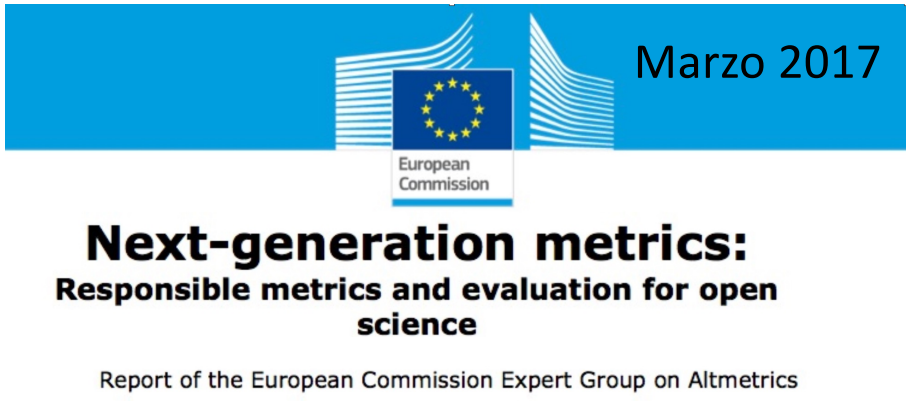
- In the Web era, scholarship leaves footprints.
- The flow of scholarly information is expanding by orders of magnitude, swamping our paper-based filtering system

J. Priem, 2013 Nature, 495, 437




DORA
About
Meetings
The Declaration
Signers
Project TARA
News and Resources
San Francisco Declaration on Research Assessment
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
العربية
Bahasa Indo
中文
Català
Čeština
Српски

Evaluations Revisited



Not just citation of articles, various forms of social media shares, web-downloads, any other measure of the Q and impact of research outcomes

Thematic Reports: Types, use in the context of Open Science, Incentives and Rewards, Strategies, Experiences and Models, Final Report - Altmetrics and Rewards

April 2020

Evaluations Revisited

November 2021

Principles for assessment criteria

- Focusing research assessment criteria on quality
  - Openness of research, and results that are verifiable and reproducible where applicable, strongly contribute to quality

- Recognise the diversity of research and reward early sharing and open collaboration

Council of the European Union

Brussels, 19 November 2021
(OR. en)

European Research Area

Conclusions on the future governance of the European Research Area

Priority Area: Deepening a truly functioning internal market for knowledge	
ERA Actions	**Outcomes**
1. Enable the open sharing of knowledge and the re-use of research outputs, including through the development of the European Open Science Cloud (EOSC)	• Deploy Open Science principles and identify Open Science best practices • Deploy the core components and services of EOSC and federate existing data infrastructures in Europe, working towards the interoperability of research data • Establish a monitoring mechanism to collect data and benchmark investments, policies, digital research outputs, open science skills and infrastructure capacities related to EOSC
2. Propose a EU copyright and data legislative and regulatory framework fit for research	• Identify barriers and challenges to access and reuse of publicly funded R&I results and of publications and data for scientific purposes, and identify potential impacts on research, through an analysis of relevant provisions under EU copyright and data legislation and related regulatory frameworks, and of relevant institutional and national initiatives • Propose legislative and non-legislative measures to improve the current EU copyright and data legislative and regulatory frameworks
3. Advance towards the reform of the Assessment System for research, researchers and institutions to improve their quality, performance and impact	• Analysis of legal and administrative barriers at national and trans-national level for a modern research assessment system • Create a coalition of European research funders and research performers who agree on a new approach for research assessment, following wide and inclusive consultations at European and international level • Implementation plan of the coalition to roll-out the new approach, including pilots in different domains

https://data.consilium.europa.eu/doc/document/ST-14126-2021-INIT/en/pdf

PLOS BIOLOGY

July 2020

ESSAY

The Hong Kong Principles for assessing researchers: Fostering research integrity

David Moher[1,2]*, **Lex Bouter**[3,4], **Sabine Kleinert**[5], **Paul Glasziou**[6], **Mai Har Sham**[7], **Virginia Barbour**[8], **Anne-Marie Coriat**[9], **Nicole Foeger**[10], **Ulrich Dirnagl**[11]

1 Centre for Journalology, Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Canada, **2** School of Epidemiology and Public Health, University of Ottawa, Ottawa, Canada, **3** Department of Epidemiology and Biostatistics, Amsterdam University Medical Centers, location VUmc, Amsterdam, the Netherlands, **4** Department of Philosophy, Faculty of Humanities, Vrije Universiteit, Amsterdam, the Netherlands, **5** The Lancet, London Wall Office, London, United Kingdom, **6** Institute for Evidence-Based Healthcare, Bond University, Gold Coast, Queensland, Australia, **7** School of Biomedical Sciences, LKS Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong SAR, China, **8** Queensland University of Technology (QUT), Brisbane, Australia, **9** Wellcome Trust, London, United Kingdom, **10** Austrian Agency for Research Integrity, Vienna, Austria, **11** Berlin Institute of Health, QUEST Center for Transforming Biomedical Research, Berlin, Germany

* dmoher@ohri.ca

OPEN ACCESS

Citation: Moher D, Bouter L, Kleinert S, Glasziou P, Sham MH, Barbour V, et al. (2020) The Hong Kong Principles for assessing researchers: Fostering research integrity. PLoS Biol 18(7): e3000737. https://doi.org/10.1371/journal.pbio.3000737

Published: July 16, 2020

Funding: PG is funded by an Australian National Health and Medical Research Council NHMRC

Abstract

For knowledge to benefit research and society, it must be trustworthy. Trustworthy research is robust, rigorous, and transparent at all stages of design, execution, and reporting. Assessment of researchers still rarely includes considerations related to trustworthiness, rigor, and transparency. We have developed the Hong Kong Principles (HKPs) as part of the 6th World Conference on Research Integrity with a specific focus on the need to drive research improvement through ensuring that researchers are explicitly recognized and rewarded for behaviors that strengthen research integrity. We present five principles: responsible research practices; transparent reporting; open science (open research); valuing a diversity of types of research; and recognizing all contributions to research and scholarly activity. For each principle, we provide a rationale for its inclusion and provide examples where these principles are already being adopted.

Impact

Vecteezy.com

Open Science for sustainability and inclusiveness

Open Science represents an approach to research that is collaborative, transparent and accessible

Open Science definition, European Commission, 2017, doi: 10.2777/75255

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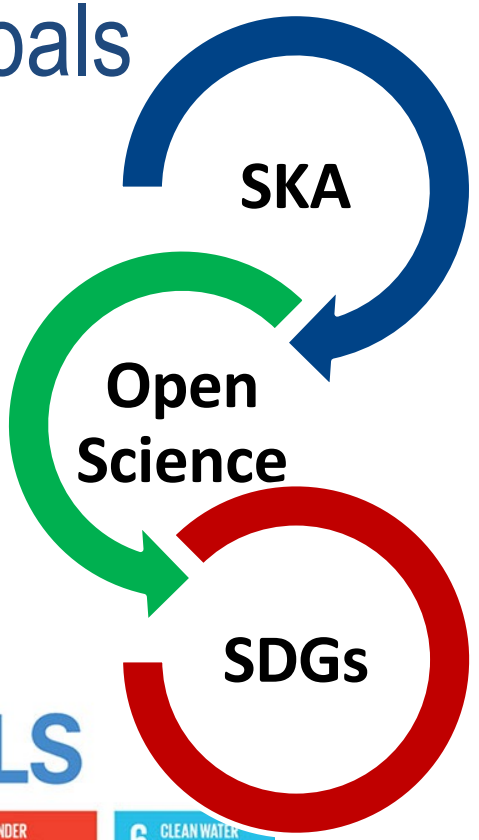
"**Open Science** embodies the need to transform, open and democratize the entire knowledge generation to ensure that every scientific challenge is faced and really drives and allows the **achievement of the United Nations Sustainable Development Goals**"

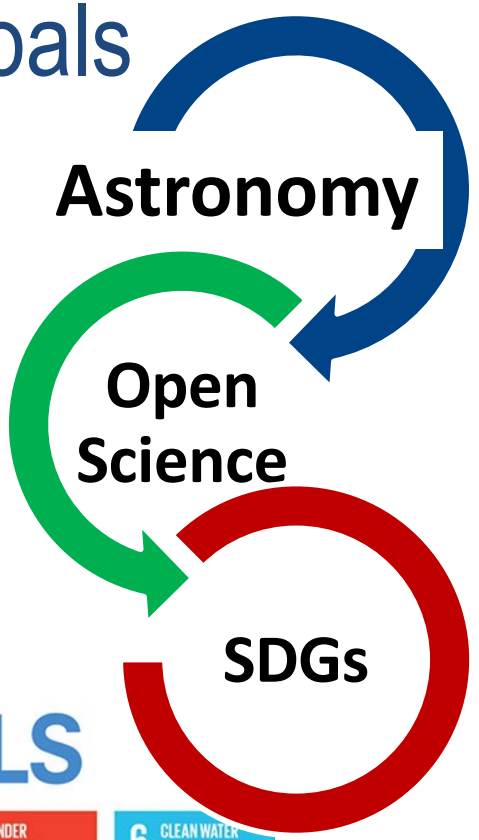
UNESCO and Open Science (2020) [1]

Sustainable development goals



Credits: UNESCO

Sustainable development goals



Credits: UNESCO

Open Science for sustainability and inclusiveness

Credits: UNESCO

Credits: UNESCO

Acceleration of knowledge transfer to Society, pandemics, sanitary crisis

- Speed up building of **skills**
- **Teaching**, e.g. how to access public archives, **fostering collaborative** practices
- **Citizen** science

Science hidden behind paywall barriers

- ⛔ Free access to research sources to the whole scientific community = limitations to science progress
- OS = Data and results more accessible and reliable
- OS = Promotion of **scholarly exchange** of ideas
- OS = Avoid duplication

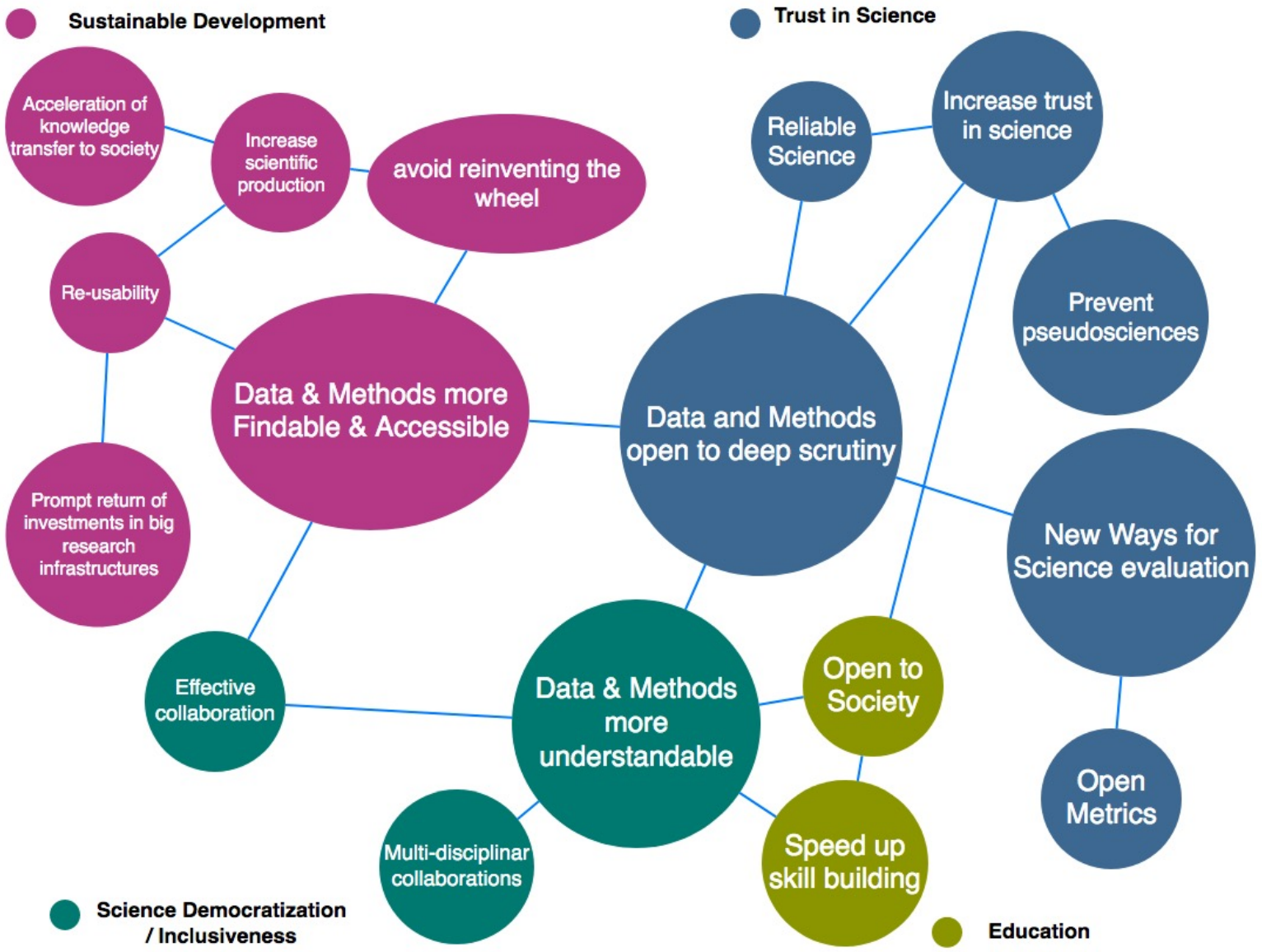
Open Science for sustainability and inclusiveness

Credits: UNESCO

Promote equity, diversity and inclusion

- All previous items +
- A tool enabling an **objective evaluation** of work
- Barriers are even more emphasized to scientist women in places where their **contribution tend to be ignored or anonymized**

Open Science



Conclusions

- “**Instead of playing the game it is time to change the rules**”

  Chambers et al 2014, AIMS Neuroscience 1,4, 2014

- Astronomy is in a privileged situation as pioneer
- Open reproducible science is: a duty and a need
- We made a lot of progress in the last few years in all areas!

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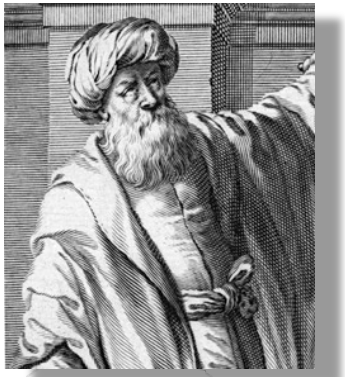
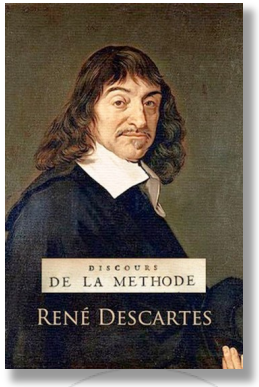
In the end there should not be "good" science, but only Science …that follows the Scientific Method





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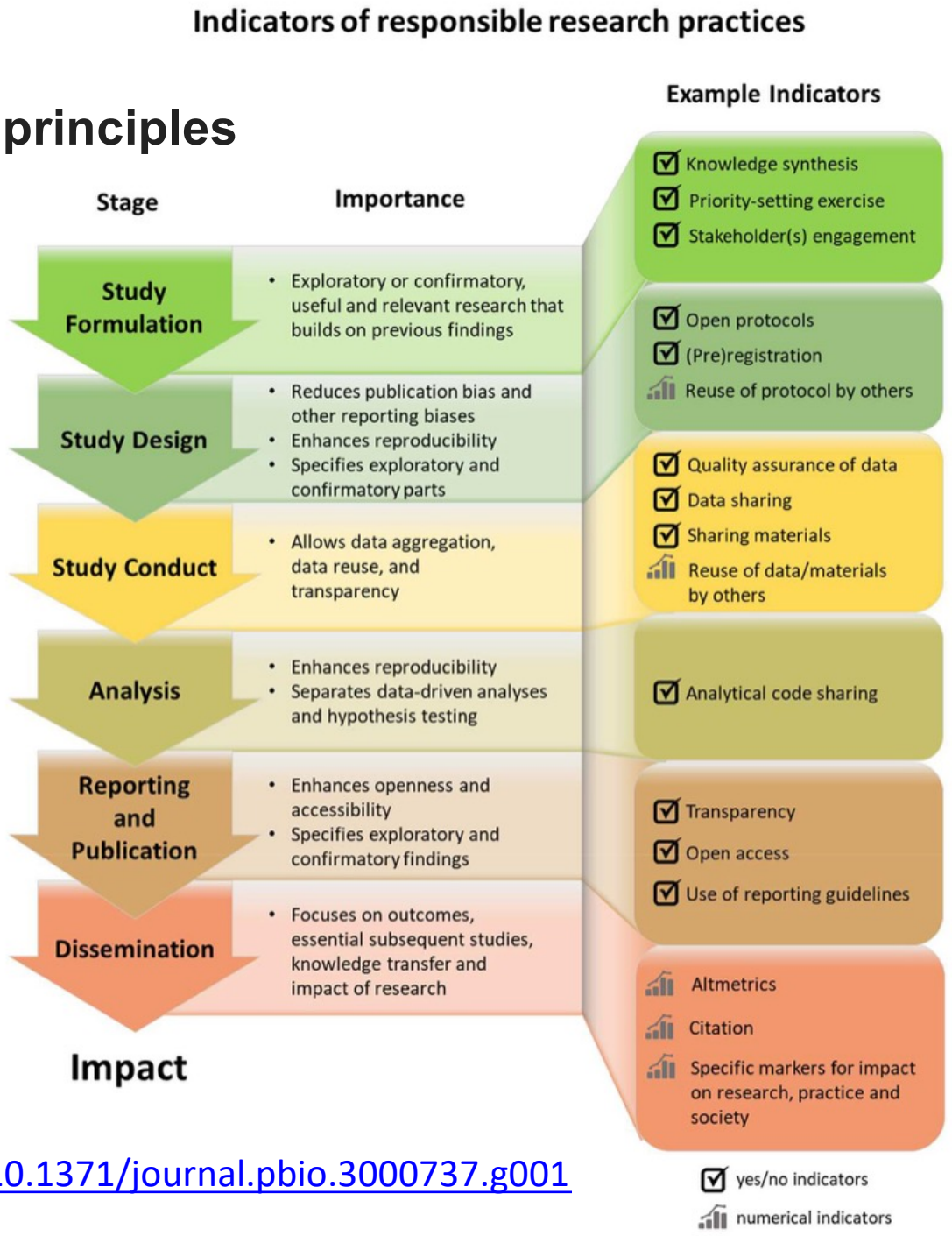
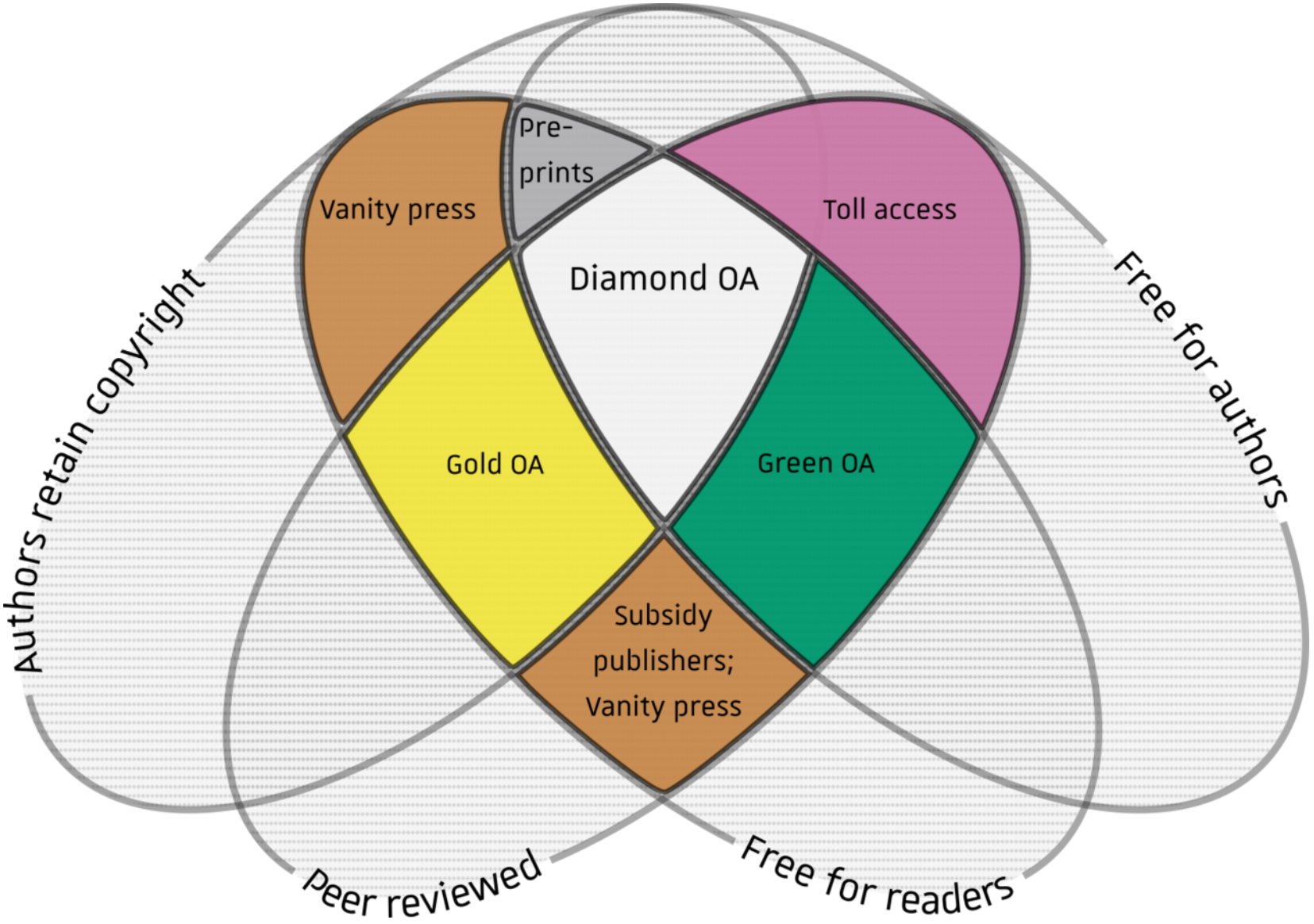
From Hong Kong principles



Credits: Plos Biology. https://doi.org/10.1371/journal.pbio.3000737.g001



Diamond among the different open access models

Jamie Farquharson - https://doi.org/10.6084/m9.figshare.6900566.v1