

# Research Integrity

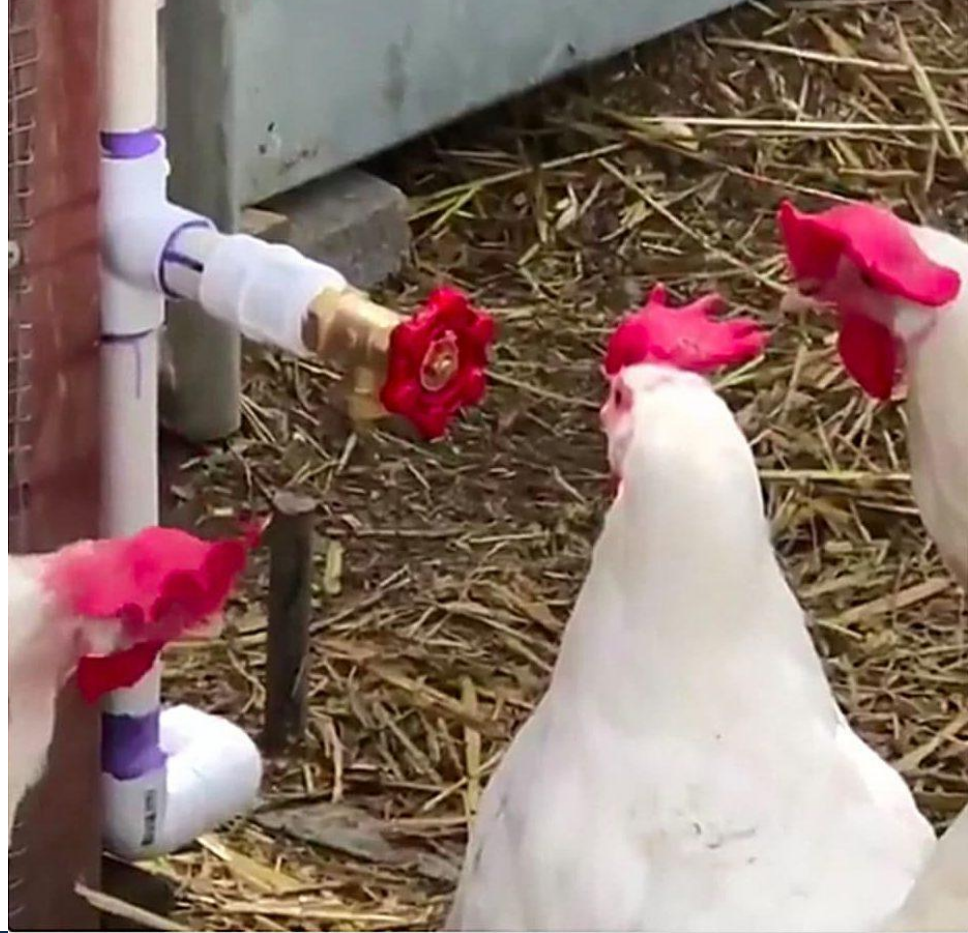
## the Good, the Bad, and the Ugly

Leslie D. McIntosh & Simon Porter  
@ripetaReview | @digitalsci  
Digital Science APAC Showcase 2023

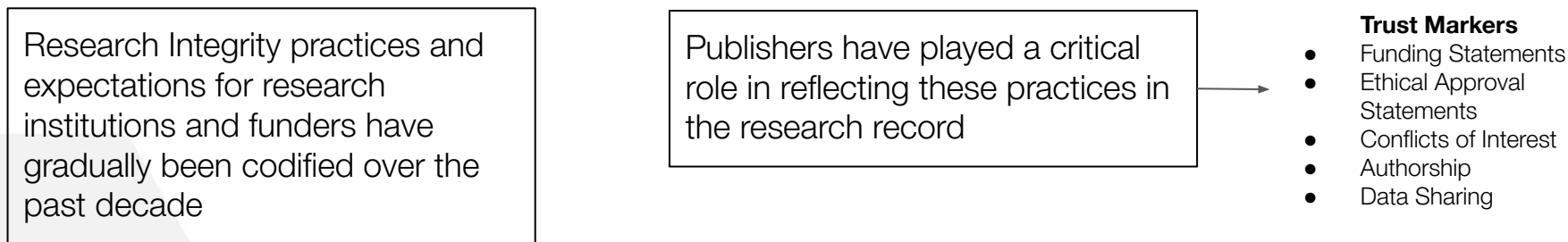
# Integrity & Trust



# Integrity & Trust



# Trust Markers and the evolution of Research Integrity practice...



**Trust Markers make research integrity practice visible**

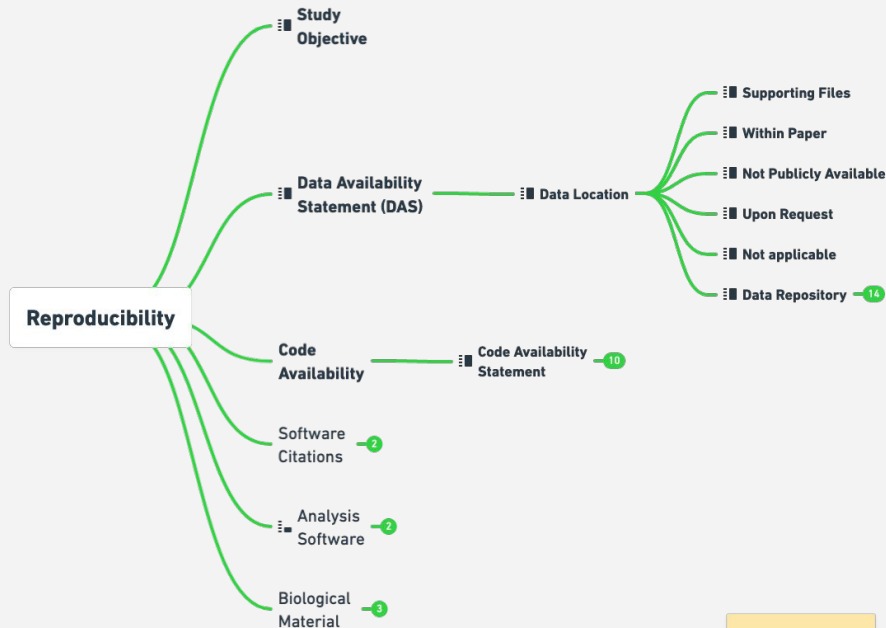


Dimensions Research Integrity:



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The Good

Data Sharing

# Data Availability Statements

A statement offset from main text detailing access to a study's data.

# Transparently Reported Research

How have policies affected data  
sharing practices from  
2016 to 2019?

## Wellcome Trust Report

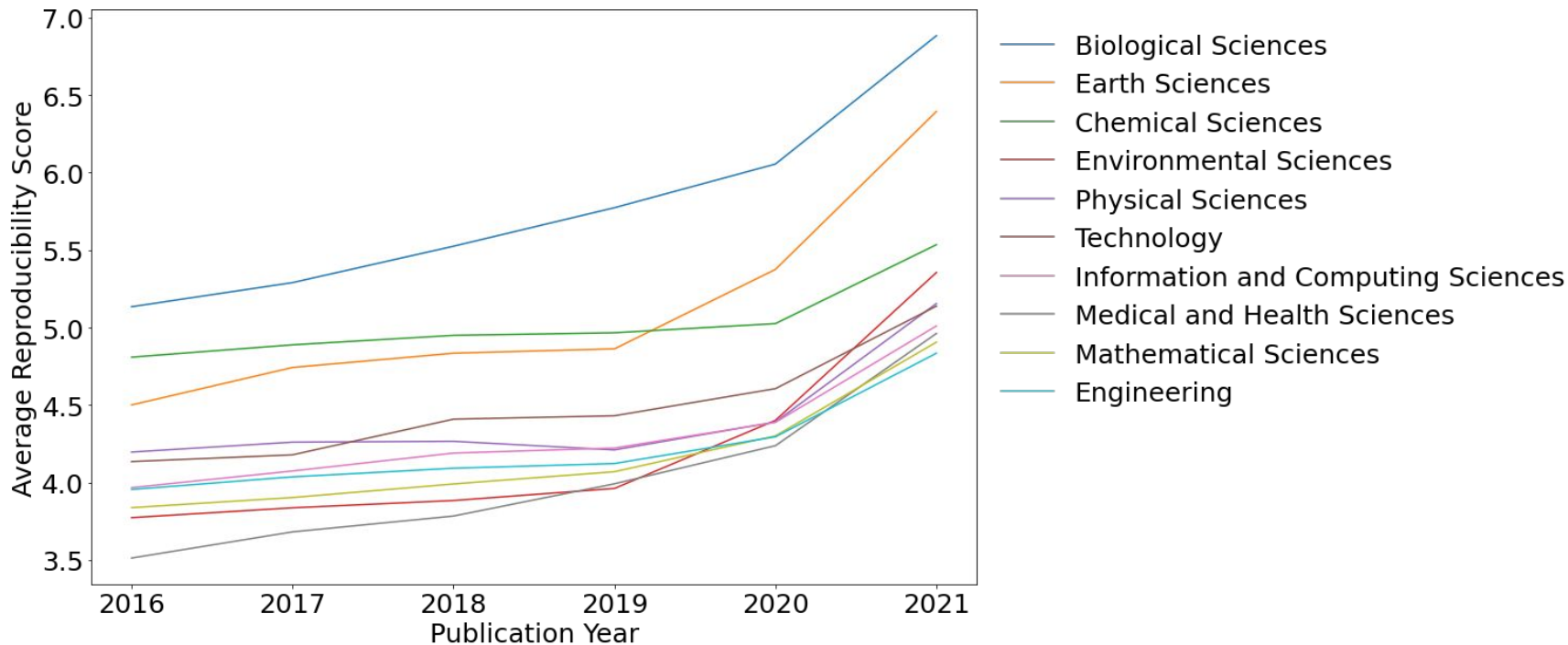
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↑ Significant  
increase in DAS

↔ Little change in  
data availability

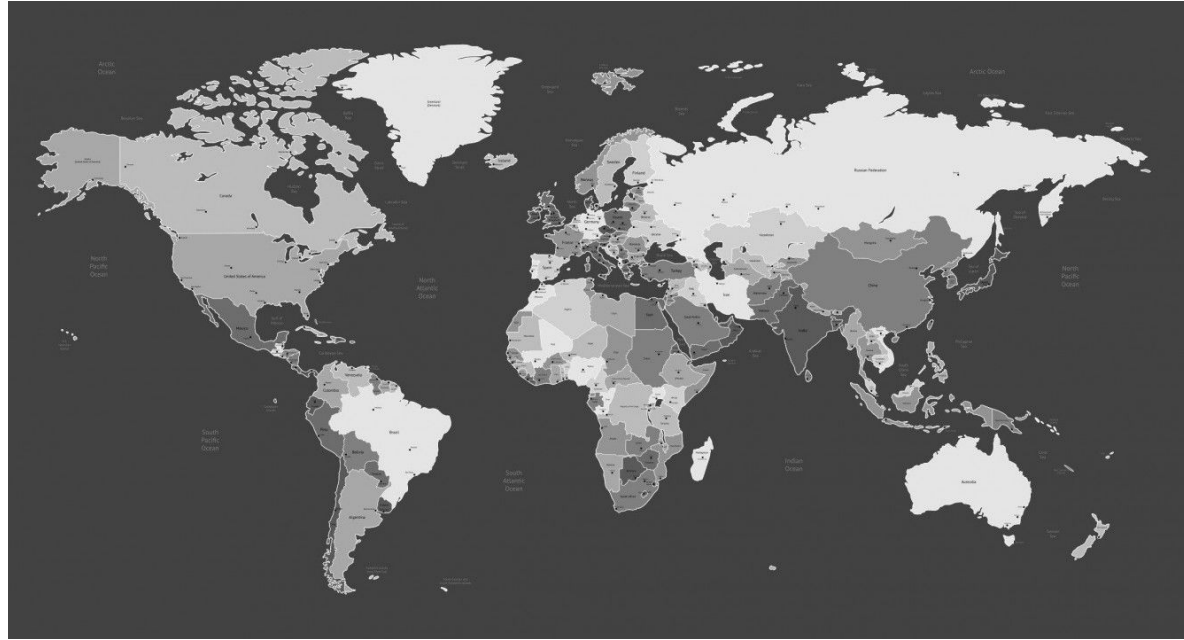


# Reproducibility Trends (n=12.4M)

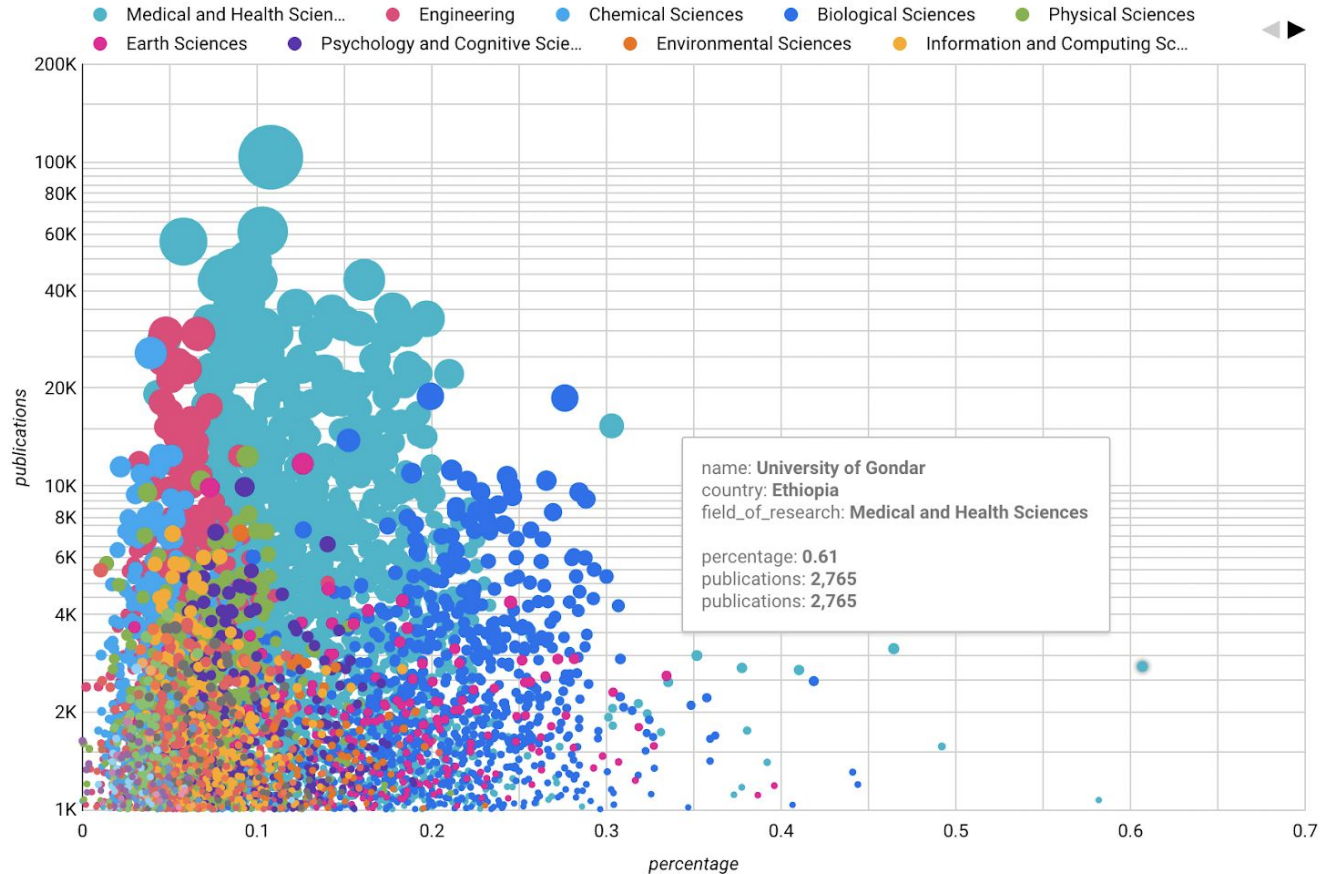


**Ripeta: Publishing Better Science with Less Effort**

Which **country** has the most  
publications with **Data  
Availability Statements**?



# Data Availability Statements in publications across global institutions



# Partners

Working together to make  
science better

**Researchers**

**Academia**

**Publishers**

**Gov't & Funders**

Industry

# Policies affect Practice

Data Availability Statements have  
been required in policies from  
**Funding Agencies & Publishers**  
supported by **Institutions**



When policies align,  
change happens

# The **Bad**

## Citation Cartels

# How it Started



**Dr Meming**

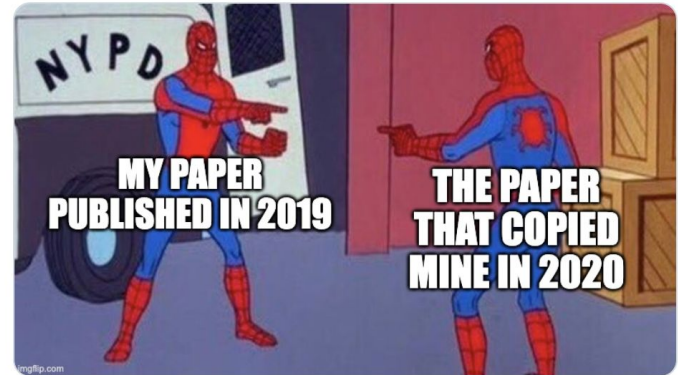
@Dr\_Meming · [Follow](#)



13 months since I reported an obvious case of plagiarism. The paper is still online. Journal gone silent and no longer replying to emails.

Ready to name and shame both authors and the journal.

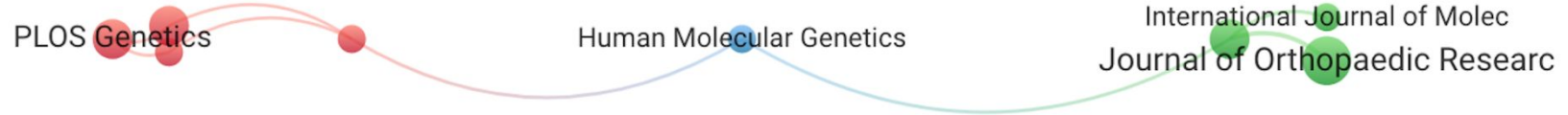
[@OpenAcademics](#) [@AcademicChatter](#)  
[#academictwitter](#) [#sciencetwitter](#)





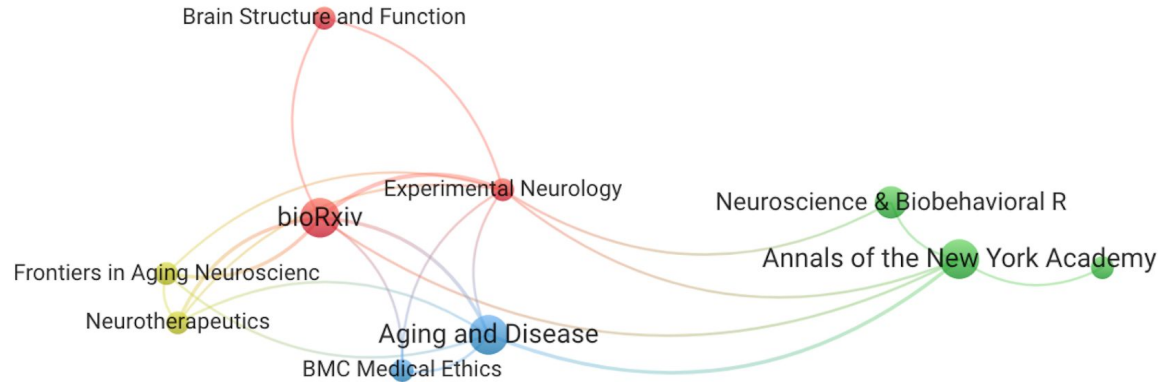
Researcher #1

30 yrs experience  
4 years of publications



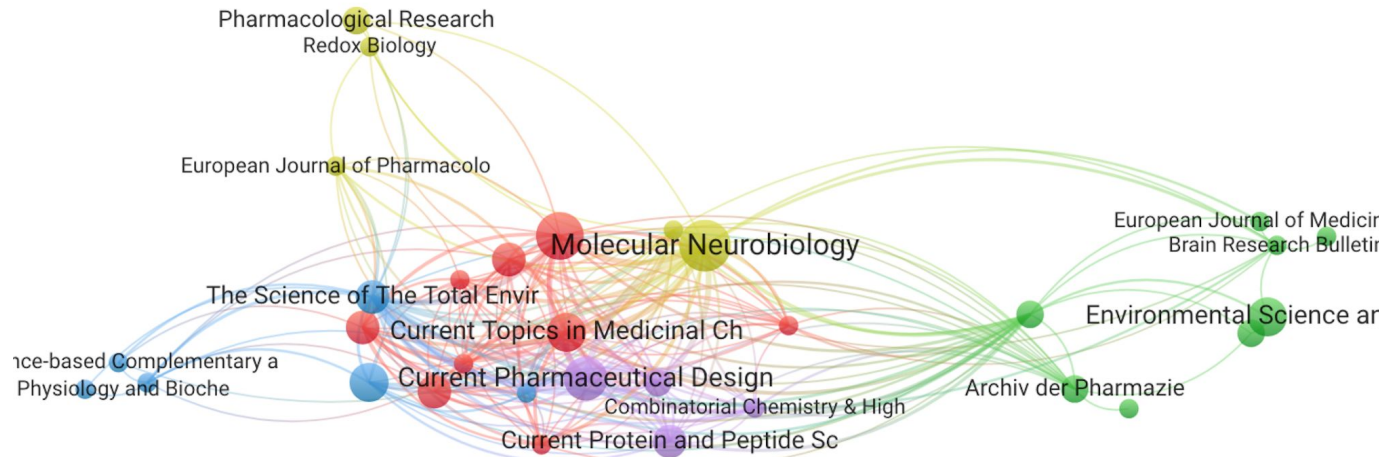
# Researcher #2

20 yrs experience  
4 years of publications



# Researcher #3

7 yrs experience (post-doc)  
2 years of publications



# Retraction Watch

How it's Going

**How a tweet sparked an investigation that led to a PhD student leaving his program<sup>[OBJ]</sup>**

<https://retractionwatch.com/2022/08/24/how-a-tweet-sparked-an-investigation-that-led-to-a-phd-student-leaving-his-program/>

# Partners

Working together to make  
science better

Researchers

**Academia**

Publishers

Gov't & Funders

**Industry**

Coordination of bad actors,  
needs cooperation among good  
ones.

# The Ugly

## Peer Review

# Peer Review

## *A publisher problem?*



# Peer Review Process: Independence

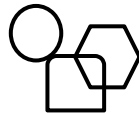


## Legend



### Colors

Disciplinary and functional expertise, such as genomics, analytics, computer science



### Shapes

Role of individual in the process, such as editor, author, and reviewer



### Outline

Organizational relationship between roles. The thickness depicts the strength of the affiliation.

# Peer Review Process: Affiliation Overlap

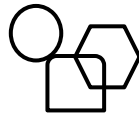


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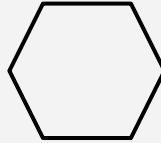
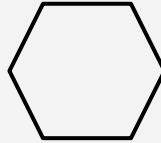
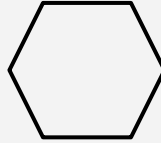


### Outline

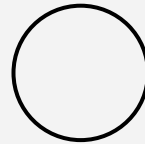
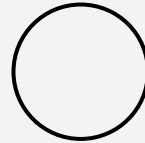
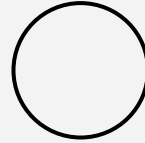
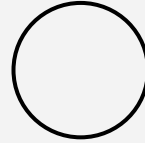
Organizational relationship between roles. The thickness depicts the strength of the affiliation.

# Peer Review Process: A Conflict of Interests

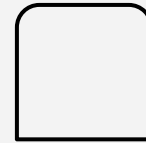
Editor



Reviewers



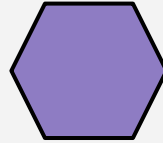
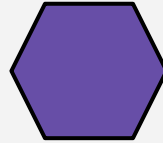
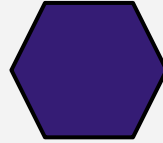
Authors



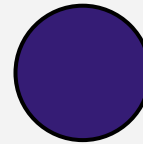
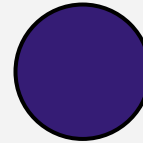
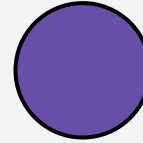
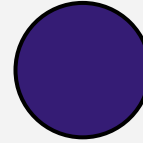
# Peer Review Process: A Conflict of Interests



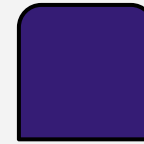
Editor



Reviewers

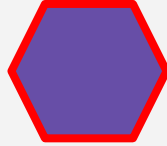


Authors

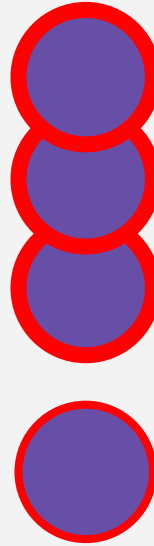


Should this paper be discussed on the merits of its content even if the process was manipulated?

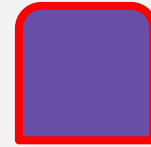
Editor



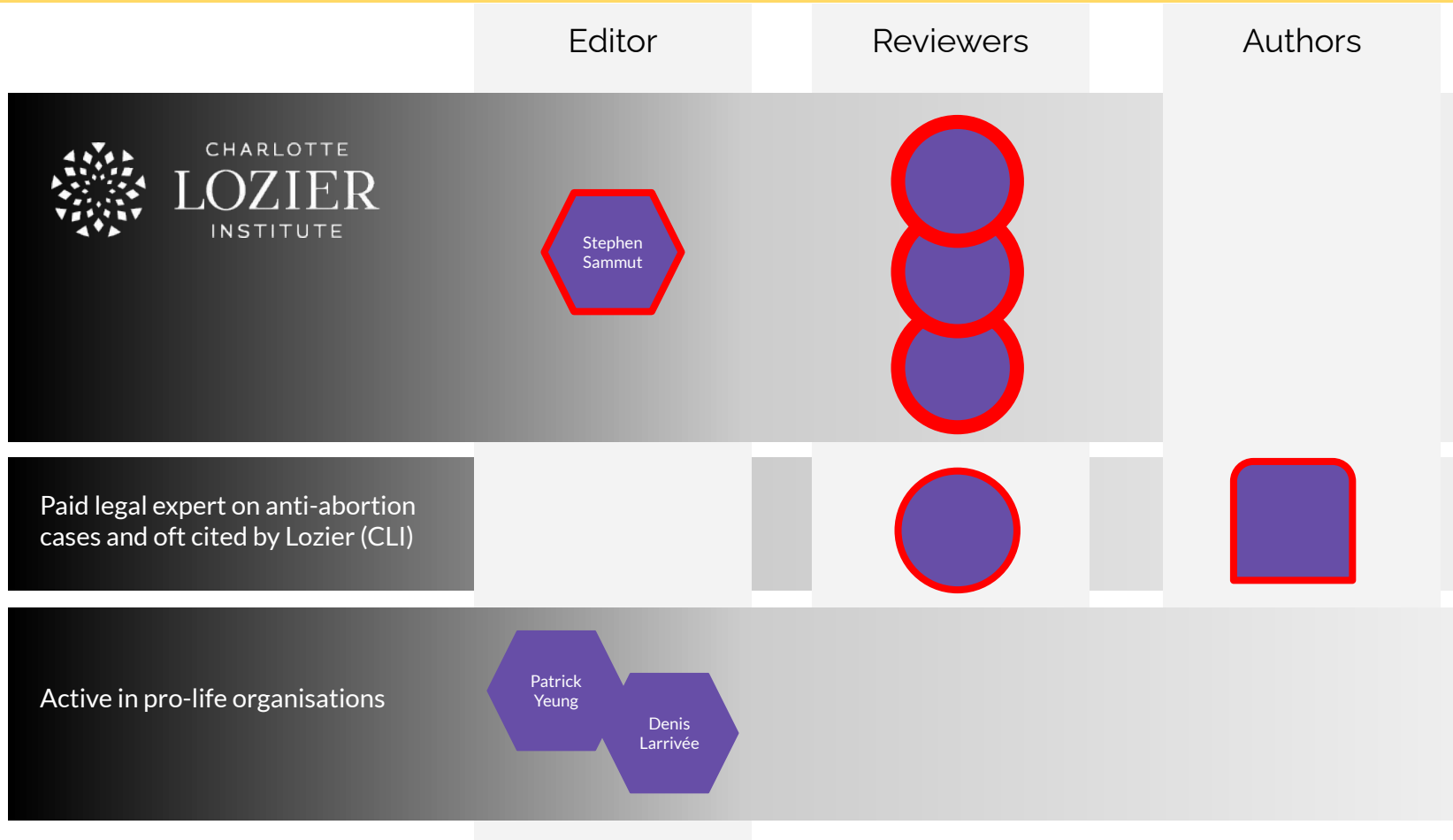
Reviewers



Authors



# Peer Review Process: A Conflict of Interests





Political manipulation is  
within science

# Partners ?

Working together to make  
science better

Researchers

Academia


Publishers

Gov't & Funders

Industry



# Enhancing Trust



Manually checking authors  
cannot keep pace with  
scams

Trusting science is vital  
(and takes time)



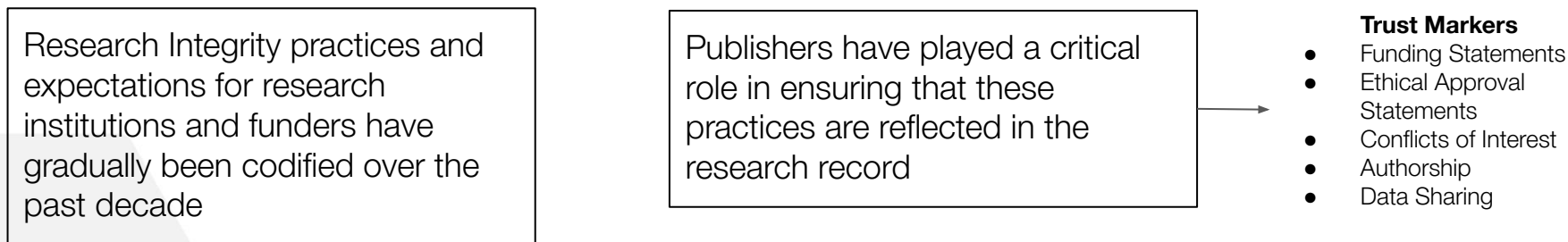
Research integrity responsibility  
belongs to every stakeholder

# Dimensions Research Integrity

Digital Science Showcase

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# Trust Markers and the evolution of Research Integrity practice...



**Trust Markers make research integrity practice visible**

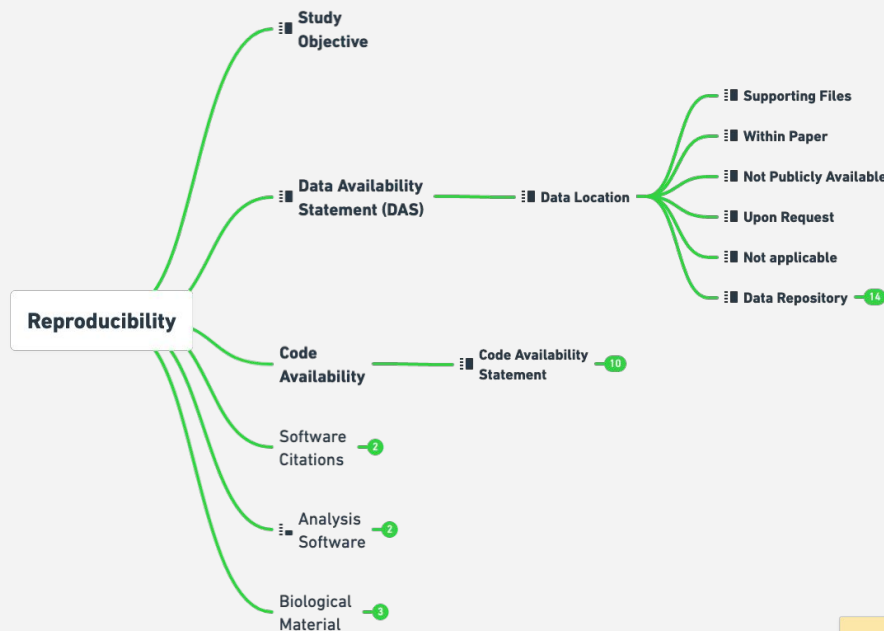
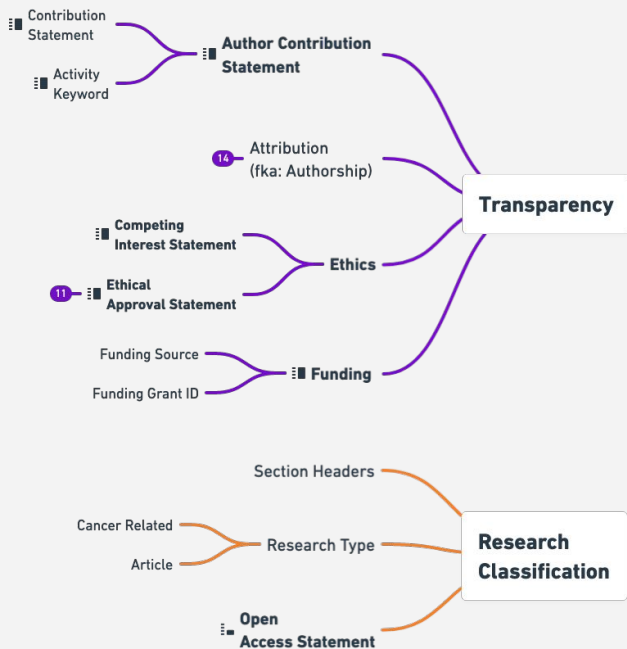


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# Dimensions Research Integrity


## 10+ Trust Markers, 33M+ data points


Trust Markers in research have increased dramatically over the last 10 years, with each Marker on a path to become an established part of research community practice

 Source: Dimensions Research Integrity via Google BigQuery

Competing Interests Statements  20%

Funding Statements  20%

Ethics Approval  25%

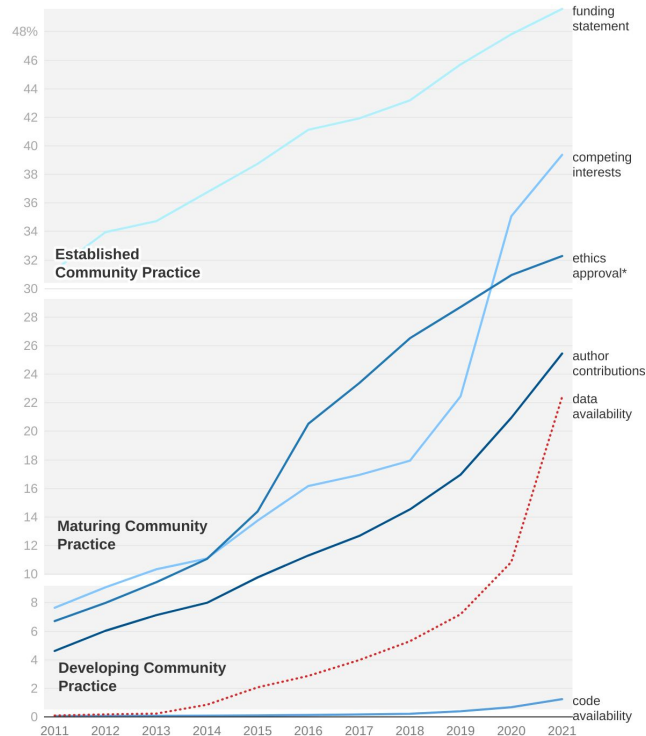
Author Contributions  25%

Data Availability Statements  20%

Code Availability Statements **New in 2019**



Evolving Science Trust Markers 2011-2021



\*The percentage of ethics papers are calculated over publications a mesh classification of Humans or Animals. the ethics trust marker looks at those papers that include a specific ethics section (as opposed to mentioning ethics approval somewhere in the text)

Chart: Dimensions Research Integrity • Source: Dimensions



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# Different Fields require different levels of engagement

For fields in band 1, there is already well established practice, and it would be reasonable to work towards 100% compliance

For band 2, there is awareness of the trust marker, but more training is required to shift practice.

For bands 3 and 4, low awareness is assumed, and significant training is required.



## Research Integrity Policy Implementation Bands

Based on the adoption percentages for 2021, Fields of Research are assigned policy implementation bands. For fields in band 1, there is already well established practice, and it would be reasonable to work towards 100% compliance for all papers for which a University has a corresponding author, or is a principle investigator on a funded project. For band 2, there is awareness of the trust marker, but more training is required to shift practice. For bands 3 and 4, low awareness is assumed, and significant training is required.

Field of research	Funding statement	Competing interests	Author contributions	Data availability	Ethics approval
Biomedical and Clinical Sciences	1	1	1	1	1
Health Sciences	1	1	1	1	1
Psychology	1	1	1	1	2
Biological Sciences	1	1	1	1	2
Environmental Sciences	1	1	2	2	2
Economics	1	1	2	2	2
Agricultural, Veterinary and Food Sciences	1	1	2	2	2
Chemical Sciences	1	1	2	2	2
Earth Sciences	1	1	2	2	2
Engineering	1	1	2	2	2
Built Environment and Design	1	1	2	2	
Physical Sciences	1	2	2	2	2
Human Society	1	2	2	2	2
Information and Computing Sciences	1	2	2	2	2
Mathematical Sciences	1	2	2	2	2
Commerce, Management, Tourism and Services	2	2	2	3	2
Education	2	2	3	3	1
Philosophy and Religious Studies	2	2	3	3	2
Creative Arts and Writing	2	2	3	3	
History, Heritage and Archaeology	2	2	3	3	
Language, Communication and Culture	2	2	3	3	
Law And Legal Studies	2	2	3	3	

Table: Dimensions Research Integrity • Source: Dimensions



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Some  
Regions have  
made more  
progress  
than others



## Research Integrity Policy Implementation Bands (Australia)

Based on the adoption percentages for 2021, Fields of Research are assigned policy implementation bands. For fields in band 1, there is already well established practice, and it would be reasonable to work towards 100% compliance for all papers for which a University has a corresponding author, or is a principle investigator on a funded project. For band 2, there is awareness of the trust marker, but more training is required to shift practice. For bands 3 low awareness is assumed, and significant training is required.

Field of research	Funding statement	Competing interests	Author contributions	Data availability	Ethics approval
Agricultural, Veterinary And Food Sciences	1	1	1	1	1
Health Sciences	1	1	1	1	1
Psychology	1	1	1	1	1
Biomedical And Clinical Sciences	1	1	1	1	1
Biological Sciences	1	1	1	1	1
Earth Sciences	1	1	1	1	
Environmental Sciences	1	1	1	2	2
Chemical Sciences	1	1	1	2	2
Human Society	1	1	2	2	1
Engineering	1	1	2	2	2
History, Heritage And Archaeology	1	1	2	2	
Built Environment And Design	1	1	2	2	
Economics	1	1	2	2	
Education	1	1	2	2	
Information And Computing Sciences	1	1	2	2	
Law And Legal Studies	1	1	2	2	
Creative Arts And Writing	1	1	3	3	
Commerce, Management, Tourism And Services	1	1	3	3	
Language, Communication And Culture	1	1	3	3	
Physical Sciences	1	2	2	2	
Philosophy And Religious Studies	1	2	2	2	
Mathematical Sciences	1	2	3	2	

Table: Dimensions Research Integrity • Source: Dimensions



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## Trust Marker uptake by Funder

### Ethical Approval Statement Trends for Selected Funders

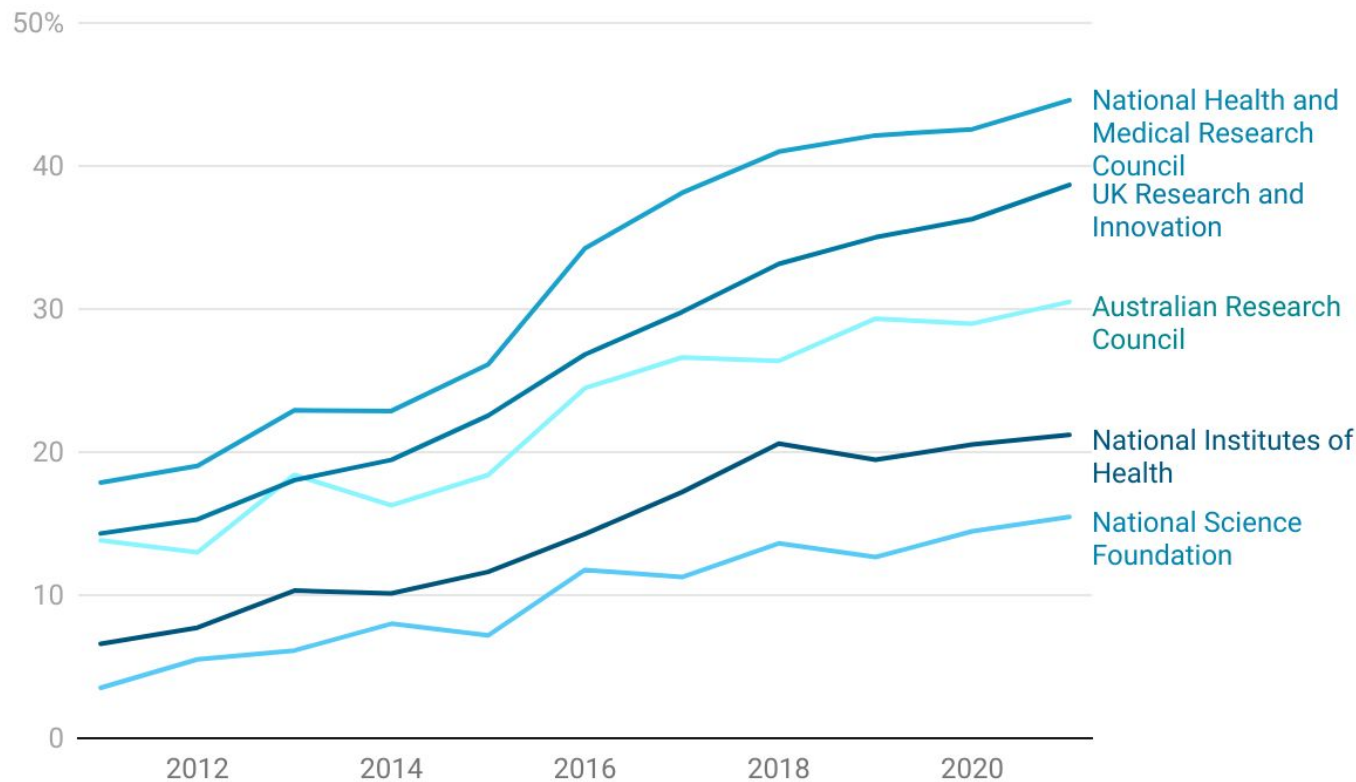


Chart: Dimensions Research Integrity • Source: Dimensions



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# Benchmarking Publishers

*Open Access Publishers have made early moves to implement trust markers in their publications*

<b>publisher</b>	<b>first published year</b>	<b>publications</b>	<b>data availability statement percentage</b>	<b>authors contribution statement</b>	<b>competing interests statement</b>	<b>funding statement percentage</b>	<b>ethics approval</b>
Public Library of Science (PLoS)	2001	<div><div></div>17,214</div>	100	99	100	89	31
Frontiers	2007	<div><div></div>54,759</div>	98	99	51	80	76
MDPI	1996	<div><div></div>129,157</div>	97	96	92	97	15
AIP Publishing	2013	<div><div></div>11,378</div>	97	16	58	62	3
Hindawi	1997	<div><div></div>24,976</div>	93	24	58	59	23
Springer Nature	1842	<div><div></div>304,847</div>	50	48	62	68	69
Wiley	1807	<div><div></div>158,801</div>	40	17	41	52	17
Oxford University Press (OUP)	1586	<div><div></div>20,701</div>	34	27	54	68	19
De Gruyter	1749	<div><div></div>14,553</div>	33	31	30	44	73
SAGE Publications	1965	<div><div></div>38,970</div>	26	17	39	82	29



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# Use Dimensions Research Integrity to benchmark Trust Marker uptake

At a deeper level, Trust Markers also reveal patterns of researcher behaviour, be it the need to encourage more researchers to deposit in online repositories

*There is a marked difference between having data availability statements, and making data available in an appropriate repository*

 Source: Dimensions Research Integrity via Google Bigquery



## Chemical Sciences Data Statement Coverage by Publisher

publisher	publications	publications with links to online repositories		online repository percentage
Elsevier	62,746	224		0.36%
American Chemical Society (ACS)	39,789	329		0.83%
Wiley	28,663	209		0.73%
Royal Society of Chemistry (RSC)	27,201	170		0.62%
MDPI	20,014	1,028		5.14%
Springer Nature	19,461	732		3.76%
Pleiades Publishing	4,193	0		0.00%
Taylor & Francis	3,276	15		0.46%
AIP Publishing	1,714	85		4.96%
The Electrochemical Society	1,563	3		0.19%

Table: Dimensions Research Integrity • Source: Dimensions

(Data filtered by Chemical Sciences)



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# Use Dimensions Research Integrity to benchmark Trust Marker uptake

...or identify the repositories that researchers are using so that they can be better supported...

*Github has become a 'repository' of choice for many researchers, but how many are also persistently creating a copy of their code/data in repository?*

 Source: Dimensions Research Integrity via Google Bigquery



## Repository Share: Data Availability Statement Mentions

Repository mentions as a percentage of data availability statements that mention a repository. Medically focussed repositories are represented in blue, with generalist repositories in green. Github is represented separately in red

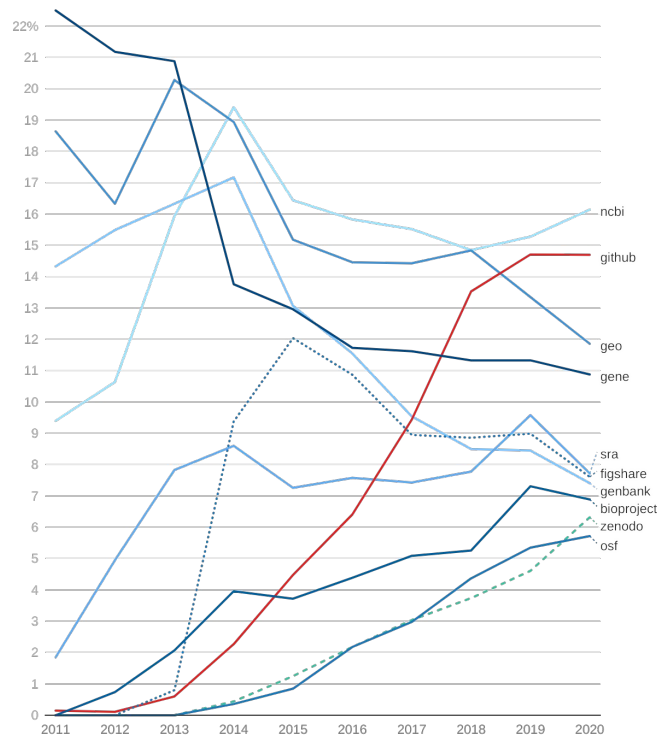


Chart: Dimensions Research Integrity • Source: Dimensions • Created with Datawrapper



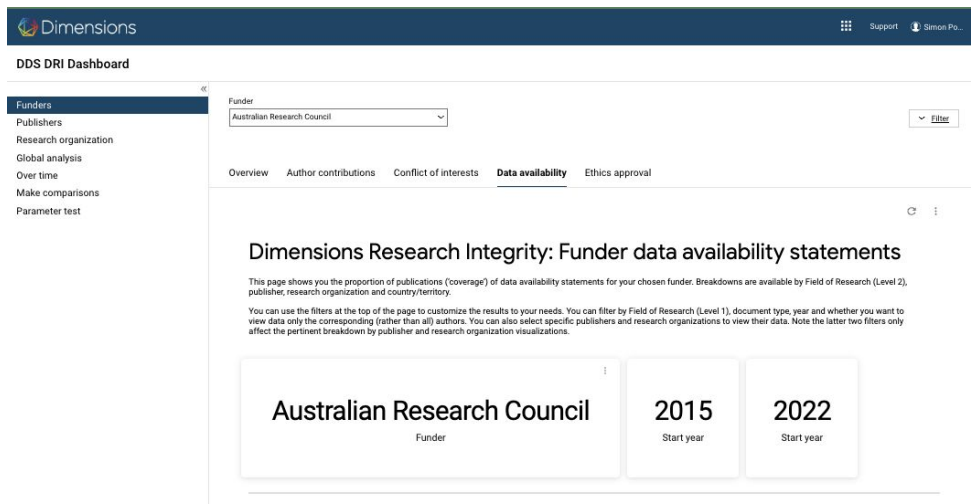
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# Dashboards (soon):



## Breakdown by Field of Research

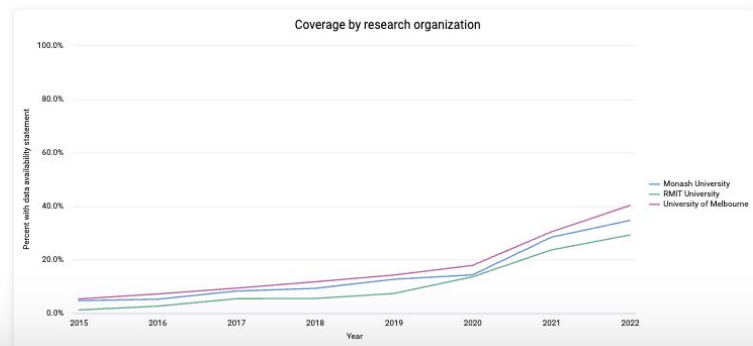
This table breaks down coverage of the trust marker at Field of Research (Level 2) level. This enables you to compare fields and identify areas of relatively high and/or low coverage. Used in conjunction with the *Field of Research* filter at the top of the page, you can focus in on interdisciplinary areas of research.

Year	< 2022	2021	2020	2019	2018	2017	2016	2015
Field of Research (Level 2)	Percent with data availability statement	Percent with data availability statement	Percent with data availability statement	Percent with data availability statement	Percent with data availability statement	Percent with data availability statement	Percent with data availability statement	Percent with data availability statement
1 Geoinformatics	100.0%	37.5%	0.0%	6.7%	0.0%	0.0%	11.1%	0.0%
2 Oceanography	74.4%	67.9%	39.5%	21.2%	15.3%	10.8%	10.0%	3.1%
3 Oncology And Carcinogenesis	71.4%	51.7%	23.4%	22.8%	25.0%	12.7%	12.7%	10.9%
4 Atmospheric Sciences	70.4%	58.6%	33.1%	23.4%	18.3%	19.6%	9.8%	1.9%
5 Climate Change Science	69.2%	50.8%	32.4%	22.4%	19.5%	11.9%	2.2%	2.5%
6 Neurosciences	68.2%	30.8%	33.7%	20.2%	19.2%	11.8%	8.7%	2.4%
7 Plant Biology	65.7%	42.0%	26.3%	17.2%	12.2%	14.0%	9.7%	8.5%
8 Medical Microbiology	65.5%	64.9%	52.7%	43.4%	33.7%	38.2%	20.6%	16.7%
9 Bioinformatics And Computational Biology	63.5%	71.4%	48.4%	52.3%	43.6%	32.7%	29.8%	26.0%
10 Medical Biochemistry And Metabolomics	62.5%	43.8%	28.6%	27.3%	0.0%	25.0%	15.4%	0.0%
11 Biochemistry And Cell Biology	61.9%	49.5%	32.5%	26.4%	24.0%	19.3%	11.8%	12.3%
12 Veterinary Sciences	61.9%	37.0%	30.6%	19.4%	31.3%	29.7%	26.7%	25.7%
13 Microbiology	61.9%	59.0%	41.0%	39.7%	25.4%	23.2%	18.1%	14.6%
14 Nutrition And Dietetics	61.8%	29.2%	20.5%	17.8%	16.7%	22.9%	6.0%	7.4%
15 Fisheries Sciences	61.5%	31.1%	15.4%	29.4%	11.8%	15.4%	22.2%	22.7%
16 Medicinal And Biomolecular Chemistry	61.2%	36.4%	6.2%	4.0%	4.0%	2.4%	6.1%	8.5%
17 Genetics	60.5%	63.6%	46.7%	41.7%	35.9%	31.2%	27.2%	34.6%

Level 2 Field of Research breakdown of data availability statement coverage over time.

## Breakdown by research organization

This chart breakdowns coverage of trust markers across research organizations, for work the chosen funder has funded. You can use the corresponding author filter to limit this data only to the affiliation(s) of the corresponding author(s). You can use the *Research organization(s)* filter to choose your own selection.



# Dimensions Research Integrity

Digital Science White Paper

