El proceso de comunicación científica en el Siglo XXI

MUSEU NACIONAL D'ART DE CATALUNYA

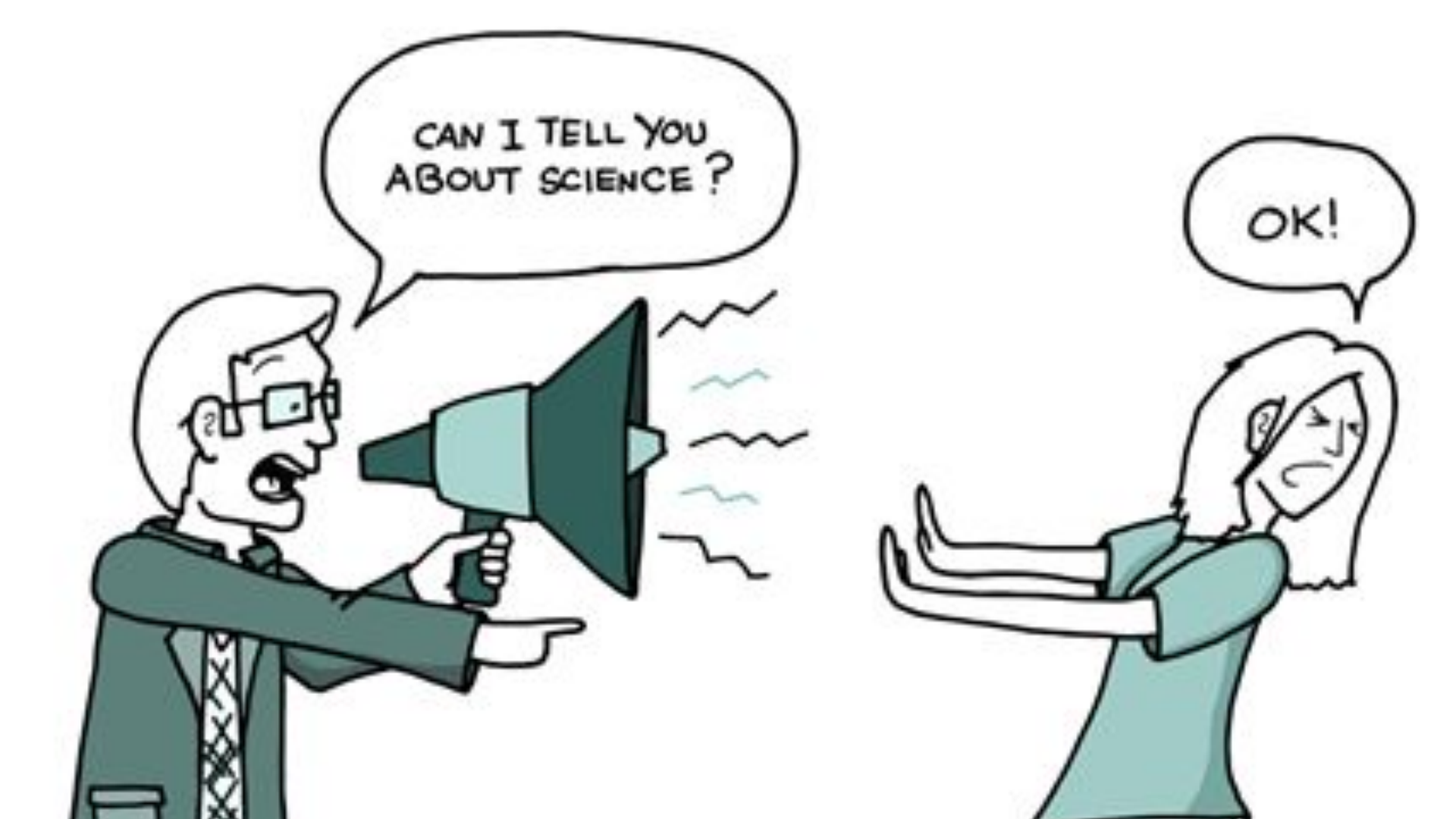
Jornada de Ciencia Abierta y Comunicación Científica

5 de noviembre de 2020 - Barcelona

¡Gracias por la invitación!

TU Delft

Nicolás Robinson-Garcia
Applied Mathematics (DIAM), TU Delft


CAN I TELL YOU ABOUT SCIENCE?
OK!

Todo tiempo pasado fue mejor...

The role of a scientist

"The goal of scientific research is publication"

Day, R. Gastel, B. 2012 How to write and publish a scientific paper [7th ed]. Cambridge University Press

Todo tiempo pasado fue mejor...

- Peer review

WORLD VIEW
A personal take on events

Take peer pressure out of peer review

Until we study the social dynamics of review panels, assessments will be suboptimal, explains **Gemma Derrick**.

Forbes

Nov 23, 2015, 07:19am EST

The Crisis Of Peer Review

Geoffrey Kabat Former Contributor
Science & Technology

ent FP Picks modities

This article is more than 4 years old.

"If peer review were a drug, it would never get on the market."

FP Comment

The peer review crisis

Junk Science Week: Peer reviewers now expected to vet articles for alignment with whatever political views currently hold sway with community-at-large

Todo tiempo pasado fue mejor...

- Peer review
- **Predatory publishing**

WORLD VIEW *A personal take on events*

J.SANCHEZ

Predatory publishers are corrupting open access

Journals that exploit the author-pays model damage scholarly publishing and promote unethical behaviour by scientists, argues **Jeffrey Beall**.

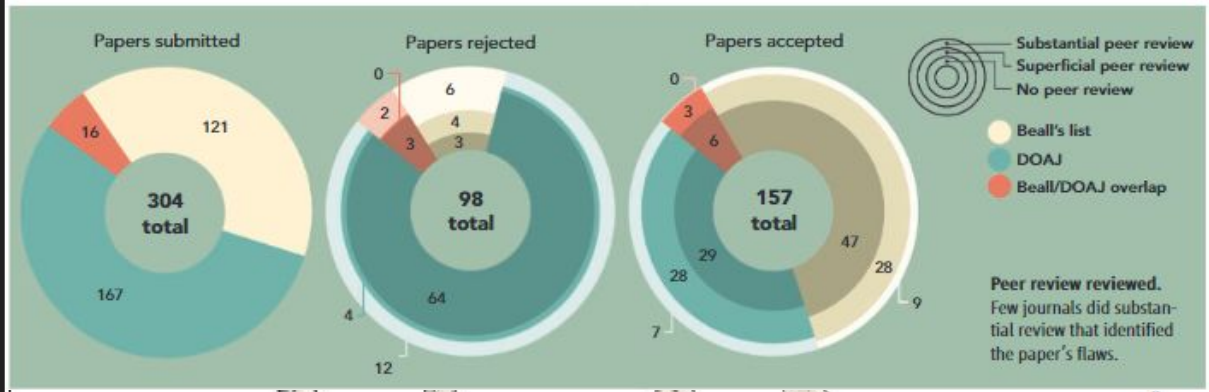


ILLUSTRATION BY TOM WOOD

Predatory journals: no definition, no defence

promise was doubtful and its validity unlikely to have been vetted.

Predatory journals are a global threat. They accept articles for publication — along with authors' fees — without performing promised quality checks for issues such as plagiarism or ethical approval. Naive readers are not the only

Todo tiempo pasado fue mejor...

- Peer review
- Predatory publishing
- **Reproducibilidad**

Open access, freely available online

Essay

Why Most Publish… Are False

John P. A. Ioannidis

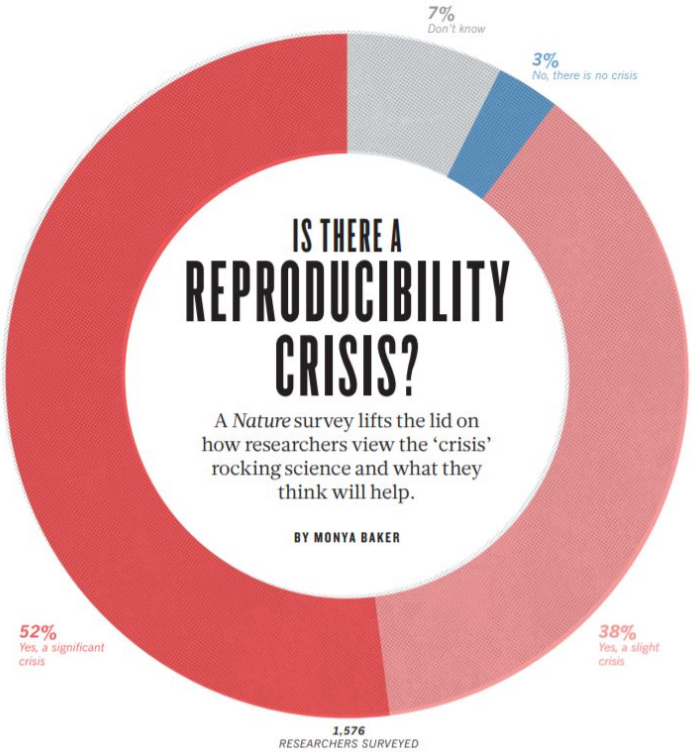
Summary

There is increasing concern that most current published research findings are false. The probability that a research claim is true may depend on study power and bias, the number of other studies on the same question, and, importantly, the ratio of true to no relationships among the relationships probed in each scientific field. In this framework, a research finding is less likely to be true when the studies conducted in a field are smaller; when effect sizes are smaller; when there is a greater number and lesser preselection of tested relationships; where there is

facto… some…

Mod… Posi…

Sever… poin… rate … confi… is a c… yet il… conc… the b… form… for a… is no…



RESEARCH ARTICLE SUMMARY

PSYCHOLOGY

Estimating the reproducibility of psychological science

Open Science Collaboration[1]

ON OUR WEB SITE

Read the full article at http://dx.doi.org/10.1126/science.aac4716

…nal effect sizes were in the 95% confidence interval of the replication effect size; 39% of effects were subjectively rated to have replicated the original result; and if no bias in original results is assumed, combining original and replication

Todo tiempo pasado fue mejor...

- Peer review
- Predatory publishing
- Reproducibilidad
- **Fake news**

Press

Chinese Virologist Claiming Covid Was Lab-Made Teases Another Reveal on Twitter

Pressfrom, 02 Nov 2020

A Chinese academic spreading the conspiracy that China was responsible for releasing SARS- CoV -2 has suggested information...

msn

Chinese Virologist Claiming Covid Was Lab-Made Teases Another Reveal on Twitter

MSN, 02 Nov 2020

A Chinese academic spreading the conspiracy that China was responsible for releasing SARS- CoV -2 has suggested information...

Newsweek

Chinese virologist claiming COVID-19 was lab-made teases another reveal on Twitter

Newsweek, 02 Nov 2020

A Chinese academic spreading the conspiracy that China was responsible for releasing SARS-CoV-2 has suggested information will...

Forbes

What Is One Health?

Forbes, 31 Oct 2020

The connection between human health and wild animals has been demonstrated on an unprecedented and global scale with the...

The New York Times

Instagram Tries Clamping Down on Misinformation

New York Times, 30 Oct 2020

Every day, Times reporters will chronicle and debunk false and misleading information that is going viral online.

NSC Total

Dilma não disse que vacina chinesa vai funcionar porque pandemia começou na China

NSC Total, 30 Oct 2020

Conteúdo checado pela NSC, em parceria com Jornal do Commercio, Correio e GaúchaZH para o Projeto Comprova, iniciativa que reúne...

nature medicine

Explore our content ⌄ Journal information ⌄

nature › nature medicine › correspondence › article

Correspondence | Published: 17 March 2020

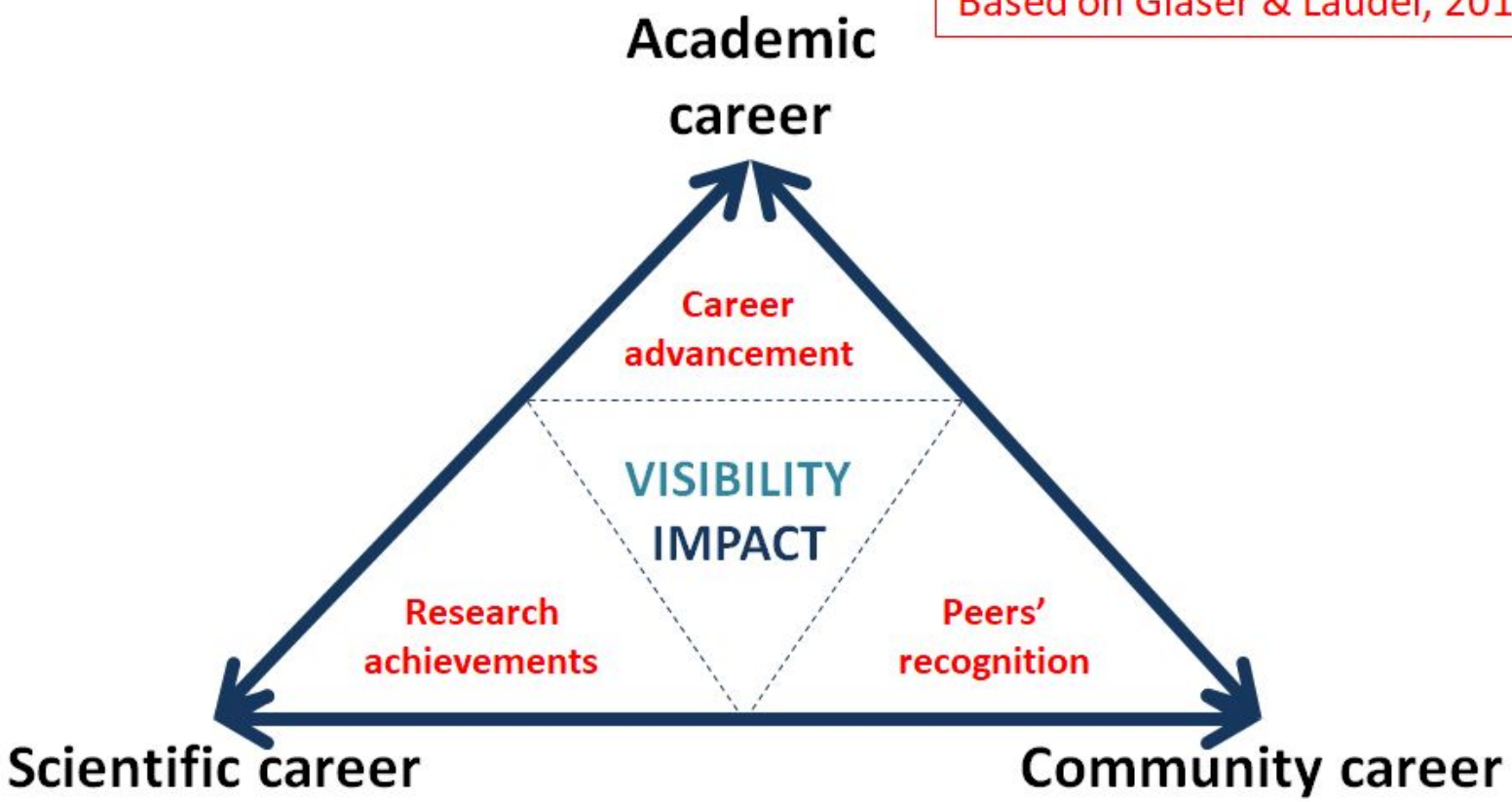
The proximal origin of SARS-CoV-2

¿Se está dejando de **confiar en la ciencia?**

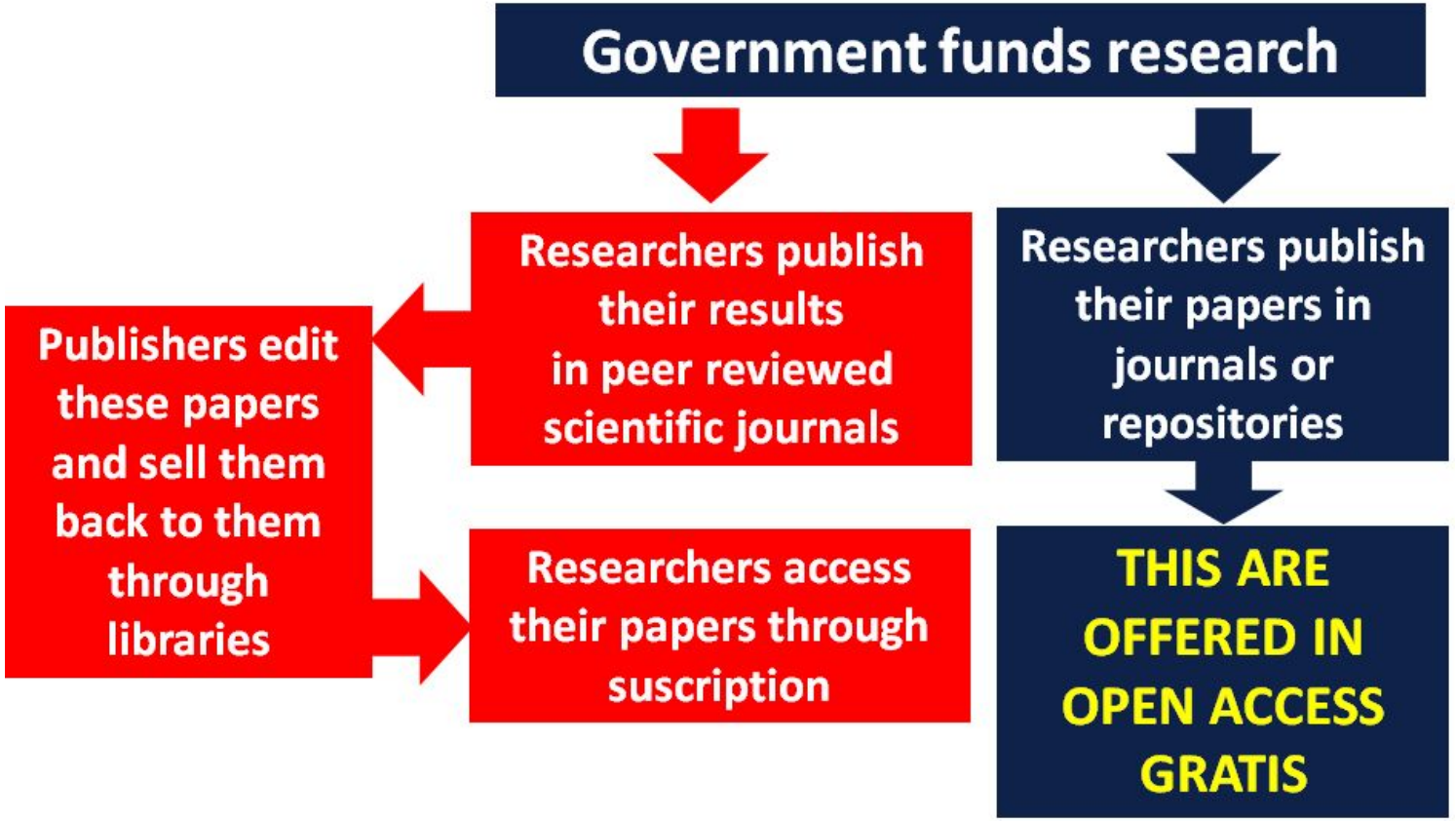
¿De qué vamos a hablar?

1. Acceso Abierto - **LA TEORÍA**
2. Brecha social - **LA REALIDAD**
3. El contexto evaluativo - **EL DILEMA**

Based on Gläser & Laudel, 2011



Acceso Abierto como **deber social**



Acceso Abierto como **demanda social**

Swartz

† 1986-2013

Alexandra Elbakyan

SCI-HUB

...to remove all barriers in the way of science

enter URL, PMID / DOI or search string

Acceso Abierto como **estrategia de difusión**

Acceso Abierto como **un camino incierto**

Name	Rank	Web of Science Documents	Times Cited	% Docs Cited	Quartile	Journal Impact Factor
PLOS ONE	1	133,873		89.17%	Q1	2.806
SCIENTIFIC REPORTS	2	38,402	254,391	82.97%	Q1	4.259
NATURE COMMUNICATIONS	3					12.124
BIOMED RESEARCH INTERNATIONAL	4	8,382			Q2	2.476
MATHEMATICAL PROBLEMS IN ENGINEERING	5					0.802
NUCLEIC ACIDS RESEARCH	6	6,823	178,809	96.12%	Q1	10.162
SENSORS	7	6,502	31,632	78.53%	Q1	2.677
JOURNAL OF HIGH ENERGY PHYSICS	8	6,126	56,181	89%	Q1	6.063
BMC PUBLIC HEALTH				83.53%	Q2	2.265
BMJ OPEN				78.24%	Q1	2.369
INTERNATIONAL JOURNAL OF MOLE				84.54%	Q2	3.226
FRONTIERS IN PSYCHOLOGY				73.85%	Q2	2.321

PLOS One

Nature Springer

Hindawi Publishing

El elemento digital

Type of profile

Speaker
Researcher
Innovative
Miscellaneous

Channel

Web
Blogs
Networks
...there are hundreds of tools...

Style

Formal vs Informal
Scientific vs
Personal
Misc.

¿Pero es suficiente?

Los retos de la comunicación científica

Expectativas

Realidad

Modelos

Complejidad

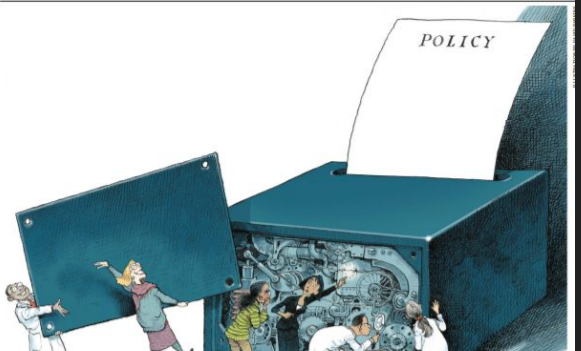
Respuestas

Incertidumbre

Los retos de la comunicación científica

Setting the agenda in research

Comment



Five ways to ensure that models serve society: a manifesto

Andrea Saltelli, Gabriele Bammer, Isabelle Bruno, Erica Charters, Monica Di Fiore, Emmanuel Didier, Wendy Nelson Espeland, John Kay, Samuele Lo Piano, Deborah Mayo, Roger Pielke Jr, Tommaso Portaluri, Theodore M. Porter, Arnald Puy, Ismael Rafols, Jerome R. Ravetz, Erik Reinert, Daniel Sarewitz, Philip B. Stark, Andrew Stirling, Jeroen van der Sluijs & Paolo Vineis

Pandemic politics highlight how predictions need to be transparent and humble to invite insight, not blame.

The COVID-19 pandemic illustrates perfectly how the operation of science changes when questions of urgency, stakes, values and uncertainty collide – in the 'post-normal' regime.

Well before the coronavirus pandemic, statisticians were debating how to prevent malpractice such as *p*-hacking, particularly when it could influence policy[1]. Now, computer modelling is in the limelight, with politicians presenting their policies as dictated by 'science'[2]. Yet there is no substantial aspect of this pandemic for which any researcher can currently provide precise, reliable numbers. Known unknowns include the prevalence and fatality and reproduction rates of the virus in

Mian and Khan *BMC Medicine* (2020) 18:89
https://doi.org/10.1186/s12916-020-01556-3

BMC Medicine

COMMENTARY Open Access

Coronavirus: the spread of misinformation

Areeb Mian and Shujhat Khan*

Keywords: COVID-19, Coronavirus, Misinformation, Internet, Antiscience, Pandemic, Public health

There has been a global rise recently in the spread of misinformation that has plagued the scientific community and public. Disconnect between scientific consensus and members of the public on topics such as vaccine safety, the shape of the earth, or climate change has existed for a number of years. However, this has progressively worsened as society has become further divided in the political climate of today. In turn, it has created an optimal environment for antiscience groups to gain footing and propagate their false theories and information. The public health crisis emerging due to the coronavirus (COVID-19) is also now beginning to feel the effects of misinformation.

We stand with our colleagues Calisher et al., who recently published a statement of solidarity to fight against COVID-19 and to promote scientific evidence and unity over misinformation and conjecture [1]. Just as the coronavirus itself, misinformation has spread far and wide, drowning out credible sources of information. Over the last couple of months, posts from the World Health Organization (WHO) and the US Center of Disease Control (CDC) have cumulatively only achieved several hundred thousand engagements, considerably eclipsed by hoax and conspiracy theory sites, which have amassed over 52 million. This serves to emphasise the popularity of unverified sources of information.

Similarly, misinformation was widespread during the early years of the HIV epidemic. It too was plagued by conspiracy theories, rumours, and misinformation for many years, with the effects still visible in regions to this day. Many people continue to argue that HIV does not exist, or cause AIDS, and that its therapies are toxic to human health. All the arguments proposed by these deniers have been rebuked through a multitude of scientific publications and debate. Yet, they continue to persist. The influence of these false arguments can be so infectious that it can influence governmental policy, which has the potential to be fatal. This was particularly highlighted by the Mbeki South African government's denialism of HIV in the early 2000s and their infamous rejection of the evidence surrounding the efficacy of HIV medication. In turn, thousands of mothers were denied access to antiretroviral therapies. Instead, the government promoted the unsubstantiated use of herbal remedies including garlic, beetroot, and lemon juice for AIDS treatment [2], leading to unnecessary HIV transmission, especially to children from pregnant mothers. This costs more than 300,000 lives [3]. It is important that we learn from past mistakes, and the media has a large role to play in this. It seems in a bid to increase viewership, major media organisations are creating dramatic headlines but are instead inciting panic amongst the public. Whilst healthcare professionals are still learning about the virus, the media has already begun to speculate about the potential health impact that the virus can have, and by publishing the potential worst effects of the virus, it only serves to fuel panic amongst the general public.

As COVID-19 turns into full-fledged public health crisis, multiple theories regarding the virus' origin have taken hold on the internet, all with a common theme: the virus was artificially created in a lab by a rogue government with an agenda. This misinformation originated from social media accounts and websites with no credible evidence to support their claims. These posts have amassed over 20 million engagements, rising each day, and the theories continue to gain traction and following on the internet, despite scientists from multiple nations

* Correspondence: sk7015@ic.ac.uk
Imperial College London, London SW7 2AZ, UK

nature climate change PERSPECTIVE
https://doi.org/10.1038/s41558-018-0368-6

Evidence-based strategies to combat scientific misinformation

Justin Farrell[1]*, Kathryn McConnell[1] and Robert Brulle[2]

Nowhere has the impact of scientific misinformation been more profound than on the issue of climate change in the United States. Effective responses to this multifaceted problem have been slow to develop, in large part because many experts have not only underestimated its impact, but have also overlooked the underlying institutional structure, organizational power and financial roots of misinformation. Fortunately, a growing body of sophisticated research has emerged that can help us to better understand these dynamics and provide the basis for developing a coordinated set of strategies across four related areas (public inoculation, legal strategies, political mechanisms and financial transparency) to thwart large-scale misinformation campaigns before they begin, or after they have taken root.

Scientific misinformation undermines public understanding of science, erodes basic trust in research findings and stalls evidenced-based policymaking[1–3]. For example, in April 2018, Scott Pruitt (former administrator of the Environmental Protection Agency; EPA) signed a proposed rule that would sharply reduce the number of scientific studies the EPA can take into account, effectively limiting the agency's ability to regulate toxic chemicals, air pollution, carbon emissions and industries that science has already shown to have lethal impacts on human and environmental health[4,5]. This rule would, in effect, limit the amount of evidence-based information for environmental decision-making. The rule itself does not directly propagate misinformation (only the limiting of information), however, the political groundwork for such a rule was laid by a long-term and well-coordinated misinformation effort. Pruitt was joined at the announcement by Steve Milloy, a member of President Trump's EPA transition team, and perhaps the nation's most influential climate science contrarian. Milloy has a long history of working on behalf of industry-led scientific misinformation campaigns — first for tobacco companies to discredit research on the public health risks of smoking and, more recently, for fossil-fuel companies aiming to refute, confuse and obstruct acceptance of the reality of climate change[6].

Milloy declared that this new EPA rule to stamp out 'secret science' by "taxpayer-funded university researchers" is, in his words, "one of my proudest achievements. The reason this is anywhere is because of Steve Milloy"[7,8]. In another interview, Milloy explained his reasoning to *The New Yorker*. "I do have a bias. I'm all for the coal industry, the fossil fuel industry. Wealth is what makes people happy, not pristine air, which you'll never get"[9]. The new EPA rule was a long time in the making, proposed as legislation twice by Representative Lamar Smith (TX)[10]. Smith himself has been an outspoken climate science contrarian, has received more funding (US$772,347) from the oil and gas industry than any other sector[11], and is chair of the House Science Committee.

Similarly, when President Trump announced the withdrawal of the United States from the Paris Agreement, he was accompanied by Myron Ebell, the leader of the administration's EPA transition team, and an influential climate change contrarian. According to Internal Revenue Service filings, Ebell and connected think-tanks and front groups have taken in tens of millions of dollars from fossil fuel companies and wealthy family foundations such as Koch, Scaife and Mercer[12,13]. Echoing Steve Milloy (above) about the EPA rule, Ebell similarly reflected about the decades of political work that it took to get to this point. "This was a very long fight. And we have turned the corner"[14].

Many, especially climate scientists who have seen the evidence of warming first hand, wondered how we had reached this point. How had these once fringe actors, who tended to be overlooked and at times even laughed off as irrelevant bloggers, managed to embed their ideas so deeply into mainstream US politics? And how, over the course of the 1990s and 2000s, did half of the American public — and the large majority of the Republican Party and its supporters — increasingly lose trust in, and become so antagonistic towards, robust scientific facts with such dire consequences?

Recent research has shown us that the spread of scientific misinformation — at a scale and level of complexity never before witnessed — was the main culprit behind this trend, altering the nature of public debate, sowing seeds of cultural and political polarization, and making meaningful legislative action nearly impossible[15–18].

But scientific misinformation is not a modern invention. We know from the seminal work of science historians that it has been produced and deployed to confuse people throughout the ages, creating false controversy about, for example, the scientific evidence of the dangers of smoking tobacco, the causes of acid rain, the role of chlorofluorocarbons on ozone depletion and, most recently, the reality of anthropogenic climate change[19–21].

Fortunately, recent years have seen considerable progress in both the scale and complexity of research into the origins and impacts of scientific misinformation campaigns. In particular, this research has focused on identifying the elaborate institutional structures behind these campaigns and the coordination among institutional actors. In addition, it has shown there to be a patterned organizational topology in the production of misinformation that is intended to confuse the public and/or block science-based policy change. These organizations include think-tanks, philanthropic foundations, corporations, trade associations, advocacy groups, front groups, shell corporations, lobby groups and public relations firms[22].

Aiming to drive the cultural and political conversation, research has shown that this coordinated network employs a multifaceted strategy to develop and promulgate ideological viewpoints and

[1]Yale University, New Haven, CT, USA. [2]Brown University, Institute for Environment and Society, Providence, RI, USA. *e-mail: justin.farrell@yale.edu

Métricas, incentivos y evaluación

La **evaluación científica** a día de hoy

- Los investigadores son unos ególatras
- La bibliometría es la culpable
- La ANECA/ANEP me odia

¿Qué hago que me sirva para progresar en mi carrera investigadora?

La **evaluación científica** a día de hoy

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Número de autores

Revistas aptas

Número de citas

Número de artículos

¿Qué hago que me sirva para progresar en mi carrera investigadora?

La **evaluación científica** a día de hoy

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- La ANECA/ANEP me odia

Factor de Impacto

Índice H

Impacto normalizado

¿Qué hago que me sirva para progresar en mi carrera investigadora?

La **evaluación científica** a día de hoy

- Los investigadores son unos ególatras
- La bibliometría es la culpable
- La ANECA/ANEP me odia

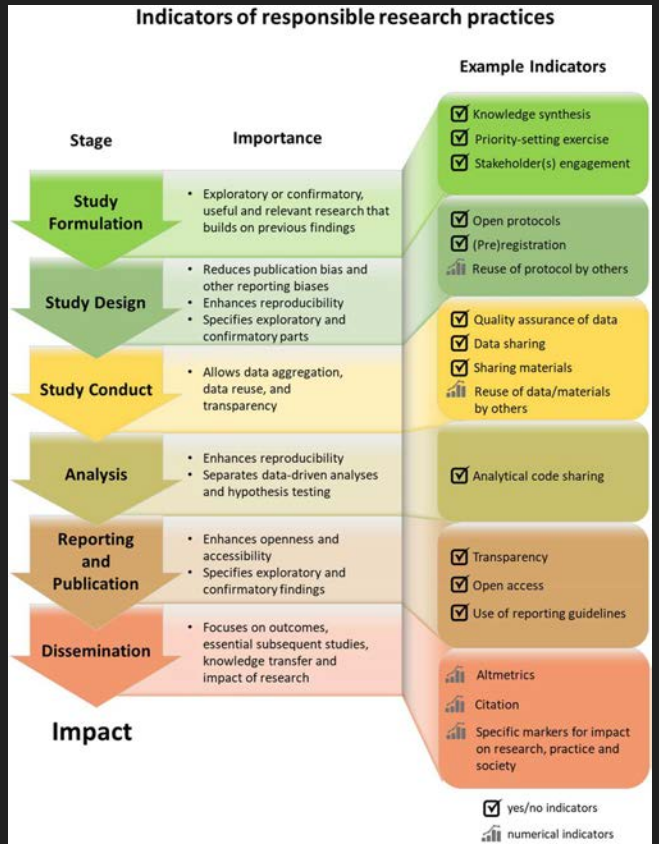
Cambios constantes

Fuera de contexto

Falso peer review

¿Qué hago que me sirva para progresar en mi carrera investigadora?

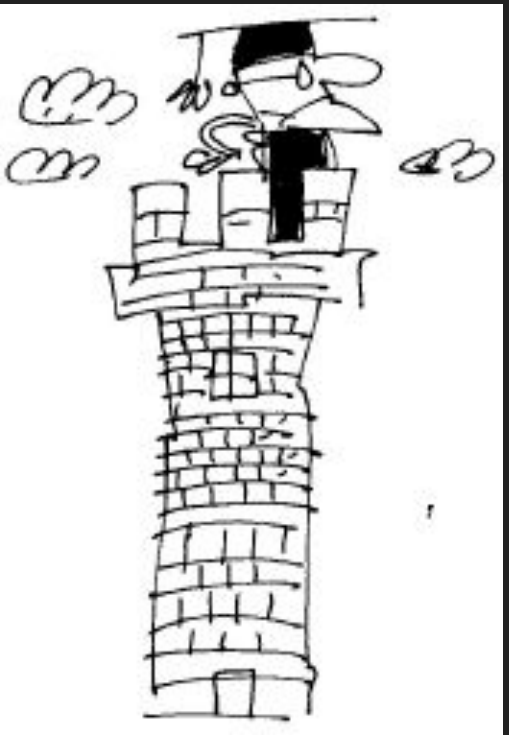
Promoviendo un uso **responsable de las métricas...**



Principios de Hong Kong

1. Evalúa prácticas responsables
2. Valora los resultados negativos
3. Premia prácticas de Ciencia Abierta
4. Reconoce la diversidad de actividades
5. Reconoce prácticas esenciales como la revisión o la supervisión

… para que nos centremos en lo importante.



- Progresar en el conocimiento científico
- Enfrentarnos a grandes (y pequeños) retos de la sociedad
- Establecer un diálogo constante con la sociedad
- Abandonar actitudes beligerantes o altaneras

Mirando hacia adelante

ACADEMIA

- Apertura de métodos
- Apertura de datos
- Transparencia

CREDIBILIDAD

SOCIEDAD

- Énfasis en la divulgación
- Colaborar
- Experimentar con nuevos medios

CONFIANZA

Sed constructivos

¡Muchas gracias!