

# Open Science for responsible quantification

Andrea Saltelli, Centre for the Study of the Sciences and the Humanities, SVT – University of Bergen (UIB) and Open Evidence Research, Universitat Oberta de Catalunya (UOC), Barcelona.

Seminar in Udine, January 30, 31 2020



Where to find this talk: [www.andreasaltelli.eu](http://www.andreasaltelli.eu)



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A large background image showing terraced rice fields in a valley, with mountains in the distance under a hazy sky. The text "CAETERIS ARE NEVER PARIBUS" is overlaid on the left side of the image.

CAETERIS ARE NEVER PARIBUS

**Tweets** by @AndreaSaltelli

**andrea saltelli** @AndreaSaltelli  
Replying to @AndreaSaltelli @merionwest  
... and these are 6 m worth watching from Slavoj Žižek [youtube.com/watch?v=TVwKjG...](https://www.youtube.com/watch?v=TVwKjG...)

**YouTube** @YouTube

A thumbnail for a YouTube video showing a man in a light-colored shirt standing in a room, gesturing with his hands. A play button icon is overlaid on the center of the video.

Jul 26, 2019

**andrea saltelli** @AndreaSaltelli

Embed View on Twitter

Open Science → responsible quantification

Open science is complex and conflicted

Existing tensions and historical perspective

The take of Mirowski

If open science is the solution which was the problem?

- The non accessibility of research funded with taxpayer money?
- A disaffection / loss of trust of citizens for science / expertise?
- Predatory publishing?
- Science's own reproducibility crisis?

Ethical issues

Evidence based policy and its problems

What is the role of quantification ?

Ethics of quantification

NUSAP

Sensitivity auditing

Science and lobbying

Post truth

Orwell or Huxley? Techno-split

Open science as a  
contested and conflicted  
field

A plurality of schools of  
thought

Open science: different understandings ...  
multitude of battlefields, ranging from the  
democratic right to access publicly funded  
knowledge (e.g. Open Access to publications) ...  
to the demand for a better bridging of the divide  
between research and society (e.g. citizen  
science)

B. Fecher and S. Friesike, "Open Science: One Term, Five Schools of Thought," in *Opening Science*, S. Bartling and S. Friesike, Eds. Springer

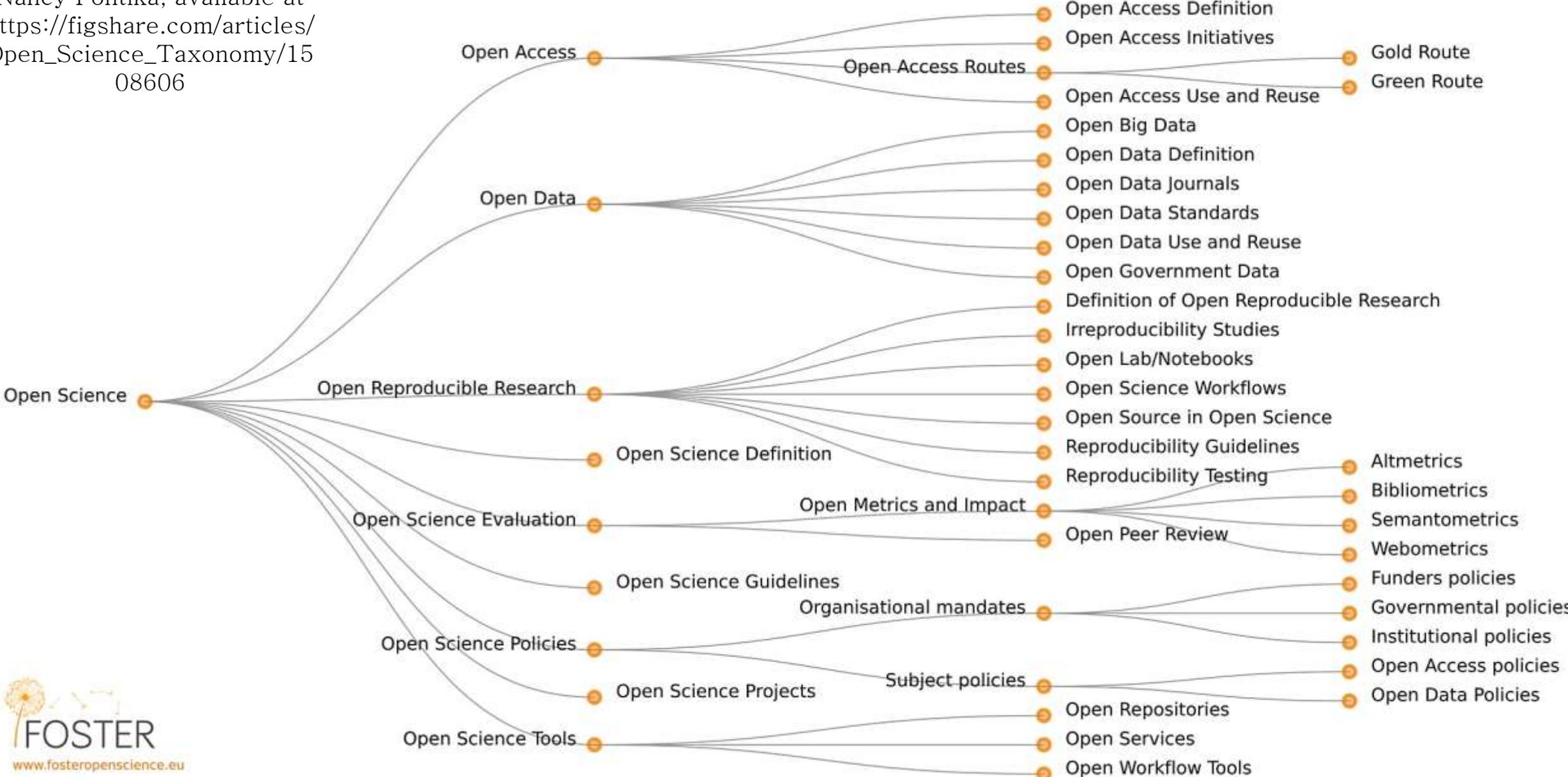
… to the development of freely available tools for collaboration (e.g. social media platforms for scientists)… and more.



B. Fecher and S. Friesike, “Open Science: One Term, Five Schools of Thought,” in *Opening Science*, S. Bartling and S. Friesike, Eds. Springer

# Open Science Taxonomy

Figure from Petr Knoth and Nancy Pontika, available at [https://figshare.com/articles/Open\\_Science\\_Taxonomy/1508606](https://figshare.com/articles/Open_Science_Taxonomy/1508606)



For Paul David open science was always a fragile social contrivance, a “puzzling phenomenon” …

… resulting from the movement away from secret knowledge and princely patronage toward state patronage, academies, and other modern institutions of science, taking place in the period between renaissance and the industrial revolution

P. A. David, “The Historical Origins of ‘Open Science’: An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution,” *Capital. Soc.*, vol. 3, no. 2, p. Article 5, 2008.

# What was before open science?

"Regarding the everyday duties, I shun only that type of prostitution consisting of having to expose my labor to the arbitrary prices set by every customer. Instead, I will never look down on service a prince or a great lord or those who may depend on him, but, to the contrary, I will always desire such a position."  
(Galileo Galilei)



P. A. David, "The Historical Origins of 'Open Science': An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution," *Capital. Soc.*, vol. 3, no. 2, p. Article 5, 2008.

Open science exists already, funded by public and private actors, based on a distinctive ethos

It coexists with commercially oriented research

P. A. David, “The Historical Origins of ‘Open Science’: An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution,” *Capital. Soc.*, vol. 3, no. 2, p. Article 5, 2008.

The ethos of open  
science, the  
republic of  
science, CUDOS



Robert K. Merton

M. Polanyi, J. Ziman, and S. Fuller, "The republic of science: its political and economic theory," *Minerva*, vol. 38, pp. 1–32.



Michal Polanyi

**Communalism** – the common ownership of scientific discoveries, according to which scientists give up intellectual property rights in exchange for recognition and esteem (Merton actually used the term Communism, but had this notion of communalism in mind, not Marxism);

**Universalism** – according to which claims to truth are evaluated in terms of universal or impersonal criteria, and not on the basis of race, class, gender, religion, or nationality;

**Disinterestedness** – according to which scientists are rewarded for acting in ways that outwardly appear to be selfless;

**Organized Skepticism** – all ideas must be tested and are subject to rigorous, structured community scrutiny.

New movement of open science: a tensions between:

Defending the existing fabric open science from the regime of legal protections for intellectual property rights

Creating an “Intellectual Capitalism”: “knowledge assets” to be protected from the potentially disruptive effects digital information technologies

P. A. David, “The Historical Origins of ‘Open Science’: An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution,” *Capital. Soc.*, vol. 3, no. 2, p. Article 5, 2008.

Tension between:

Defending the existing ethos of the republic of science, Merton's CUDOS, "public knowledge"

Proprietary science, secrecy, visions of a knowledge economy

P. A. David, "The Historical Origins of 'Open Science': An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution," *Capital. Soc.*, vol. 3, no. 2, p. Article 5, 2008.

Paul David:

An acceleration toward ‘Intellectual Capitalism’ risks to move science back to the age of princely patronage ...

... from CUDOS back to the pre-renaissance ethos of secrecy in the pursuit of Nature’s Secrets

P. A. David, “The Historical Origins of ‘Open Science’: An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution,” *Capital. Soc.*, vol. 3, no. 2, p. Article 5, 2008.

# What Philip Mirowski has to say about the dangers of open science



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*Article*

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## **The future(s) of open science**

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**Philip Mirowski** 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



“the agenda [of open science] is effectively to re-engineer science along the lines of platform capitalism, under the misleading banner of opening up science to the masses”

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**Philip Mirowski** 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA

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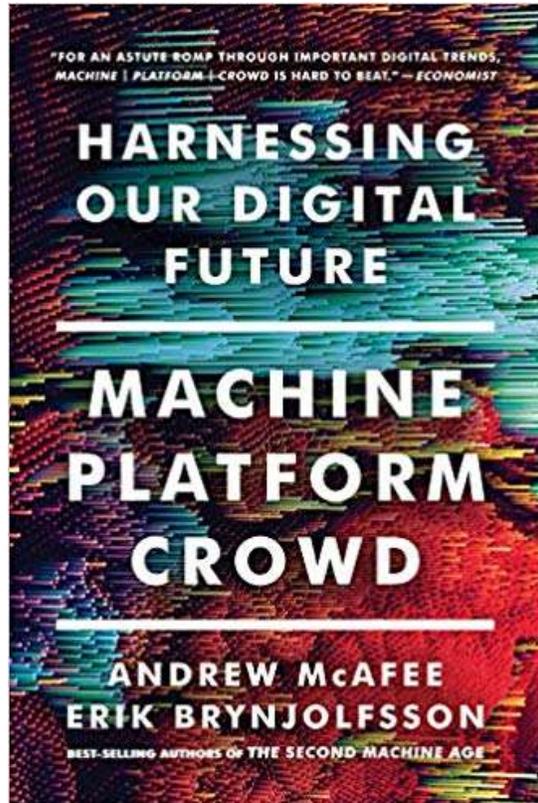
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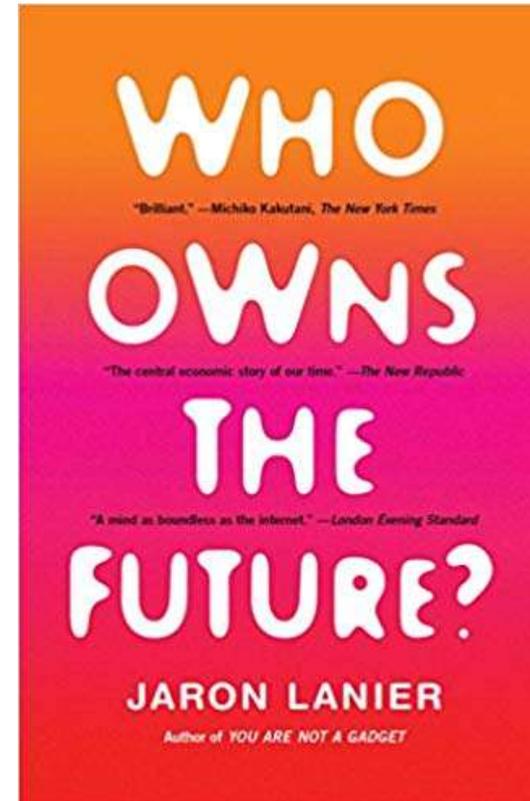


# Platform capitalism?

It is good!



It is bad!



“the open science movement is an artifact of the current neoliberal regime of science, [to] reconfigures both the institutions and the nature of knowledge to better conform to market imperatives”



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**Philip Mirowski** 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA

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Open science is not there to solve

- Distrust of science in the general population
- Science's democracy deficit
- Slowdown in scientific productivity
- Reproducibility crisis

*Article*

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John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA

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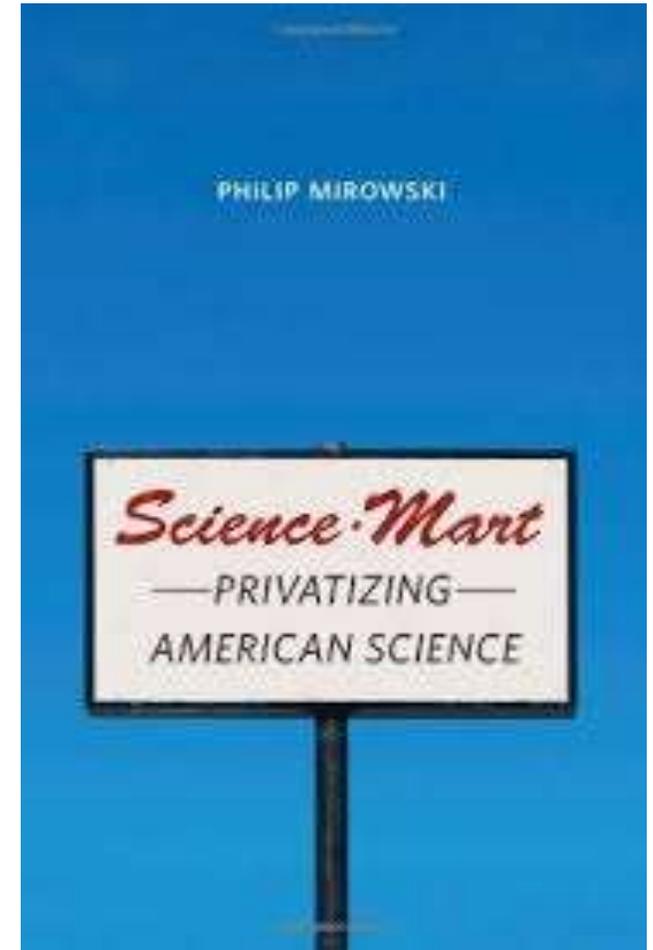
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It was the neoliberal project all along which produced science's ailments



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## The future(s) of open science

Philip Mirowski 

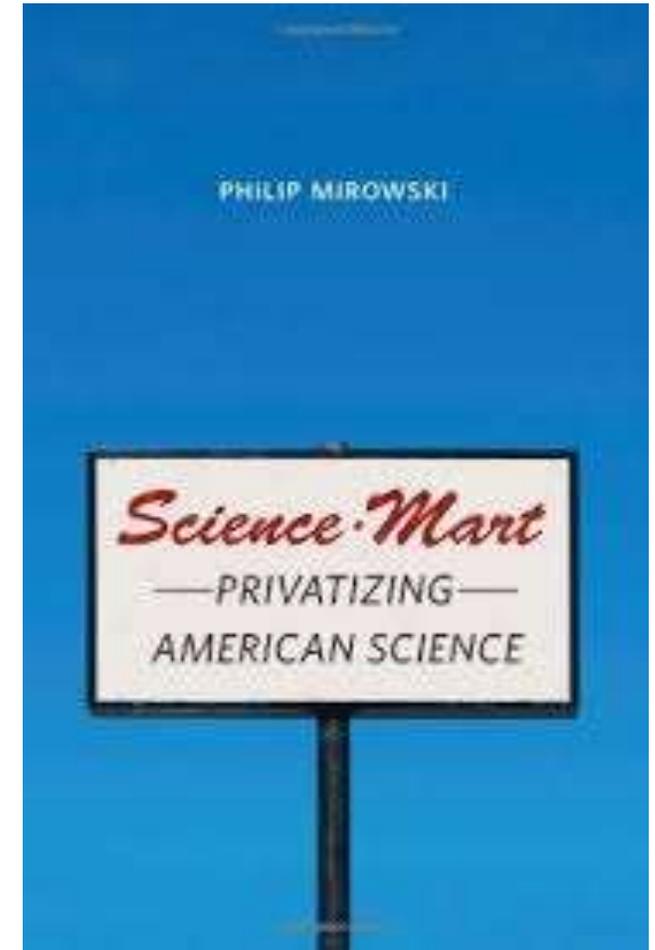
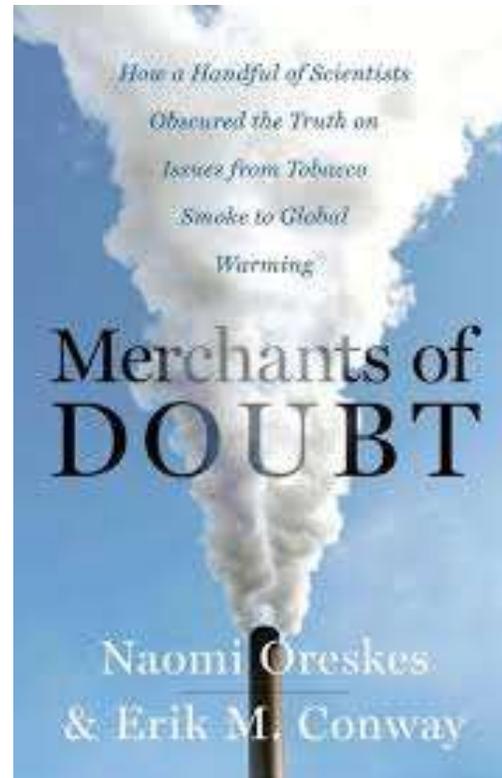
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(1) it was neoliberal think tanks that first stoked the fires of science distrust amongst the populace that have led to the current predicament



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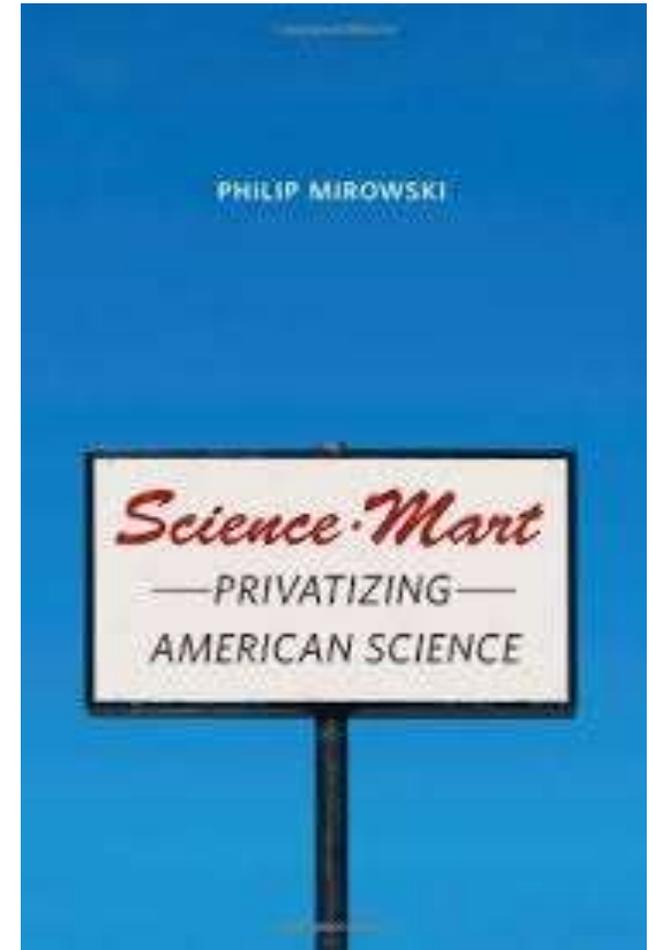
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John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA

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(2) It was neoliberals who provided the justification for the strengthening of intellectual property



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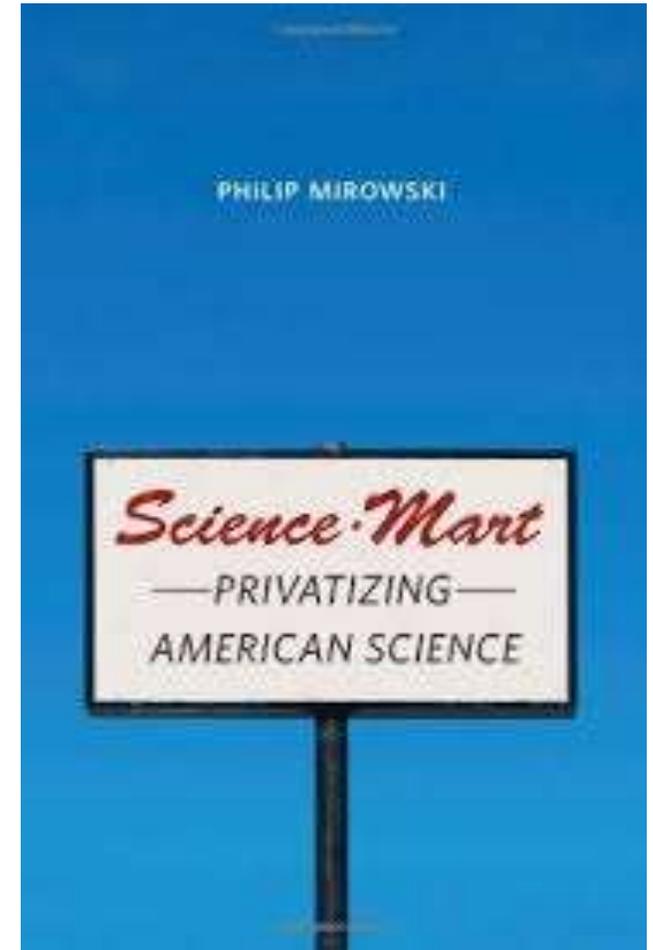
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(3) It was neoliberals who  
[permitted research's public  
cost and private profits ]



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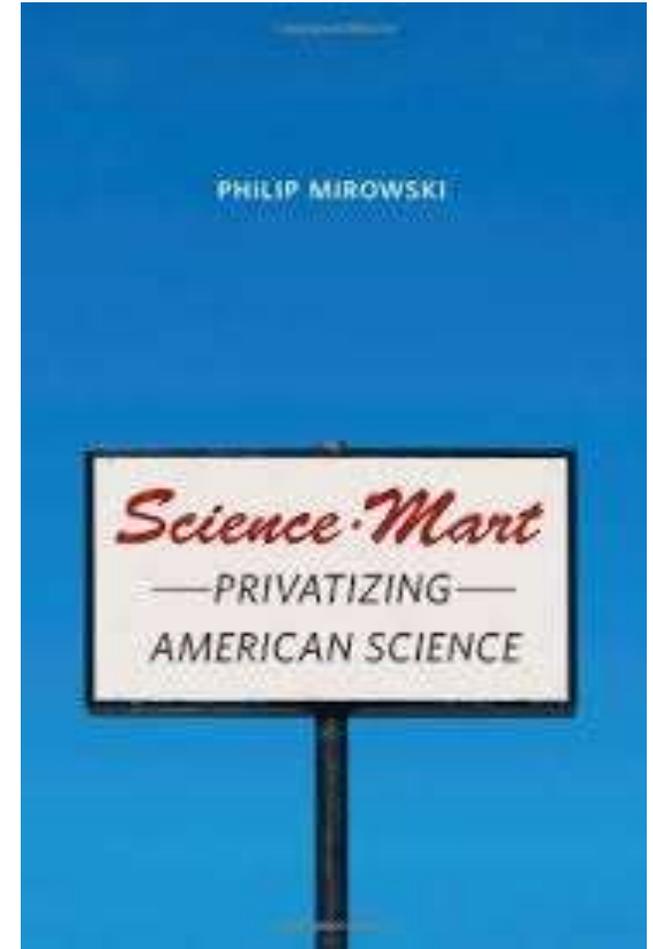
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Philip Mirowski 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



(4) It was neoliberal administrators who began to fragment the university into ‘cash cows’ and loss leader disciplines



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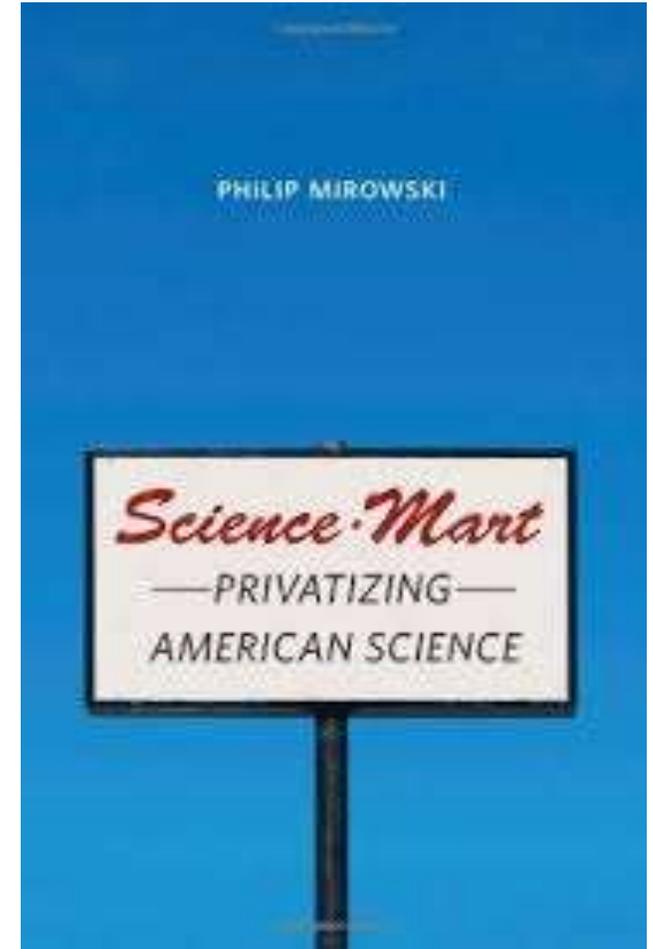
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**Philip Mirowski**   
John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



(5) It was neoliberal corporate officers who sought to wrest clinical trials away from academic health centers and towards CRO contract research organizations to better control the disclosure or nondisclosure of the data generated



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Philip Mirowski 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



Could this become worse? What is hence  
the danger for Mirowski?

Platform capitalism and the uberization of  
science

*Article*

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**Philip Mirowski** 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA

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# Platforms competing to become the 'Facebook for Science'

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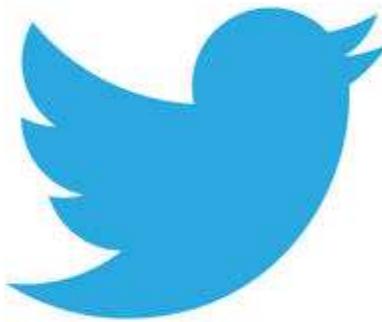
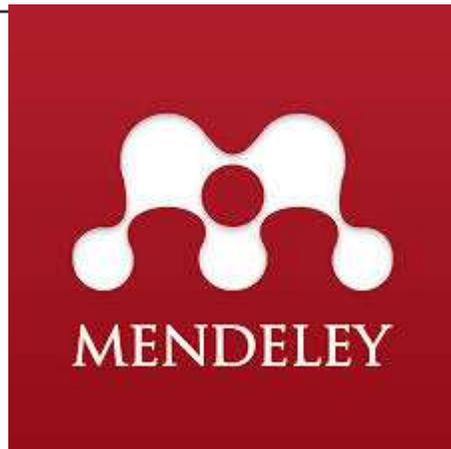
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**Philip Mirowski**   
 John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



Table 3. The landscape of science communication platforms

By whom	Writeup	Publication	Post-publication
Normal scientists			Academia.edu; PeerJ; PubPeer
Funders			Open access commentary
Computer scientists			Fac of 1000
Spectator scientists			
Outsider citizens			
Kibitzers			



Wilson Ctr CS  
 Twitter

Polymath; Mendeley  
 EU OS Cloud  
 Open collaborate;  
 ScienceMatters  
 SETI@home; Foldit

Virtuallabs; Vlab.co.in  
 DIY bio; zooniverse  
 Open source software

Publication managers

Peerage  
 Fac of 1000

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**Philip Mirowski** 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



The future is with us already we  
as scientist already live in “a  
quasi-market that constantly  
monitors [our] ‘net worth’ through  
a range of metrics, scores and  
indicators:  
h-index, impact factors, peer  
contacts, network affiliations, and  
the like

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**Philip Mirowski** 

John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA



We already struggle with “author–paid Article Publishing Charges (APCs) that range from \$500 to \$5,000 USD [Elsevier OA]”;

Corporate publishers have easily assimilated open access into their profit model.

If open science is a  
solution which was the  
problem?

Predatory publishers (the  
Achilles heel of the APC model)

Predatory open access  
publishers

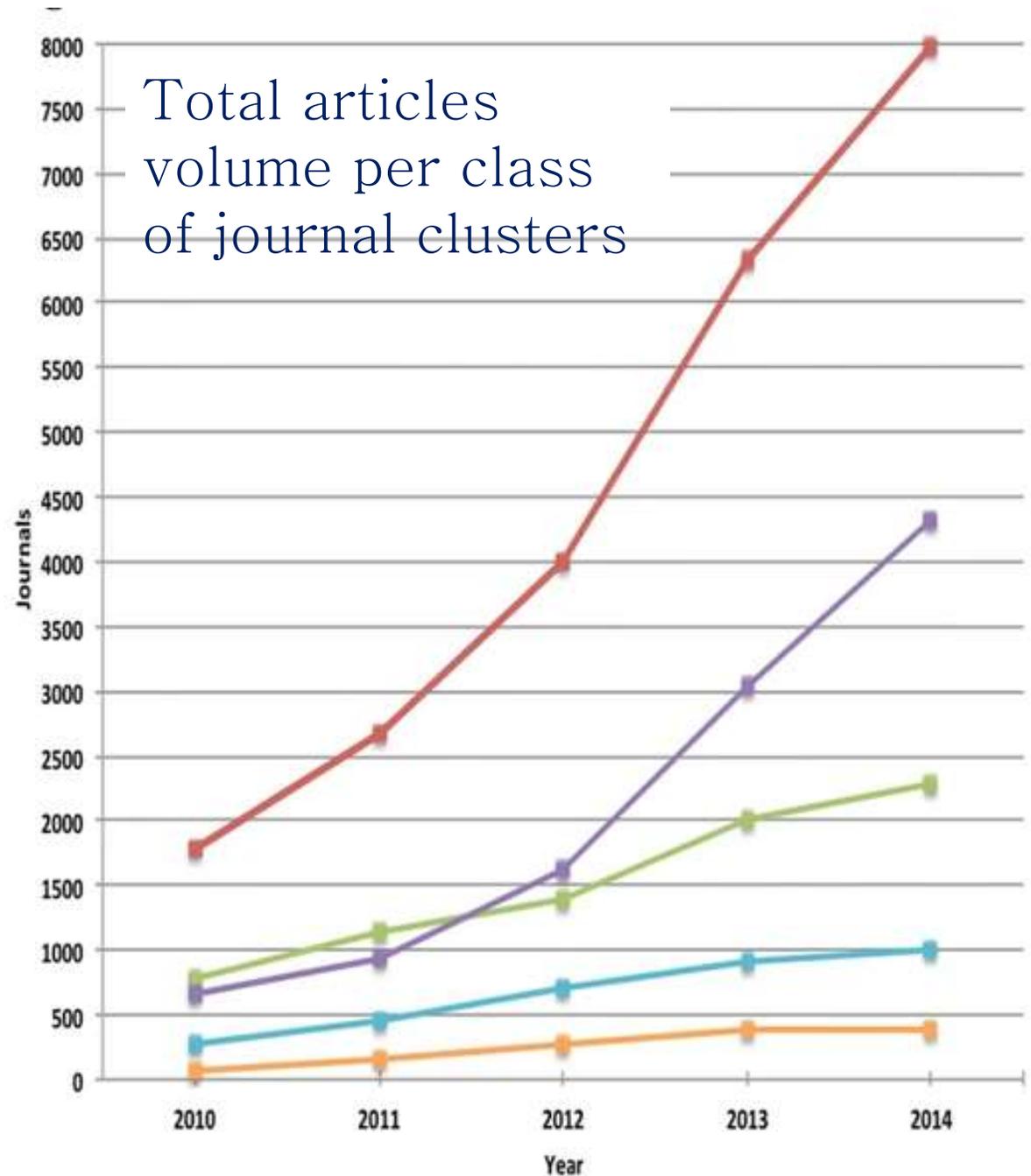
<https://beallslit.weebly.com/>

Beall was threatened by Omics  
International with a \$1billion  
lawsuit



Jeffrey Beall,  
librarian,  
University  
of Colorado,  
Denver

C. Shen and B.-C. Björk, “‘Predatory’ open access: a longitudinal study of article volumes and market characteristics,” BMC Med., vol. 13, no. 1, p. 230, Dec. 2015.



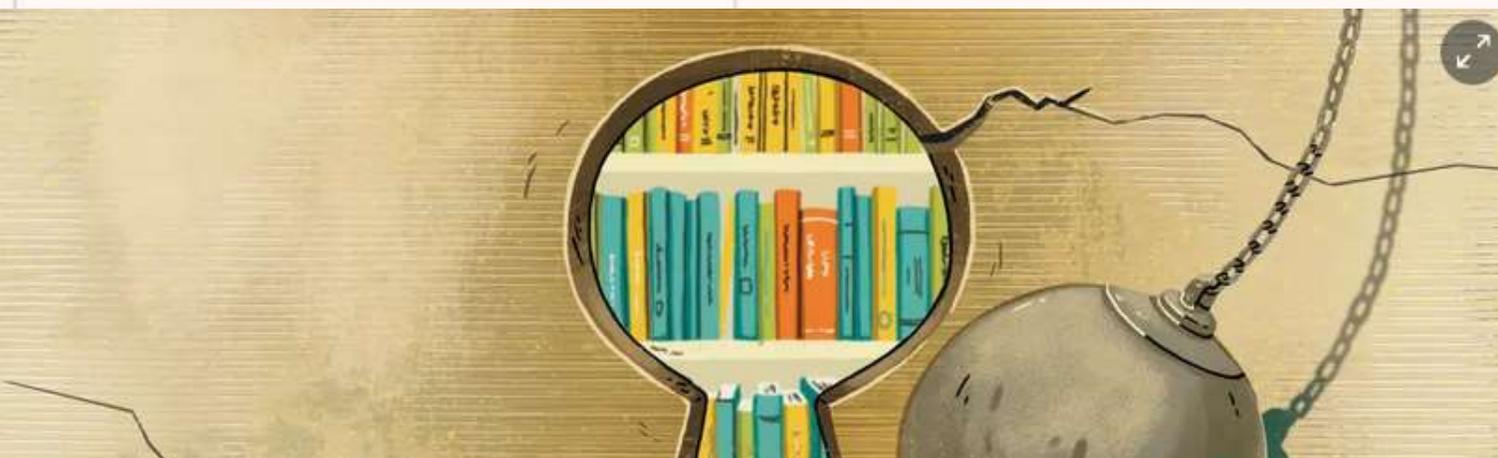
## Opinion

Peer review and scientific publishing

Thu 13 Sep 2018

Scientific publishing is a rip-off. We fund the research - it should be free

*George Monbiot*



Those who take on the global industry that traps research behind paywalls are heroes, not thieves





I. Graber-Stiehl, “Science’s pirate queen,” *Verge*, Feb-2018.



Kazakhstani scientist  
Alexandra Elbakyan



The long read

## Is the staggeringly profitable business of scientific publishing bad for science?

Elsevier profits 2010 = £724m on £2bn revenue: a 36% margin – higher than Apple, Google, or Amazon

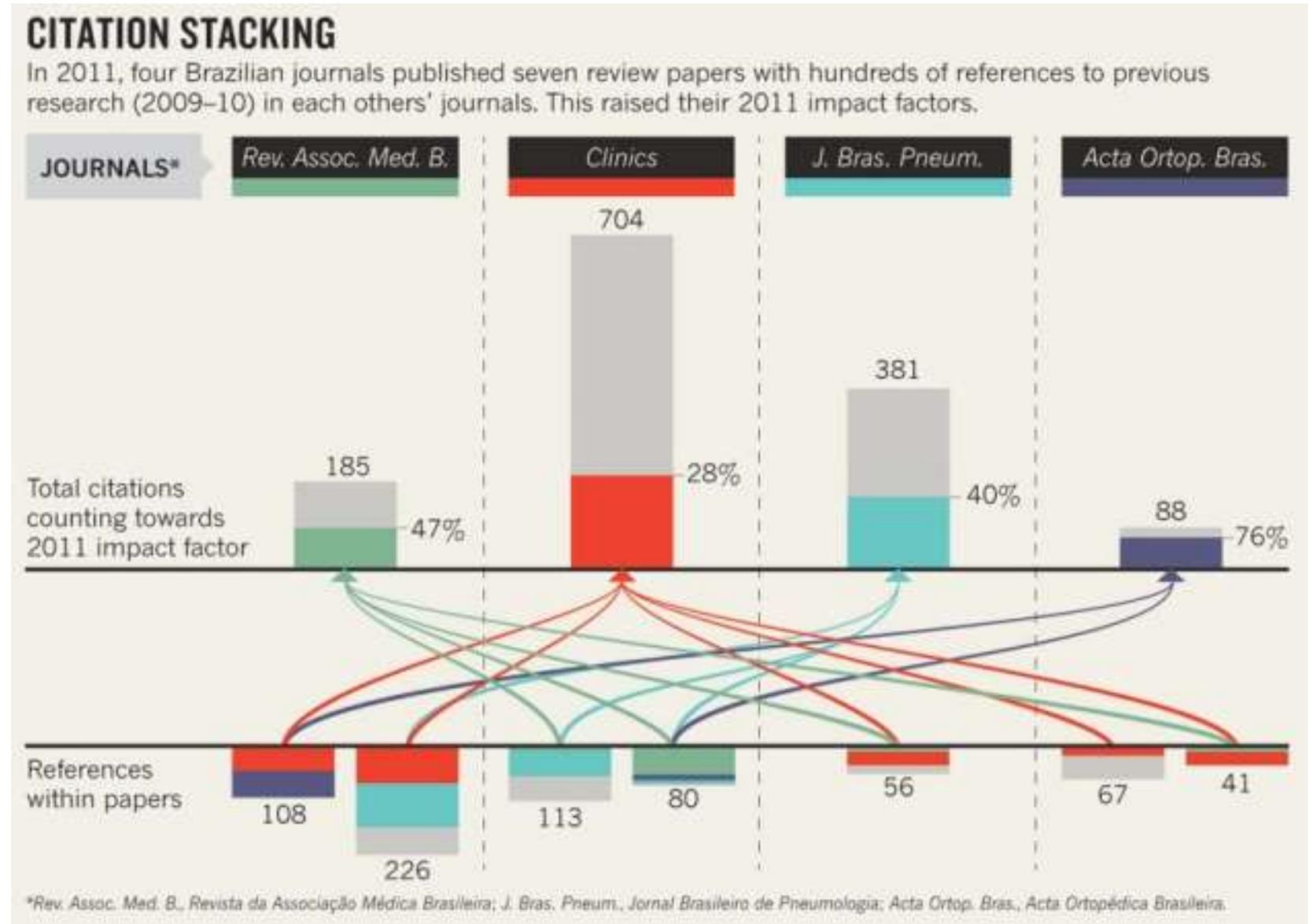
Stephen Buranyi, The Guardian, 27 Jun 2017.



A 2005 Deutsche Bank report referred to it as a “bizarre” “triple-pay” system, in which “the state funds most research, pays the salaries of most of those checking the quality of research, and then buys most of the published product”

Stephen Buranyi, The Guardian, 27 Jun 2017.

Use and abuse of metrics: from self-citation to citation cartels to citation stacking



Richard Van Noorden, 2017, Brazilian citation scheme outed. Thomson Reuters suspends journals from its rankings for 'citation stacking'. Nature, 27 August 2013

# Calls for change in the culture of metrics use

- San Francisco Declaration on Research Assessment (DORA)
- The Leiden Manifesto
- The Metric Tide
- Plan S and cOAlition S for open science
- ...

# The Metric Tide

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

**JAMES WILSDON**

July 2015

[http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/Independentresearch/2015/The,Metric,Tide/2015\\_metric\\_tide.pdf](http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/Independentresearch/2015/The,Metric,Tide/2015_metric_tide.pdf)

Note: this is part of Research Excellence Framework (REF)

San Francisco declaration, (2012), signed by 15006 individuals, and 1565 organizations (26/11/2019)

“Do not use journal-based metrics, such as Journal Impact Factor, as a surrogate measure of the quality of individual research articles to assess an individual scientist’s contributions, or in hiring, promotion, or funding decisions”

Declaration: <http://ascb.org/dora/> ; Lancet, Editorial, 2015, Rewarding true inquiry and diligence in research, 385, p. 2121; Wilsdon, J., 2015, We need a measured approach to metrics, Nature, 523, 129; See also <http://ethics-and-integrity.net/>

# How to Make More Published Research True (Ioannides 2014)

John P. A. Ioannides



“Modifications [ ] in the reward system for science, affecting the exchange rates for currencies (e.g., publications and grants) and purchased academic goods (e.g., promotion and other academic or administrative power) and **introducing currencies that are better aligned with translatable and reproducible research**”

Ioannidis, J. P. (2014). How to Make More Published Research True. PLoS medicine, 11(10), e1001747.

# The Peer Reviewers' Openness Initiative: incentivizing open research practices through peer review

---

Richard D. Morey<sup>1</sup>, Christopher D. Chambers<sup>1</sup>, Peter J. Etchells<sup>2</sup>, Christine R. Harris<sup>3</sup>, Rink Hoekstra<sup>4</sup>, Daniël Lakens<sup>5</sup>, Stephan Lewandowsky<sup>6,7</sup>, Candice Coker Morey<sup>8</sup>, Daniel P. Newman<sup>9</sup>, Felix D. Schönbrodt<sup>10</sup>, Wolf Vanpaemel<sup>11</sup>, Eric-Jan Wagenmakers<sup>12</sup> and Rolf A. Zwaan<sup>13</sup>

How peer reviewers might hold the key to making science more transparent

A new initiative published this week outlines how scientists can make a change to open science practices at an individual level



The Peer Reviewers' Openness (PRO) Initiative is a pledge: scientists who sign up to the initiative agree that

“will not offer to comprehensively review, or recommend the publication of, any scientific research papers for which the data, materials and analysis code are not publicly available”

How peer reviewers might hold the key to making science more transparent

A new initiative published this week outlines how scientists can make a change to open science practices at an individual level



# More recent initiatives



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## The Hong Kong Principles for Assessing Researchers: Fostering Research Integrity



**AUTHORS**  
David Moher, Lex Bouter, Sabine Kleinert, Paul Glasziou, Mai Har Sham, Virginia Barbour, Anne-Marie Coriat, Nicole Foeger, Ulrich Dirnagl

CREATED ON: September 17, 2019      LAST EDITED: November 23, 2019

Page: 1 of 21 Automatic Zoom

**1 The Hong Kong Principles for Assessing  
2 Researchers: Fostering Research Integrity**

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

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Alexa von Hagen has endorsed this work.

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Abstract

AI FOR BETTER SCIENCE



## Open Science, Open Data, and Open Scholarship: European Policies to Make Science Fit for the Twenty-First Century

*Jean-Claude Burgelman\*, Corina Pascu\*, Katarzyna Szkuta, Rene Von Schomberg, Athanasios Karalopoulos, Konstantinos Repanas and Michel Schouppe*

# More recent initiatives



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## **Conflict between Open Access and Open Science: APCs are a key part of the problem, preprints are a key part of the solution**

January 21st, 2020, David Mellor, Brian Nosek, Nicole Pfeiffer

Posted in [Scholarly Publishing](#)

# More recent initiatives



PROFESSIONAL

JOB

EVENTS

RANKINGS

STUDENT

AB



## Journal transparency index will be 'alternative' to impact scores

Center for Open Science project will pass judgment on journals' commitment to research transparency

January 29, 2020

By [Jack Grove](#)

Twitter: [@jgro\\_the](#)

# How about lotteries?





nature

NEWS • 20 NOVEMBER 2019

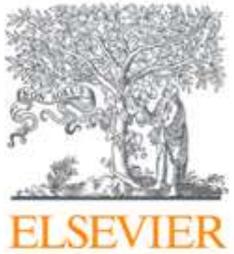
David Adam

## Science funders gamble on grant lotteries

A growing number of research agencies are assigning money randomly.



What can one learn from the Health Research Council of New Zealand?



## Research Policy

Volume 49, Issue 1, February 2020, 103831



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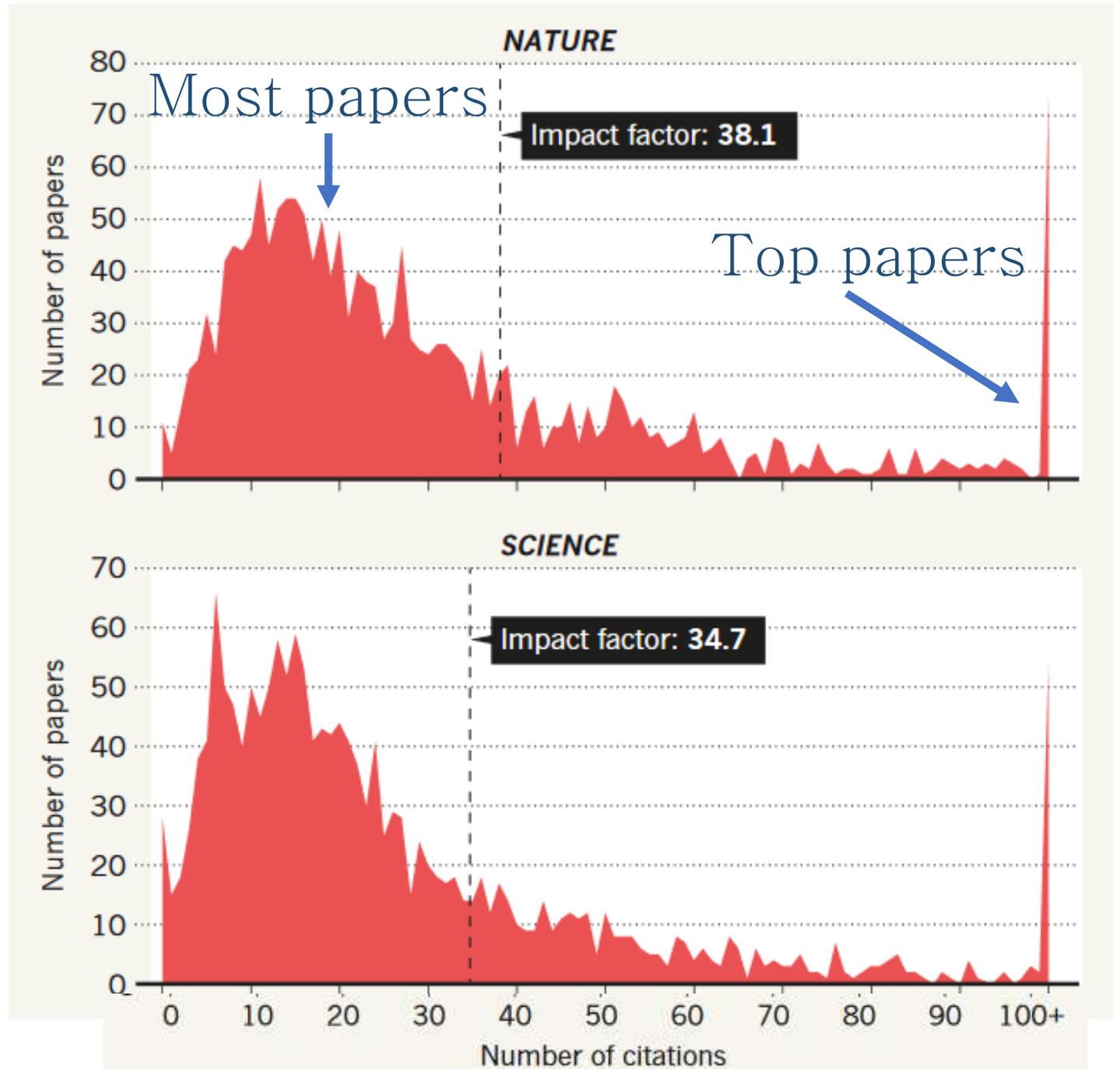
### How to avoid borrowed plumes in academia

Margit Osterloh  , Bruno S. Frey 

The impact factor is a misleading measure  
of the importance of an individual article.

The average paper is cited much less than the journal's impact factor

Source: E. Callaway, 2014  
Publishing elite turns against impact factor, Nature, 535, 210–211.



# Impact factors' resilience due to a combination of:

- Incumbents' support (by those up the ladder)
- Goodhart Law (misplaced goal, gaming the measure)
- Existing institutional bureaucracies



Research Policy

Volume 49, Issue 1, February 2020, 103831



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How to avoid borrowed plumes in  
academia

Margit Osterloh  , Bruno S. Frey 

A proposal based on the insight that uncertainty about future success is intrinsic to scholarly work



Research Policy

Volume 49, Issue 1, February 2020, 103831



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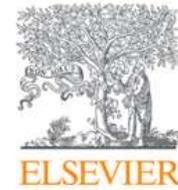
How to avoid borrowed plumes in academia

Margit Osterloh  , Bruno S. Frey 

Papers/project unanimously approved – published/accepted as such

Papers/project unanimously disliked – rejected

All the rest: lottery



Research Policy  
Volume 49, Issue 1, February 2020, 103831



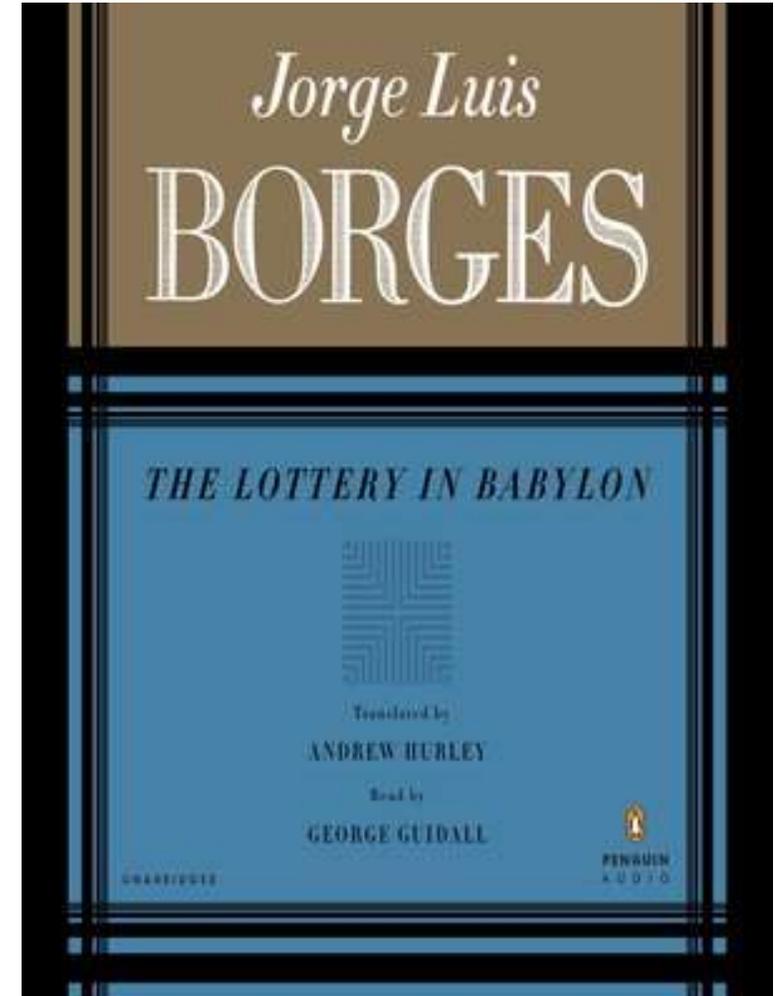
How to avoid borrowed plumes in academia [Margit Osterloh](#)  , [Bruno S. Frey](#) 

- Reduce conservative bias
- Encourage non orthodox submissions
- Reduce losers' disappointment
- Temper winners' hubris

Isn't the publishing / winning process  
already a lottery?



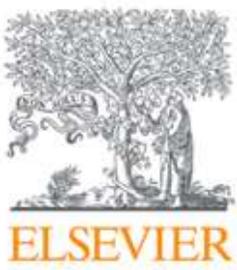
Adam Ruben, 2017,  
Another tenure-track  
scientist bites the dust,  
Science,  
<https://www.sciencemag.org/careers/2017/07/another-tenure-track-scientist-bites-dust>



Let's zoom out now and ...



Crisis in science?  
Surely you must be  
joking



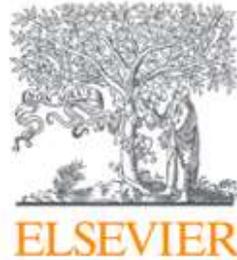
## Futures

Volume 91, August 2017, Pages 5-11



# What is science's crisis really about?

Andrea Saltelli <sup>a, b</sup>  , Silvio Funtowicz <sup>a</sup>



## Futures

Volume 104, December 2018, Pages 85-90



# Why science's crisis should not become a political battling ground

Andrea, Saltelli 

Failed replications, entire subfields going bad,  
fraudulent peer reviews, predatory publishers,  
perverse metrics, statistics on trial ...



Brow

 OPEN ACCESS

ESSAY

June 21, 2017

Why Most Clinical Research Is Not Useful

John P. A. Ioannidis 

Published: June 21, 2016 • <https://doi.org/10.1371/journal.pmed.1002049>

THE  
ECONOMIC  
JOURNAL



*The Economic Journal*, 127 (October), F236–F265. Doi: 10.1111/eoj.12461 © 2017 Royal Economic Society. Published by John Wiley & Sons, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA 02148, USA.

THE POWER OF BIAS IN ECONOMICS RESEARCH\*

*John P. A. Ioannidis, T. D. Stanley and Hristos Doucouliagos*

October 27, 2017

… misleading science advice, institutions on denial, a new breed of science wars

## Opinion: Is science really facing a reproducibility crisis, and do we need it to?

Daniele Fanelli

PNAS March 12, 2018. 201708272; published ahead of print March 12, 2018. <https://doi.org/10.1073/pnas.1708272114>



“The new “science is in crisis” narrative is not only empirically unsupported, but also quite obviously counterproductive”

The crisis is methodological,  
epistemological, ethical and  
metaphysical



COMMENT • 20 MARCH 2019

## Scientists rise up against statistical significance

*Valentin Amrhein, Sander Greenland, Blake McShane and more than 800 signatories call for an end to hyped claims and the dismissal of possibly crucial effects.*

Valentin Amrhein , Sander Greenland & Blake McShane



**nature**

International journal of science

Statistical wars?

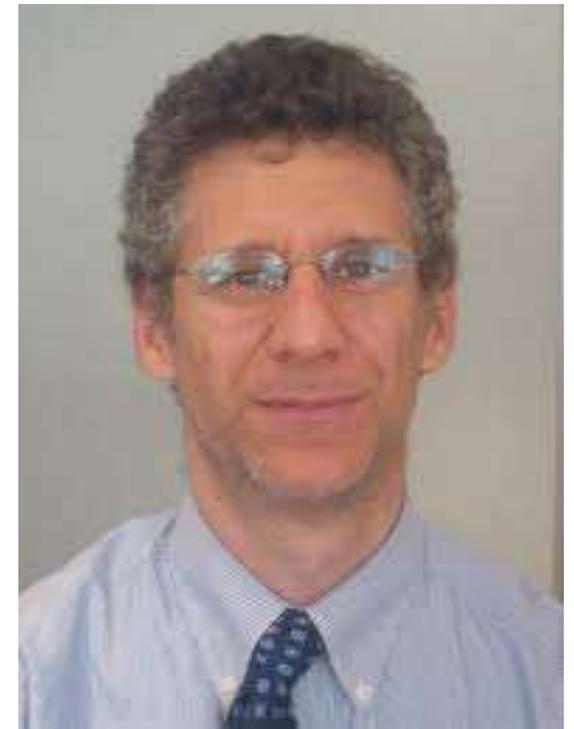
See the discussion on the  
blogs of Deborah Mayo

<https://errorstatistics.com/>

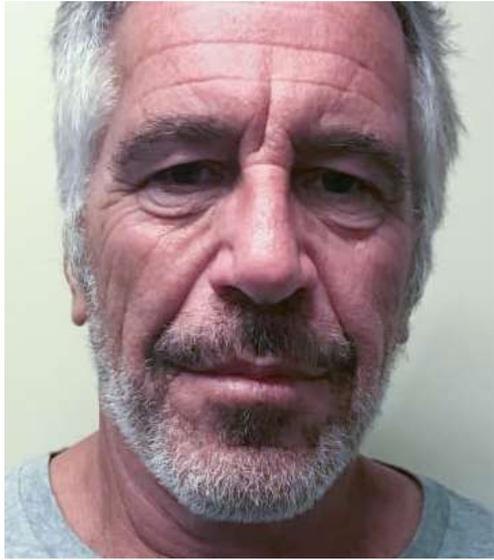
and

Andrew Gelman

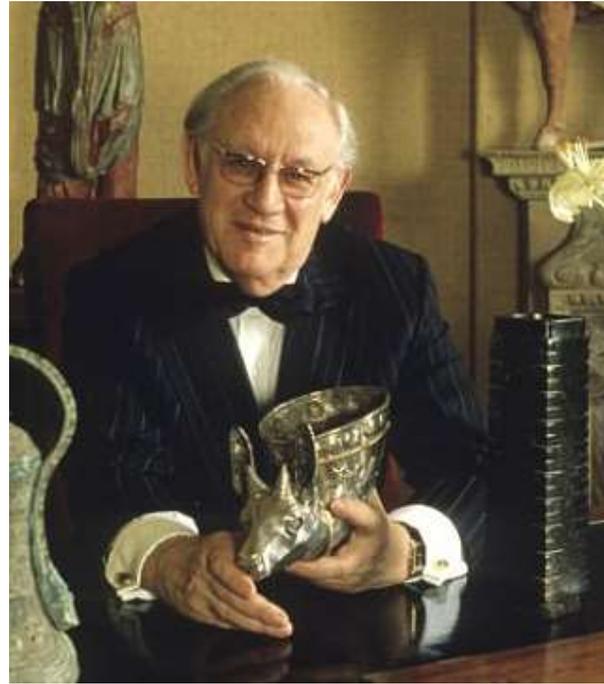
<https://statmodeling.stat.columbia.edu/>



Ethical issues?  
Tainted donations



Jeffrey Epstein  
& paedophilia



Sackler family  
& opioids



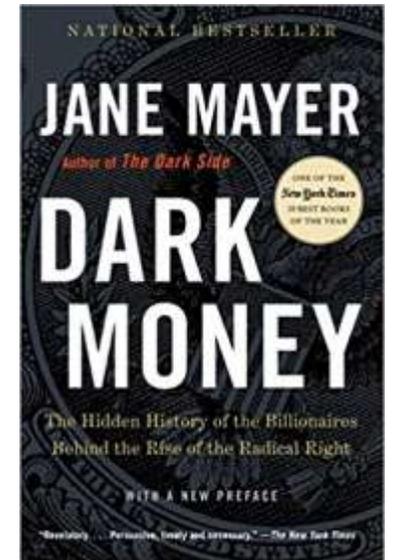
Koch brothers  
& climate

# How Rich Donors Like Epstein (and Others) Undermine Science

ADAM ROGERS

SCIENCE 09.15.2019 07:00 AM

WIRED



# Powerful drivers: the crisis will be worse before it can be better

Downloaded from <http://rsos.royalsocietypublishing.org/> on September 23, 2016

ROYAL SOCIETY  
OPEN SCIENCE

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

Research



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

2016 The natural selection of bad science.

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

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

Received: 1 June 2016

Accepted: 17 August 2016

## The natural selection of bad science

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

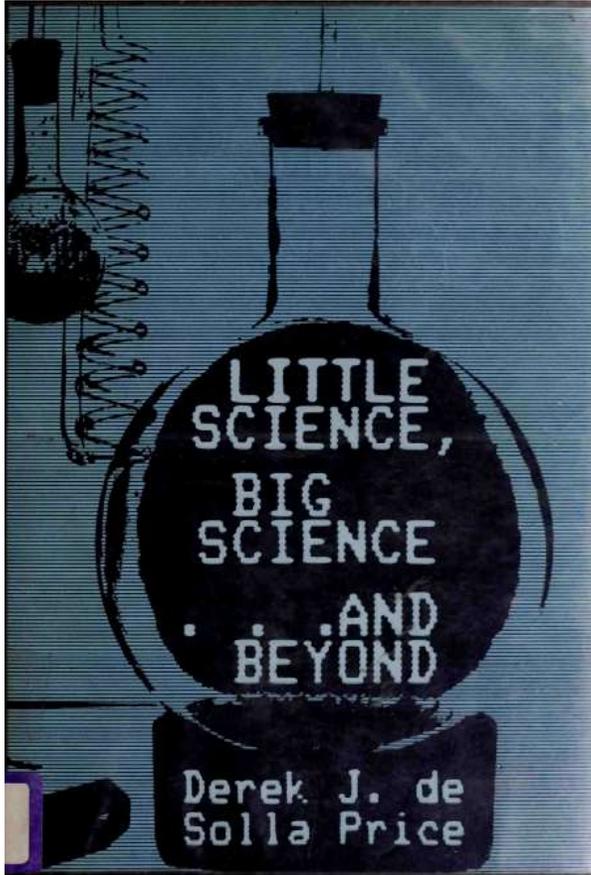
<sup>1</sup>Cognitive and Information Sciences, University of California, Merced, CA 95343, USA

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

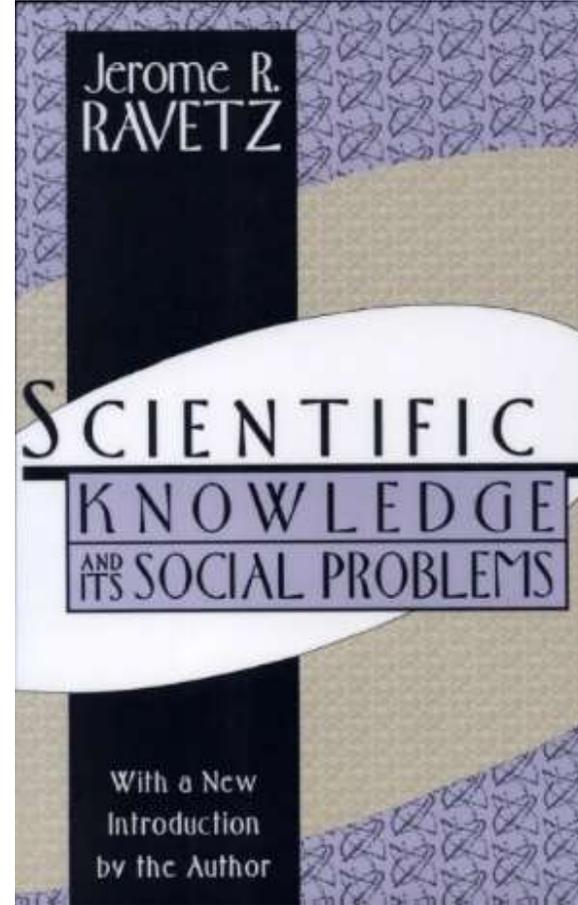
 PES, 0000-0002-7133-5620; RME, 0000-0002-0387-5377

Poor research design and data analysis encourage false-positive findings. Such poor methods persist despite perennial calls for improvement, suggesting that they result from something more than just misunderstanding. The persistence of poor methods results partly from incentives that favour them, leading to the natural selection of bad science. This dynamic requires no conscious strategizing—no deliberate cheating nor loafing—by scientists, only that publication is a principal factor for

# The crisis was predicted



Derek J. de  
Solla Price



Jerome R.  
Ravetz

de Solla Price, D.J., 1963, Little science big science, Columbia University Press;  
Ravetz, J., 1971, Scientific Knowledge and its Social Problems, Oxford University Press.

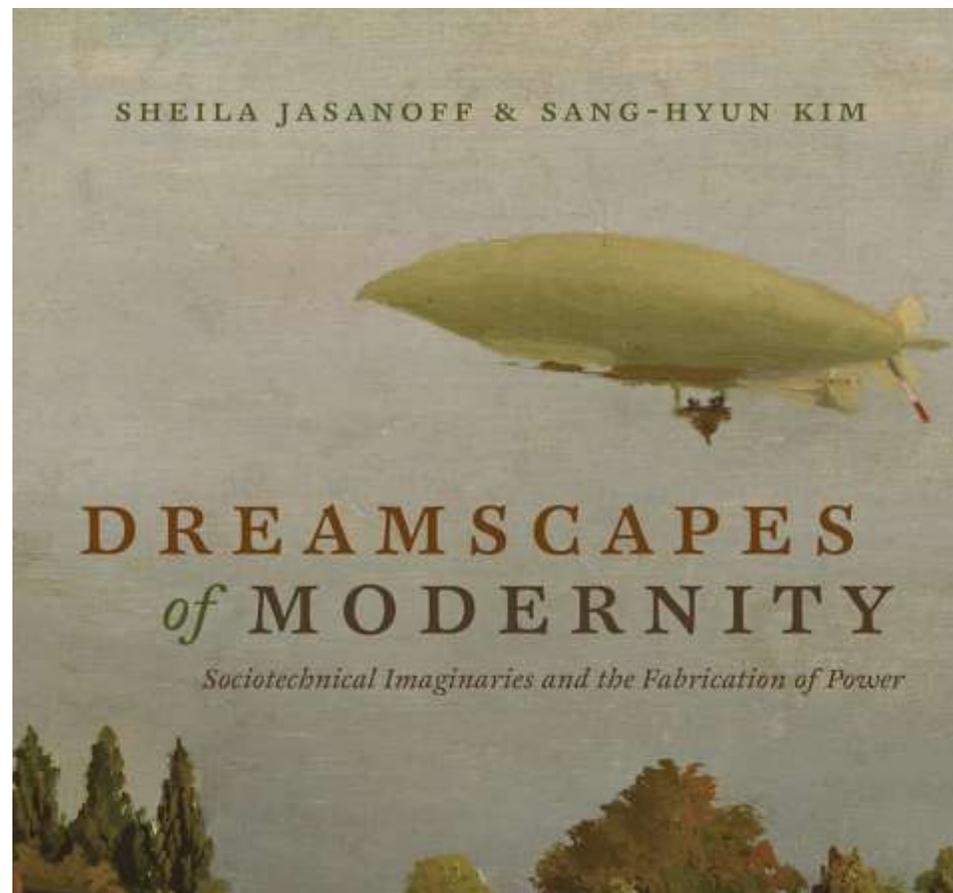
Evidence-based  
policy, expertise, use of  
quantification

“People in this country have had enough of experts” (M. Gove)

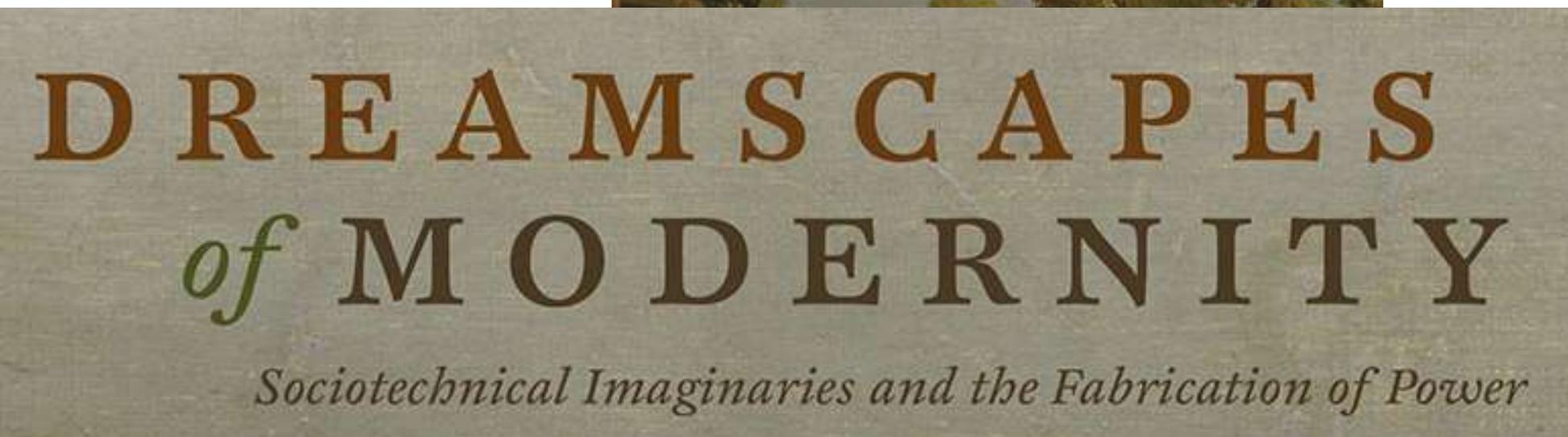


P. Stephens, Financial Times, June 23 2016, <https://www.ft.com/content/bfb5f3d4-379d-11e6-a780-b48ed7b6126f>

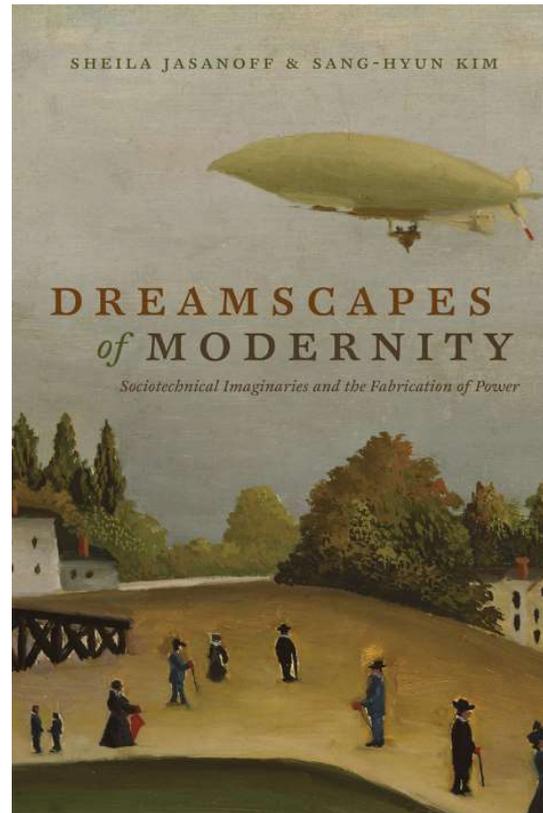
# Sociotechnical Imaginaries



Sheila Jasanoff



How visions of scientific and technological progress carry with them implicit ideas about public purposes, collective futures, and the common good



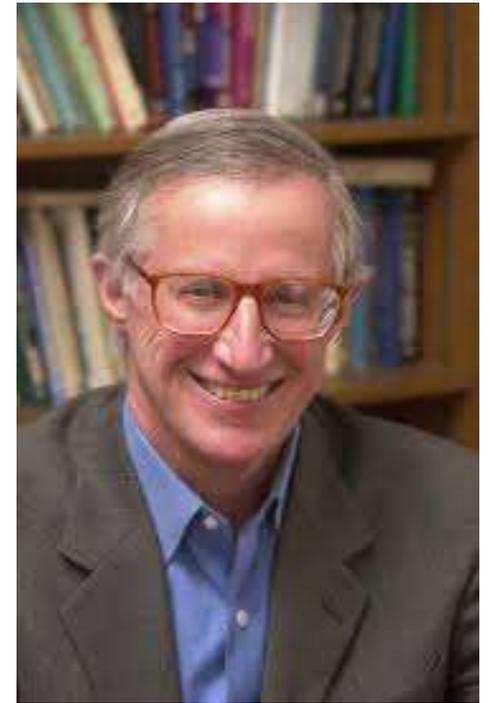
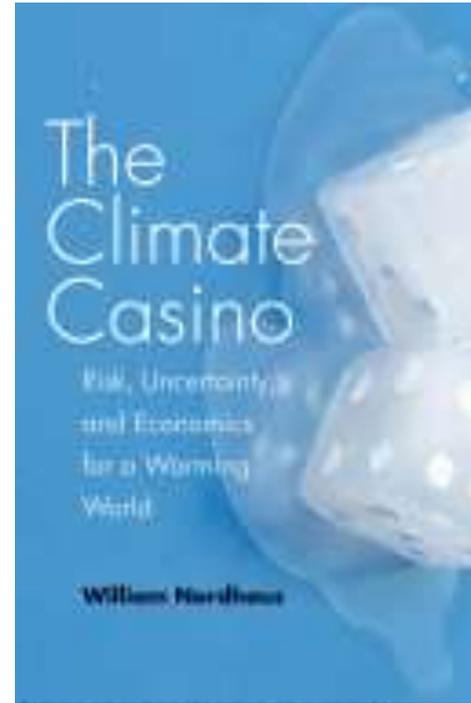
Sheila Jasanoff

“Often, immersion in the facts makes value disagreements feel much less relevant” (Cass Sunstein, winner of the 2018 Holberg Prize )



One of the winner of Nobel prize for economics 2018 is **Willem Nordhaus**, for his work on the economics of climate change.

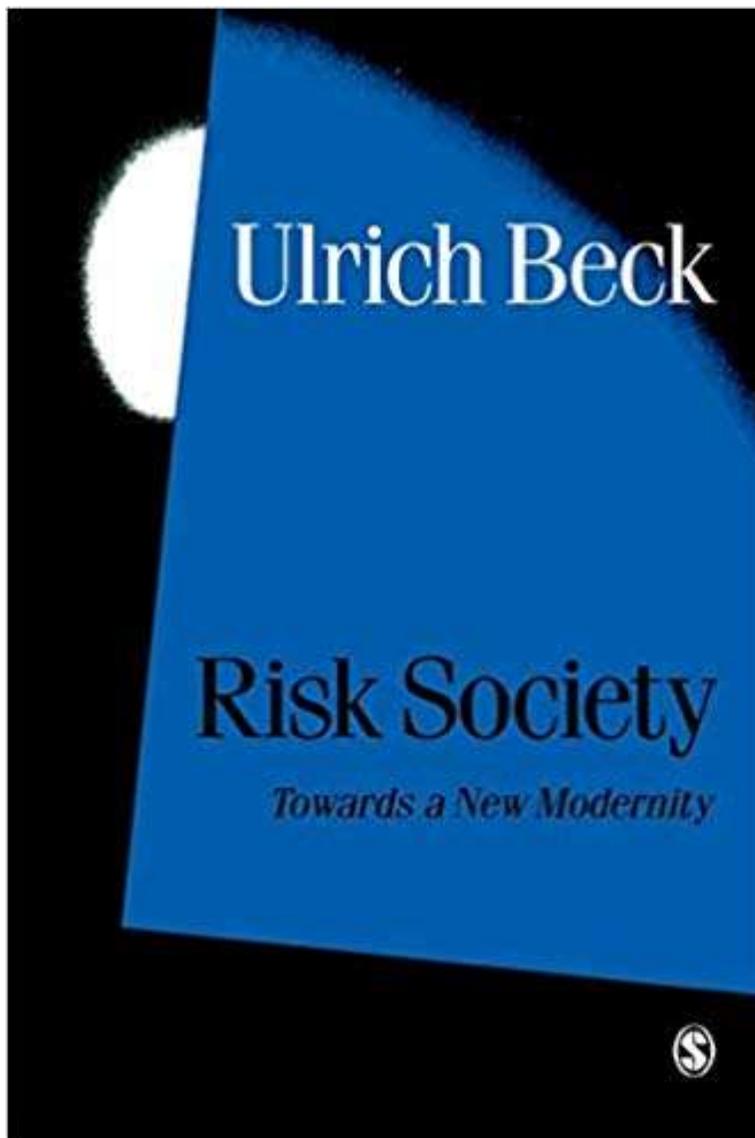
Cost benefit analysis to the year 2100



# Critical voices



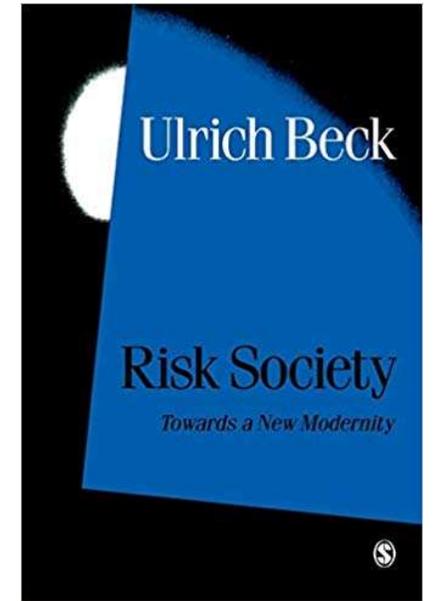
Ulrich Beck  
(1944 –2015)



1992 (1986)

## Chapter 7 Science beyond truth and enlightenment

- “The differentiation and complexification of the sciences transforms it into a “self service shops for financially well endowed customers in need of arguments.”
- “It is not uncommon for political programs to be decided in advance simply by the choice of what expert representatives are included in the circle of advisers.”
  - The technique is never neutral



EVIDENCE,  
ARGUMENT, &  
PERSUASION IN  
THE POLICY  
PROCESS  
GIANDOMENICO  
MAJONE

“The technique is never neutral”

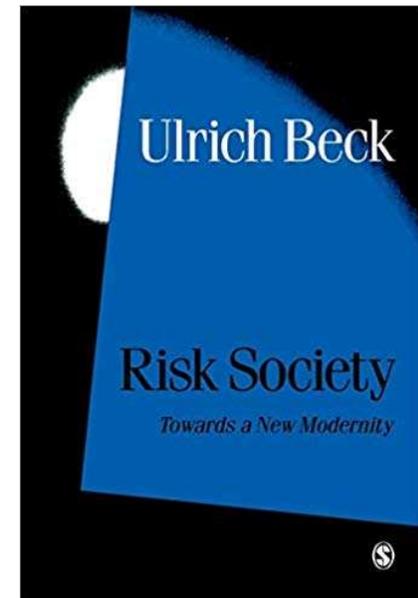
Majone: “In any area of public policy the choice of instruments, far from being a technical exercise that can be safely delegated to the experts, reflects as in a microcosm all the political, moral, and cultural dimensions of policy-making”

## Chapter 7 Science beyond truth and enlightenment

– Feudalization of cognitive practices

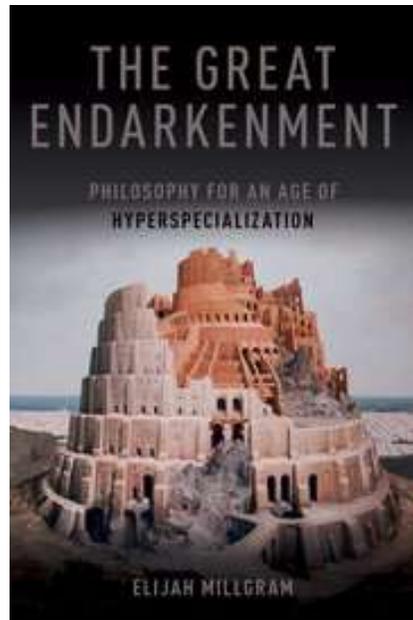
“In developed civilizations, scientific cognitive practice becomes an *implicit, objectivized manipulation of latently political variables, hidden behind the pretence of elective decision not subject to justification.*”

→ On transforming a political problem into a technical one

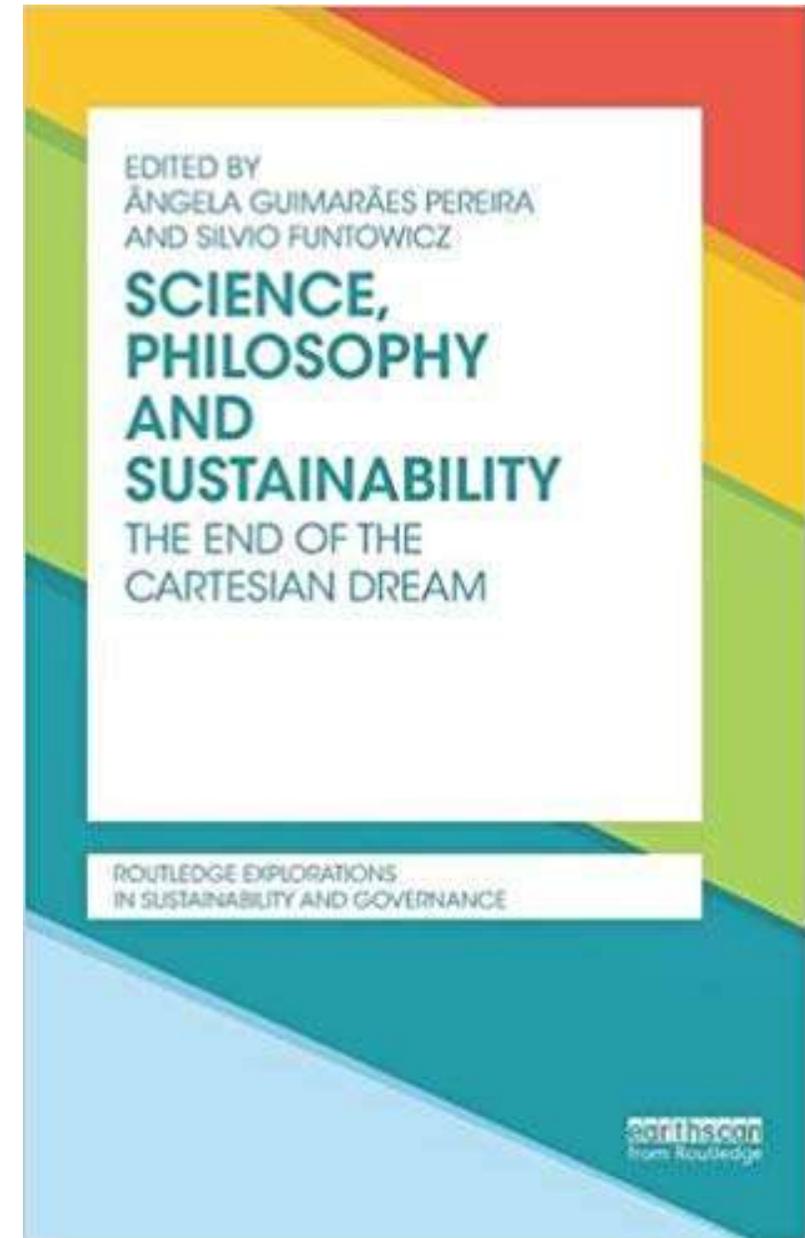




Elijah Millgram: warns against “procedural utopia”, a machinery to take the right decision based on a set of logical rules and methods.



A Cartesian dream?



<<[...] rhetoric clamour [surrounds]  
'expected utility', 'decision theory',  
'life cycle assessment', 'ecosystem  
services' 'sound scientific decisions'  
and 'evidence-based policy'



Andrew Stirling

Each technique routinely delivers its  
answers with formidable levels of  
precision. Yet the resulting impression  
of accuracy is deeply misplaced >>

<https://steps-centre.org/blog/how-politics-closes-down-uncertainty/>



# Futures

Volume 91, August 2017, Pages 62-71



Original research article

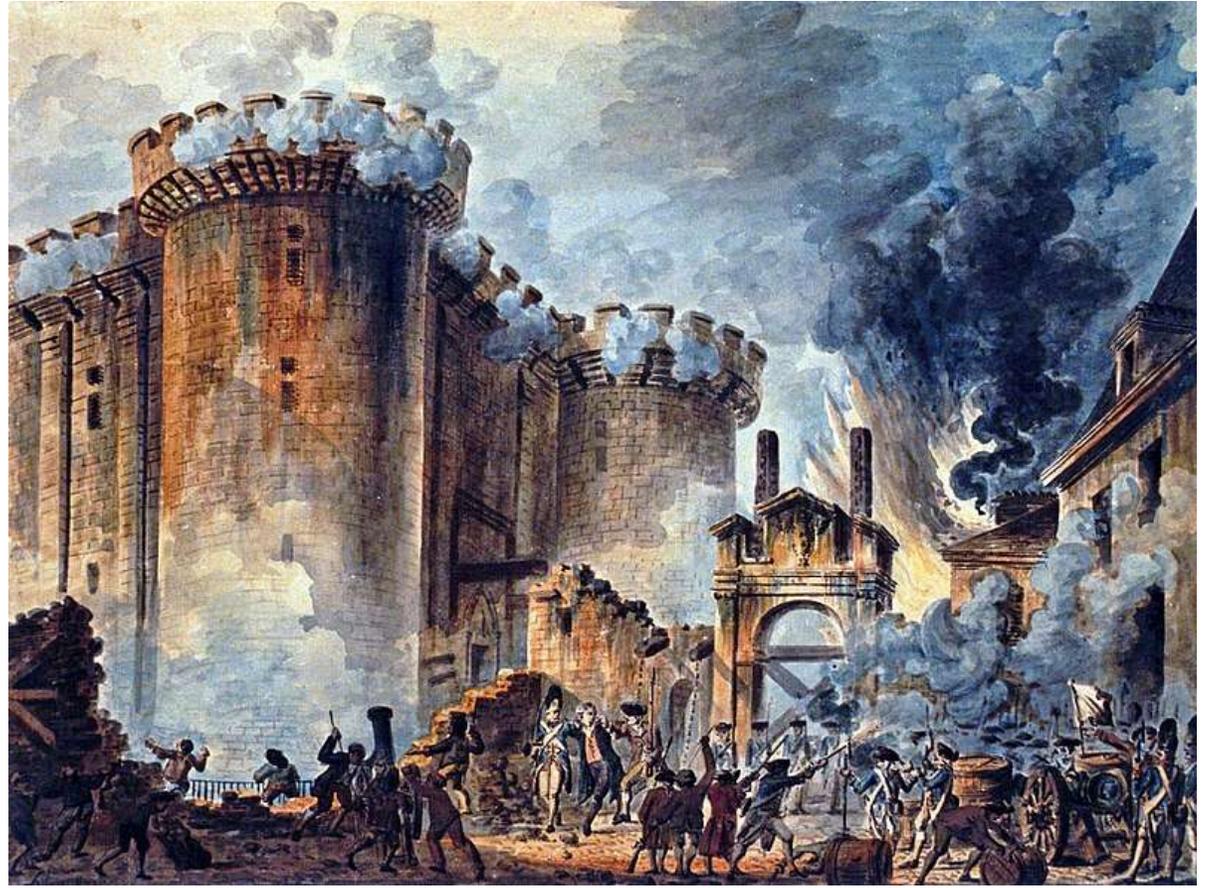
## What is wrong with evidence based policy, and how can it be improved?

Andrea Saltelli<sup>a, b, c</sup>  , Mario Giampietro<sup>a, c, d</sup>

# Highlights

- The closure of any issue in a pre-established frame used for quantification may correspond to normative and political stances.
- The use of mathematical modelling and indicators conveys a spurious impression of precision, prediction and control.
- Better styles of evidence based policy should flag the existence of 'uncomfortable knowledge' usually avoided in policy discussions.

“Uncomfortable knowledge” can be used test for Ancien Régime (Silvio Funtowicz and Jerome R. Ravetz, EMERGENT COMPLEX SYSTEMS, Futures 1994 26(6) 568–582)



# More on quantification

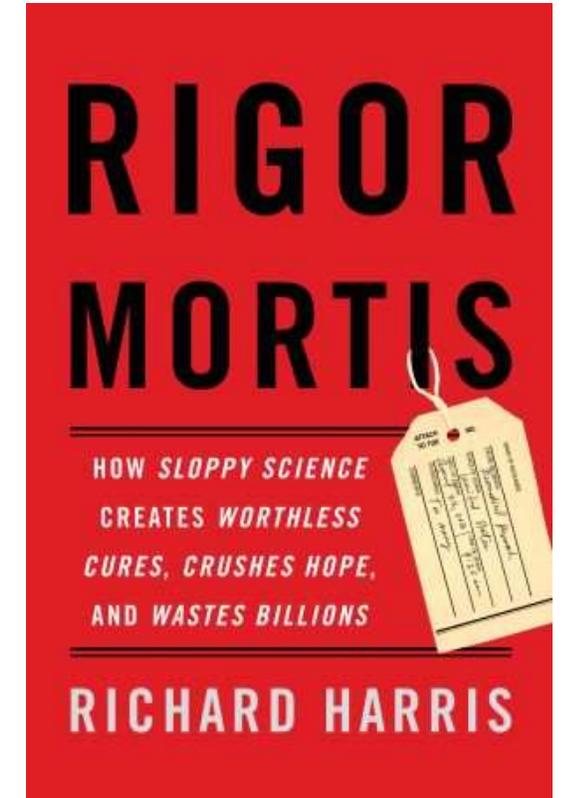
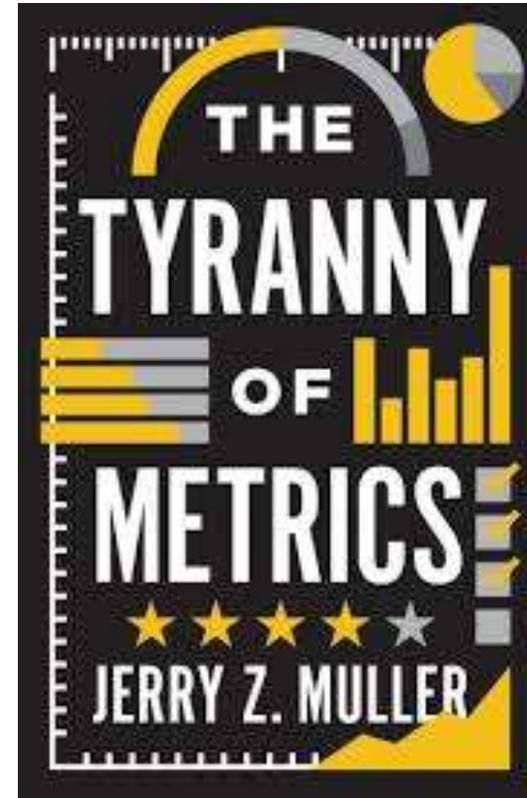
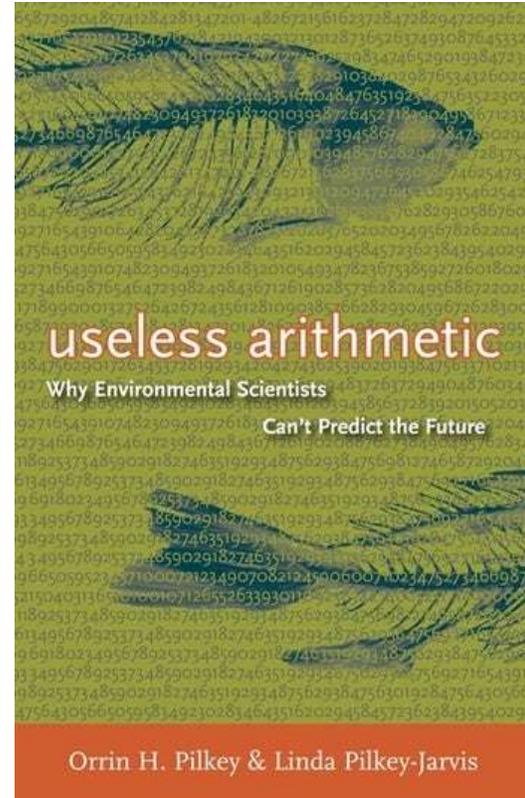
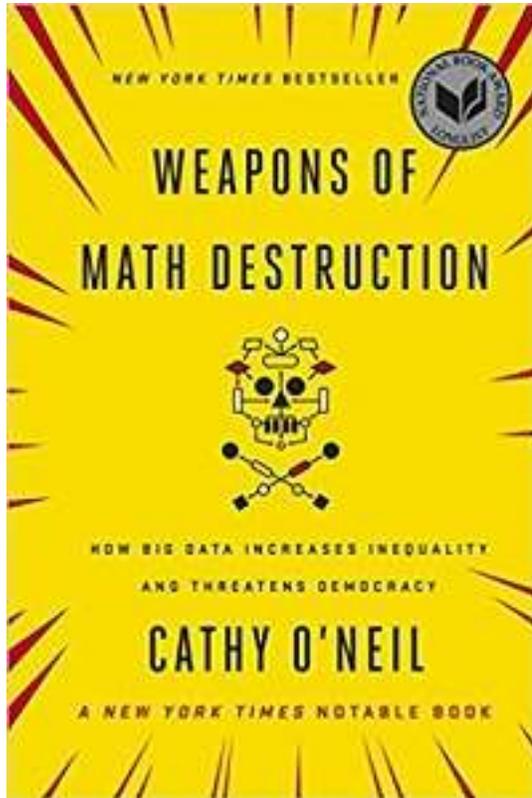
“What qualities are specific to rankings, or indicators, or models, or algorithms?”



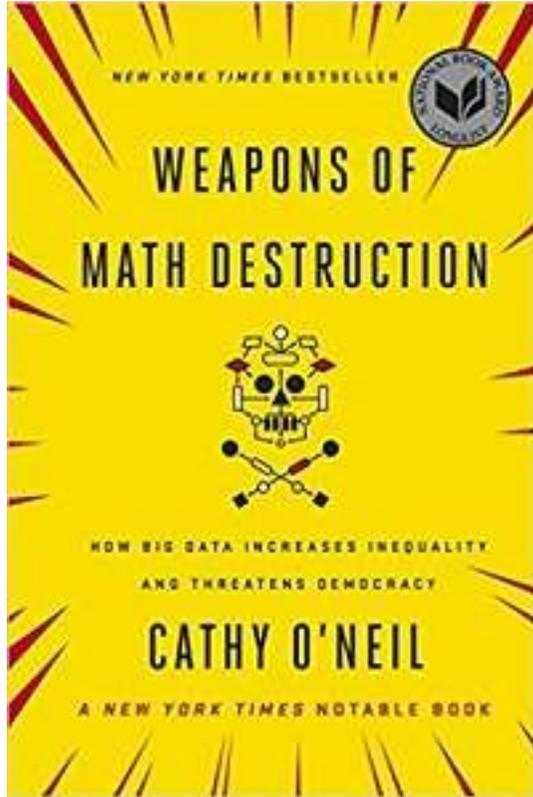
E. Popp Berman

Popp Berman, E. & Hirschman, D. The Sociology of Quantification: Where Are We Now? *Contemp. Sociol.* 47, 257–266 (2018).

# Algorithms, models, metrics, statistics

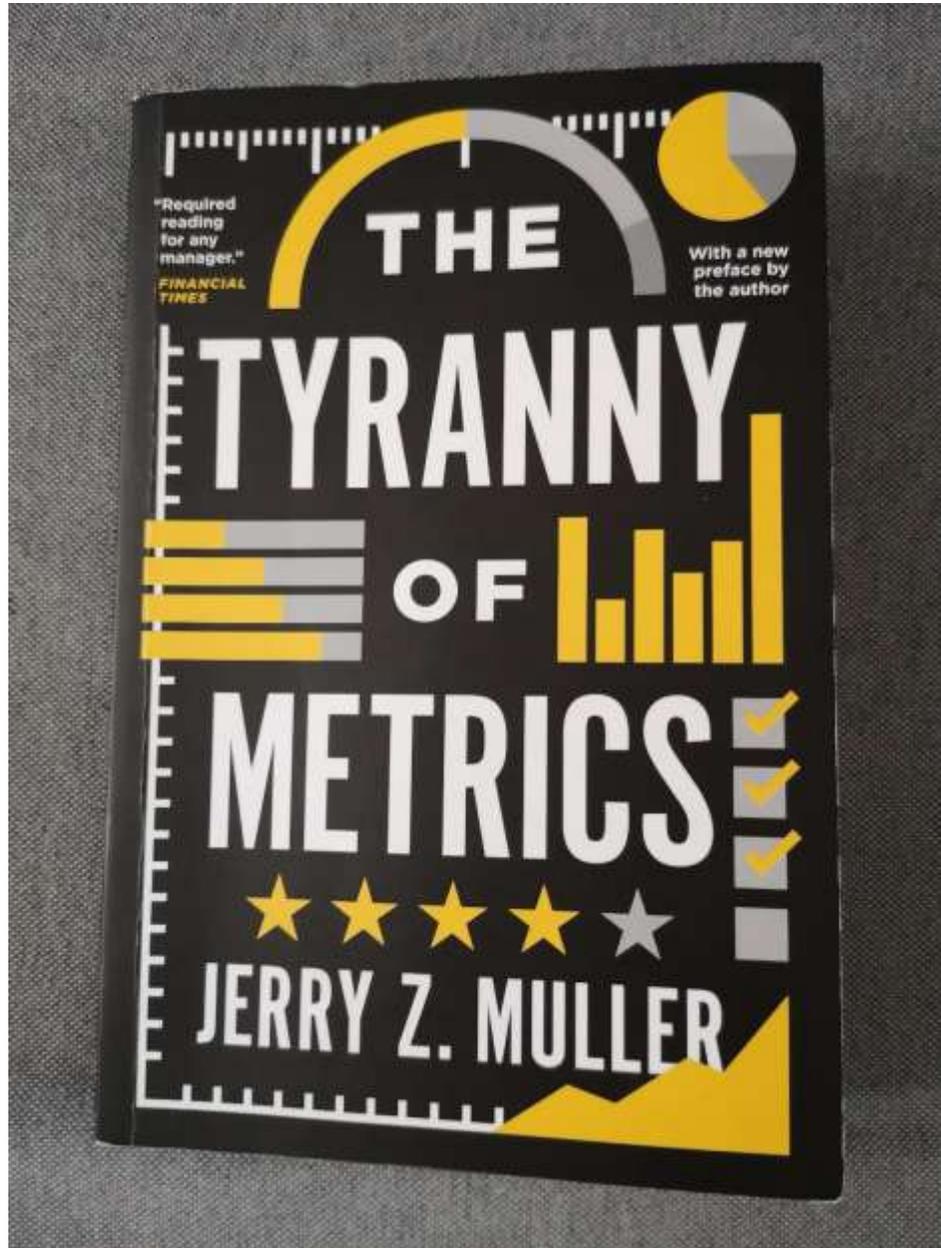


Common root causes?



Cathy O'Neil

Algorithms taking decisions about hiring and careers; adjudicating the custody of minors; approving or denying credits; choosing which neighbourhoods to patrol; whom to free on parole, and more

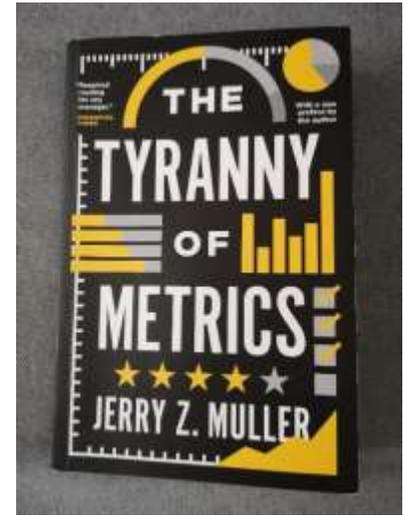


# The case against metrics

J. Z. Muller, *The tyranny of metrics*.  
Princeton University Press, 2018.

Metric fixation, or the irresistible pressure to measure performance

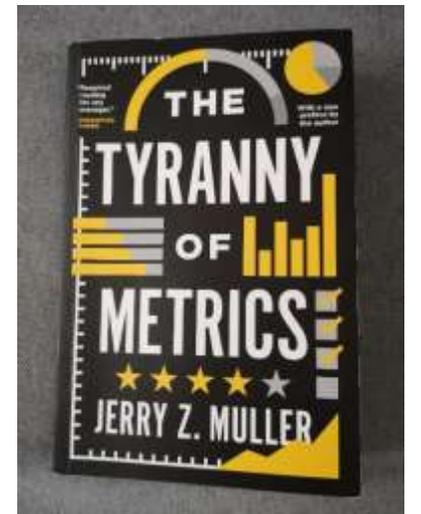
A wealth of case studies from education to war to medicine to foreign aid..



# Critiques of metrics

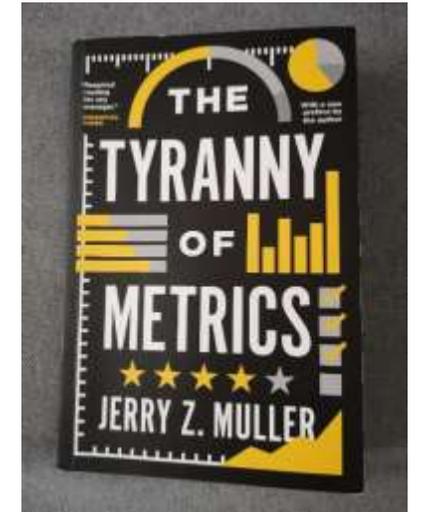
From the left: metric fixation promotes deskilling; “The calculative is the enemy of the imaginative”

From the right (Friedrich Hayek):  
metric fixation reproduces features of  
the soviet system (See Alain Supiot)



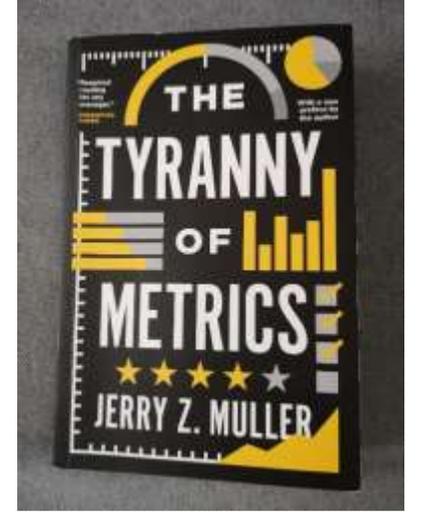
# Critiques of metrics

An epistemological critique: metrics privilege abstract and formulaic knowledge against practical and tacit knowledge (Michael Polanyi)



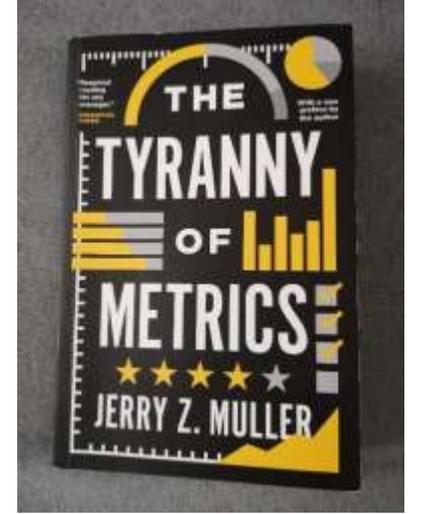
(Greek concept of metis)

# Unintended consequences: a litany (1)



- Goal displacement
- Short termism
- Diminishing utility
- Rewarding luck
- Discouraging cooperation and common purpose

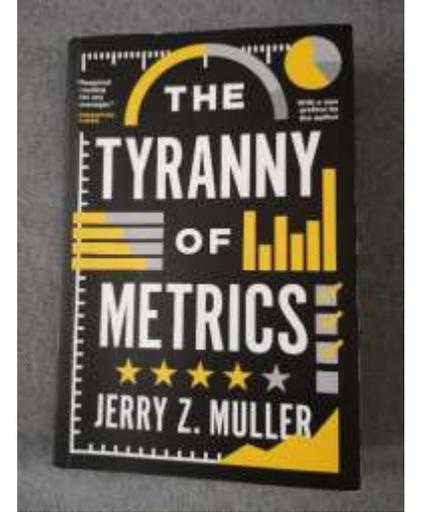
# Unintended consequences: a litany (2)



- Rule cascade
- Discouraging risk taking
- Discouraging innovation
- Degrading work
- Time waste
- Loss of productivity

A concluding remarks of Muller

Considering all of the above keep in mind at every step that “the best use of metrics may be not to use it at all”



Ethics of quantification  
or quantification of  
ethics?



# Futures

Volume 116, February 2020, 102509



Essays

## Ethics of quantification or quantification of ethics?

Andrea Saltelli

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<https://doi.org/10.1016/j.futures.2019.102509>

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Theodore M. Porter

# TRUST IN NUMBERS

The Pursuit  
of Objectivity  
in Science and  
Public Life

Alain Supiot

La Gouvernance  
par les nombres

*Cours au Collège de France  
(2012-2014)*



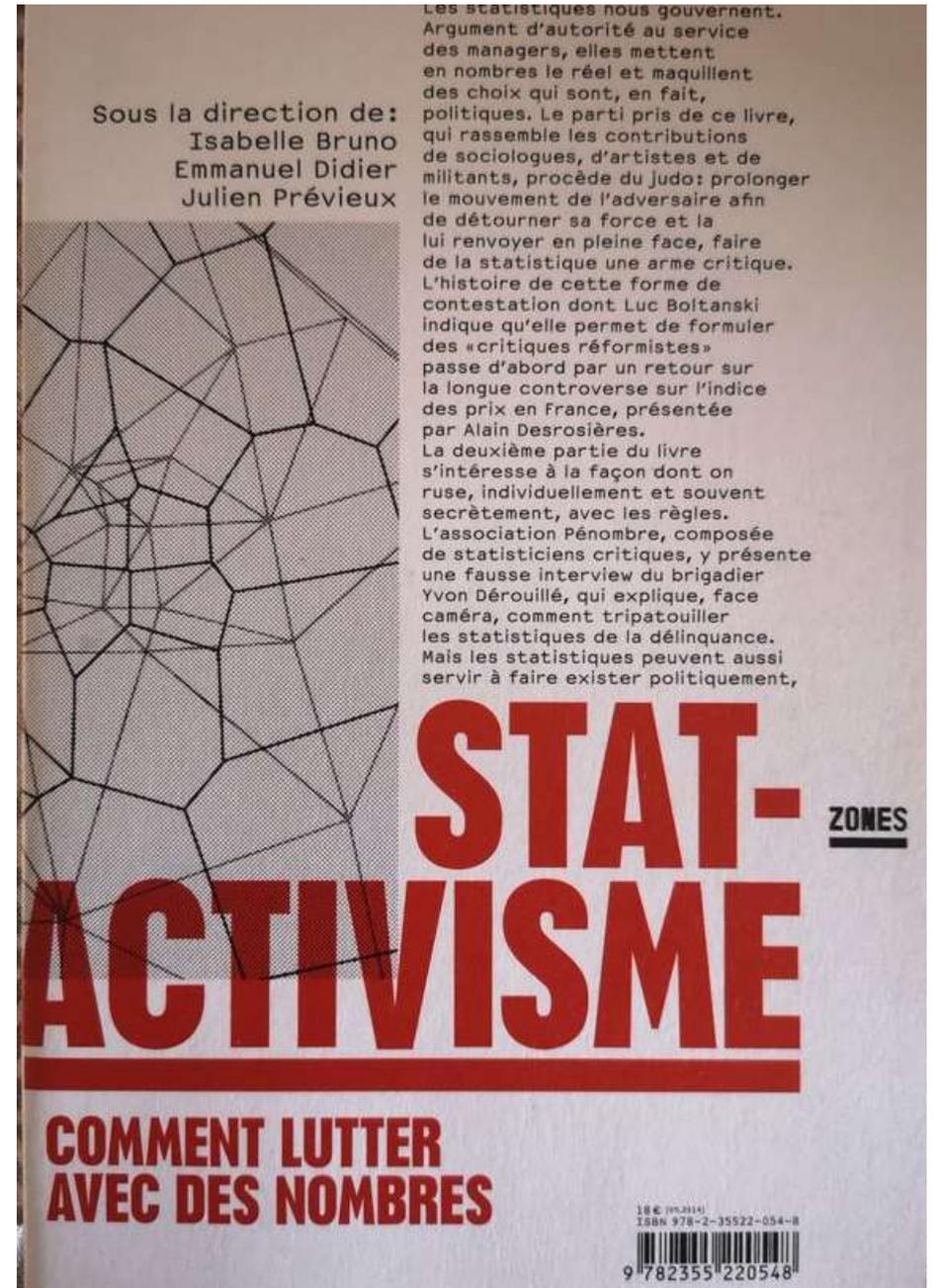
FAYARD  
POIDS ET MESURES  
DU MONDE

Can we learn  
something from  
sociology of  
numbers?

From law?

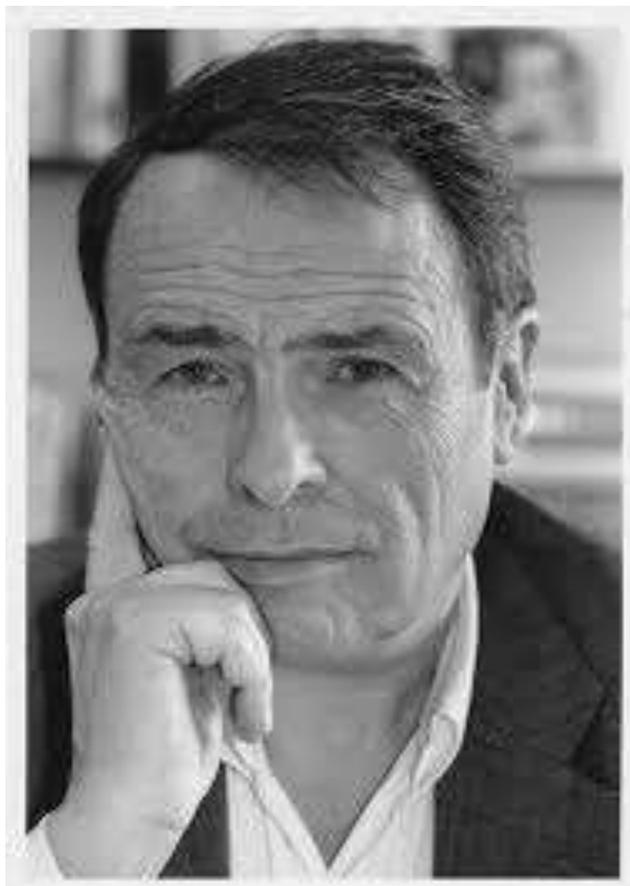
# Do we need a movement of resistance?

I. Bruno, E. Didier, and J. Prévieux, Stat-activisme. Comment lutter avec des nombres. Paris: Zones, La Découverte, 2014



# How to be a "statactiviste"?

1. Deconstruct existing metrics, including using irony (Pierre Bourdieu, *Les héritiers*)



La sociologie,  
ça doit être  
rigolo

(Sociology must be fun)



# How to be a "statactiviste"?

2. Gaming metrics (statistical judo) – use Goodhart's law to your advantage – or make the ruse public

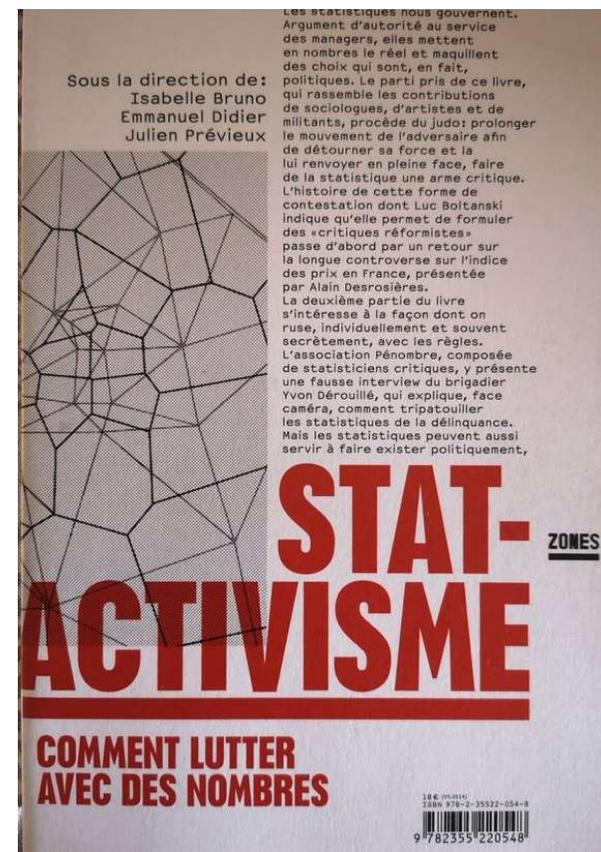
- Police statistics in NY



## How to be a "statactiviste"?

3. Bring to the surface what is hidden / unsaid/ excluded – new social classes, marginalization, minorities:

- ‘Creative class’ or ‘precarious intellectuals’?



# How to be a "statactiviste"?

## 4. Measure something different

- Suicides at France Telecom;
- BIP 40, a new French measure of poverty/inequality

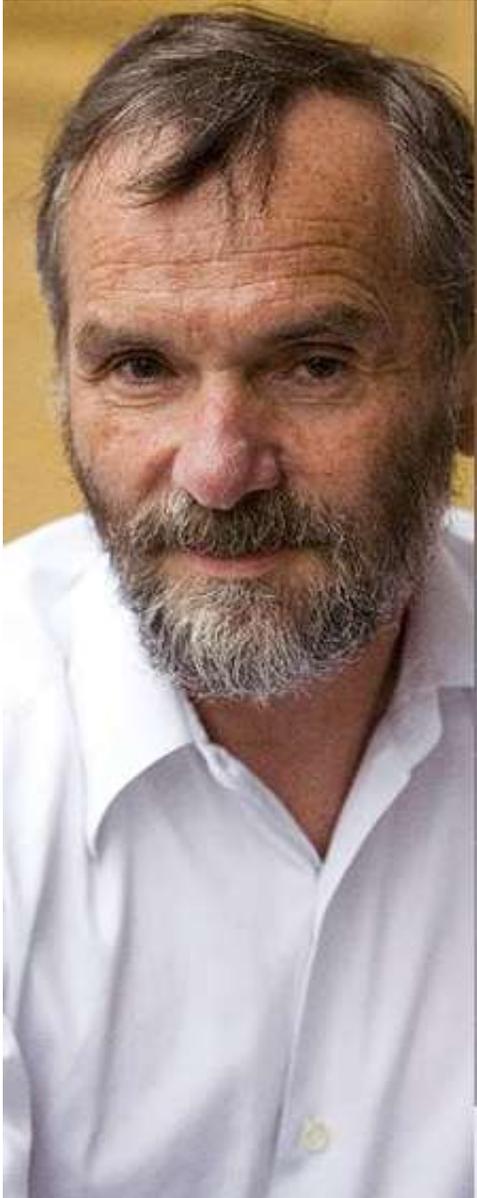


# Important:

“Quantification should not be abandoned to the advantage of exalting qualities, singularities, and the incommensurable. Such an abandon would be a tactical error”



Alain Supiot

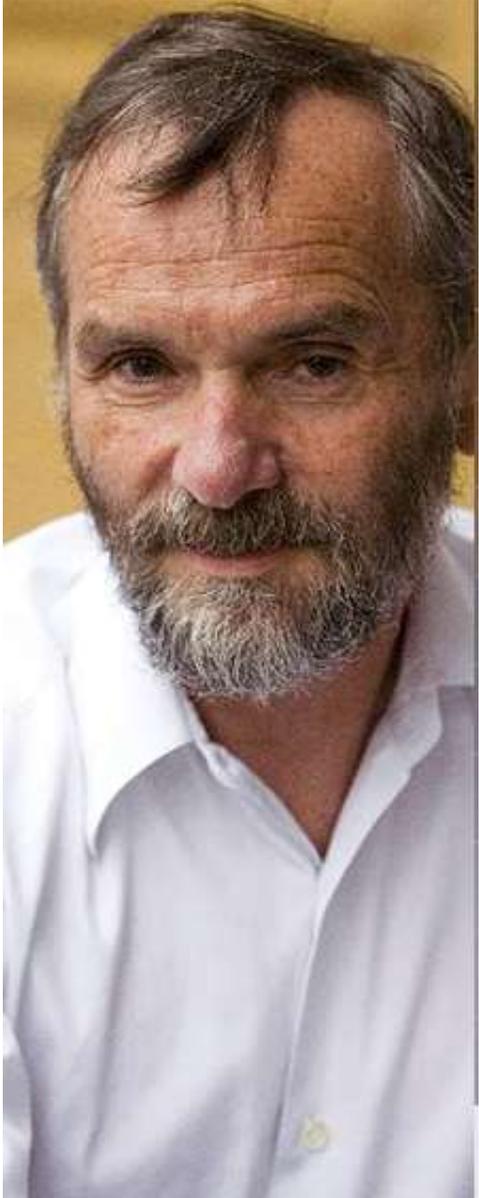


An indictment of  
the Total Market  
and the normative  
uses of economic  
quantification

<https://www.college-de-france.fr/site/en-alain-supiot/Governance-by-Numbers-Introduction.htm>

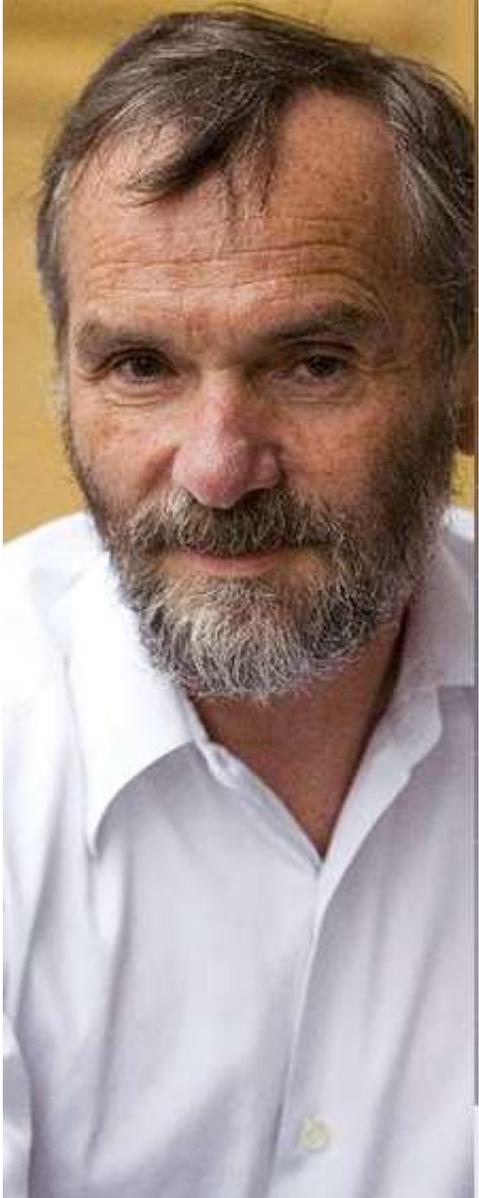


# Alain Supiot



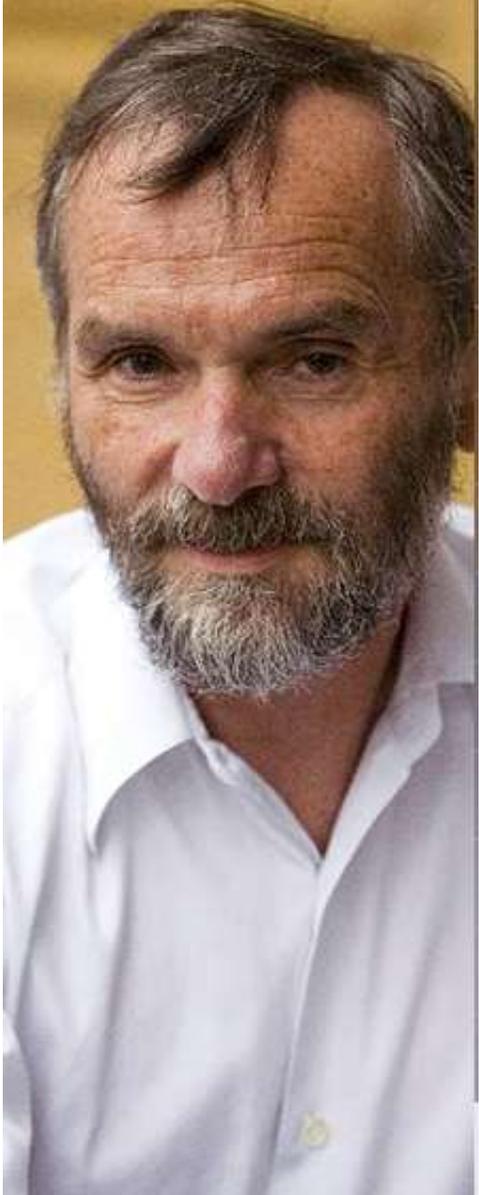
...we have entered the era of the cybernetic imaginary, which revives the West's age-old dream of grounding social harmony in calculations

# Alain Supiot



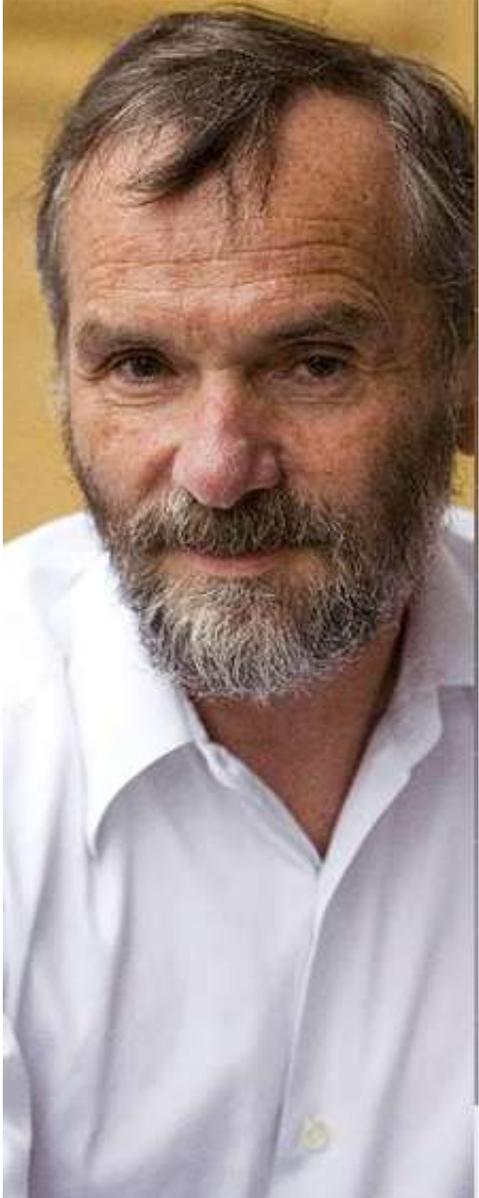
...In this passage from the mechanical (Taylorian) imaginary to the cybernetic lies the origin of multiple interconnected crises

Alain Supiot



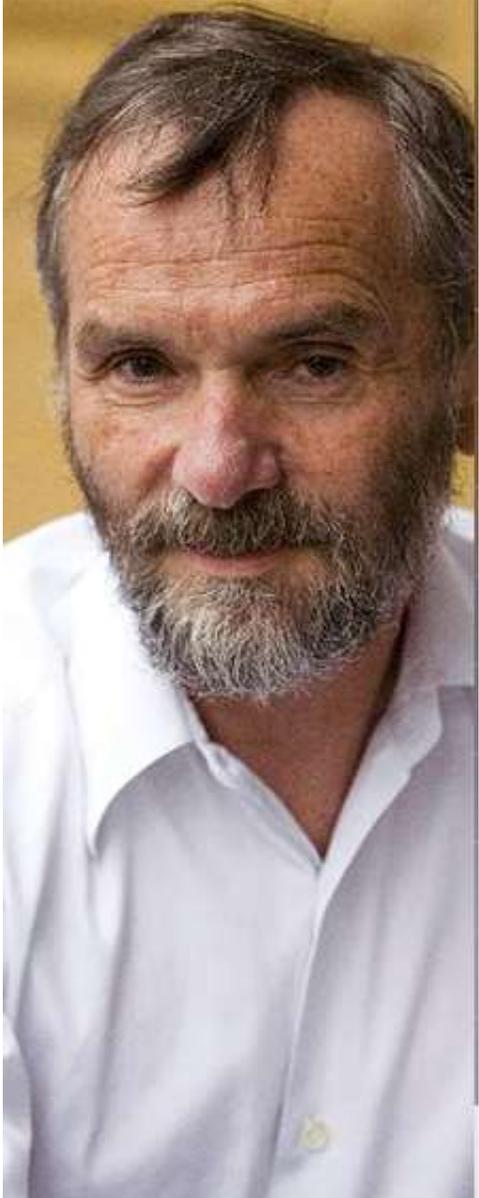
Repudiating the goal of governing by just laws, this new discourse advocates in its stead the attainment of measurable objectives ...

Alain Supiot

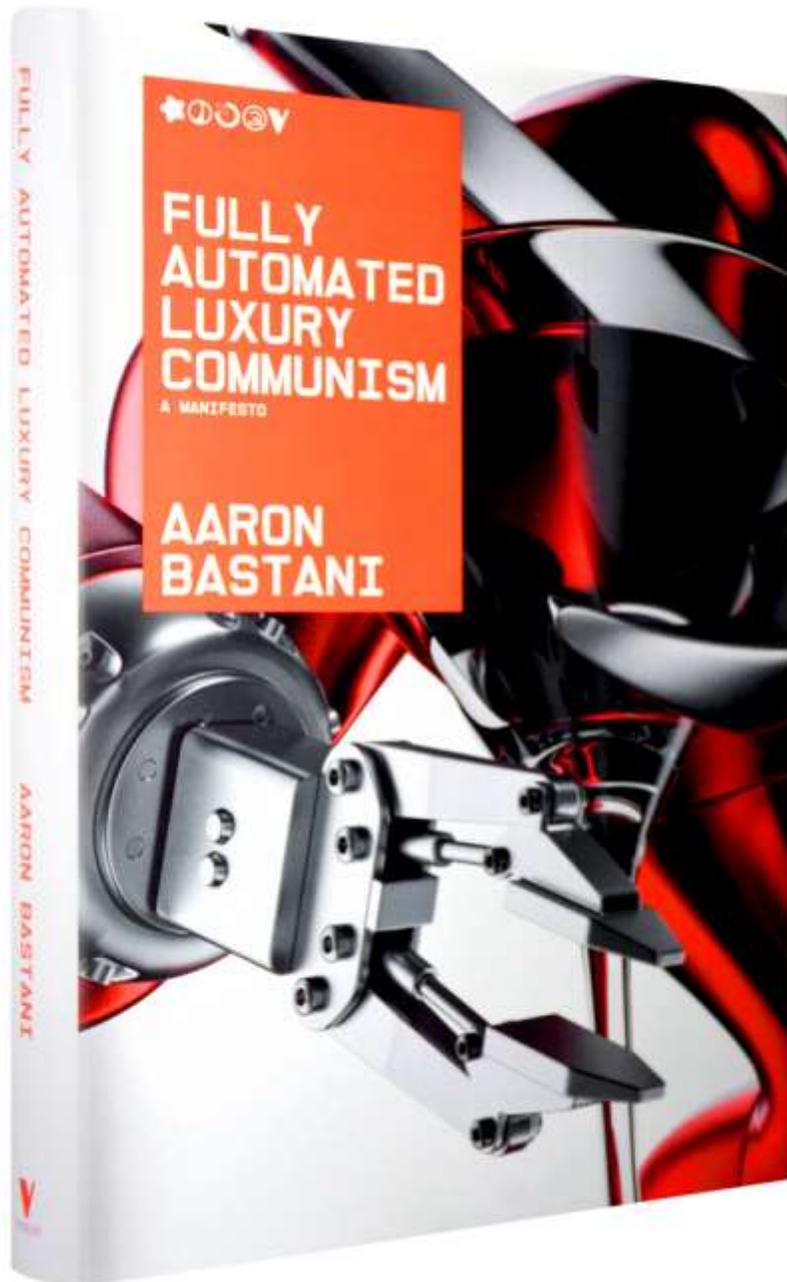


… law is subjugated to a  
computation of utility

# Alain Supiot



… This leaves no option open to populations or countries than to ride roughshod over social legislation, and pledge allegiance to those stronger than they are



nlr

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EVGENY MOROZOV

## DIGITAL SOCIALISM?

*The Calculation Debate in the Age of Big Data*

The debate rages on ...

Ethics of quantification or  
quantification of ethics?



Also in the paper:

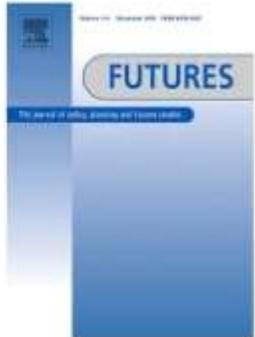
# What issues for an ethics of quantification?

- Trust (Porter, legitimacy, the OECD PISA example)



Ethics of  
quantification or  
quantification of  
ethics?

Andrea Saltelli, 2020?



# What issues for an ethics of quantification?

## -Defence against abuse (statactivism)



Ethics of  
quantification or  
quantification of  
ethics?

Andrea Saltelli, 2020?



# What issues for an ethics of quantification?

- Consequentialism (Ecological Footprint)



Mathis Wackernagel



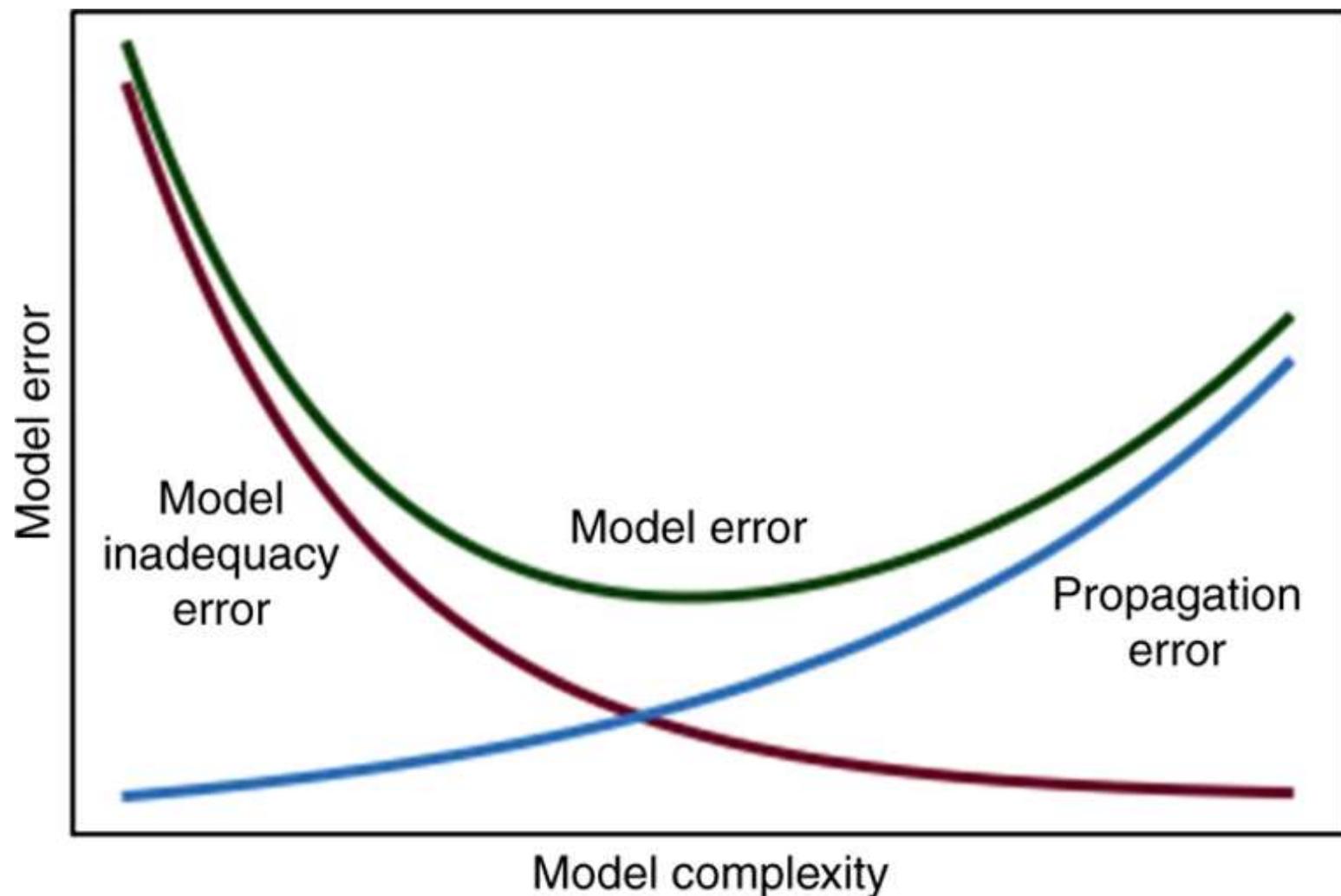
Ethics of  
quantification or  
quantification of  
ethics?

Andrea Saltelli, 2020?



# What issues for an ethics of quantification?

-Optimism/Hubris



Ethics of  
quantification or  
quantification of  
ethics?

Andrea Saltelli, 2020?



# What issues for an ethics of quantification?

-Purported neutrality of the technique  
(Beck, Majone, Funtowicz and Ravetz;  
Romer, Reinert...)

Ethics of  
quantification or  
quantification of  
ethics?

Andrea Saltelli, 2020?



# What issues for an ethics of quantification?

–Quality of a quantitative research →  
“relational validity”, how it corresponds to  
its **context and purpose**



Issues ▾

For authors ▾

Statistics ▾

Home > 22 (3), 6

## Different Modelling Purposes



Bruce Edmonds<sup>a</sup>, Christophe Le Page<sup>b</sup>, Mike Bithell<sup>c</sup>, Edmund Chattoe-Brown<sup>d</sup>, Volker Grimm<sup>e</sup>, Ruth Meyer<sup>f</sup>,  
Sales<sup>g</sup>, Paul Ormerod<sup>h</sup>, Hilton Root<sup>i</sup> and Flaminio Squazzoni<sup>j</sup>

Ethics of  
quantification or  
quantification of  
ethics?

Andrea Saltelli, 2020?



# What recipes for an ethics of quantification?

-Use tools such as NUSAP and sensitivity auditing to tame hubris, to make quantifications interpretable, conveyable in plain English, and context/purpose specific

NUSAP

Numeral, Unit, Spread

+

Assessment (qualitative judgement on quantification)

Pedigree (qualitative assessment of mode of production and anticipated use)

THEORY AND DECISION LIBRARY

SERIES A: PHILOSOPHY AND METHODOLOGY  
OF THE SOCIAL SCIENCES

SILVIO O. FUNTOWICZ AND JEROME R. RAVETZ

UNCERTAINTY AND QUALITY  
IN  
SCIENCE FOR POLICY

KLUWER ACADEMIC PUBLISHERS



# Sensitivity Auditing

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## **What do I make of your latinorum? Sensitivity auditing of mathematical modelling**

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Saltelli, A., Guimarães Pereira, Â.,  
Van der Sluijs, J.P. and Funtowicz, S.



Ângela Guimarães Pereira

# The rules of sensitivity auditing

1. Check against rhetorical use of mathematical modelling;
2. Adopt an “assumption hunting” attitude; focus on unearthing possibly implicit assumptions;
3. Check if uncertainty been instrumentally inflated or deflated.

4. Find sensitive assumptions before these find you; do your SA before publishing;
5. Aim for transparency; Show all the data;
6. Do the right sums, not just the sums right;
7. Perform a proper global sensitivity analysis.

# What recipes for an ethics of quantification?

–Improve existing disciplinary arrangements



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## **AMERICAN STATISTICAL ASSOCIATION RELEASES STATEMENT ON STATISTICAL SIGNIFICANCE AND P-VALUES**

*Provides Principles to Improve the Conduct and Interpretation of Quantitative  
Science*

March 7, 2016

Wasserstein, R.L. and Lazar, N.A., 2016. 'The ASA's statement on p-values: context, process, and purpose', *The American Statistician*, Volume 70, 2016 – Issue 2, Pages 129–133.

What recipes would be offered by an ethics of quantification?

-Conquer a license not-to-quantify

# Science and lobbying

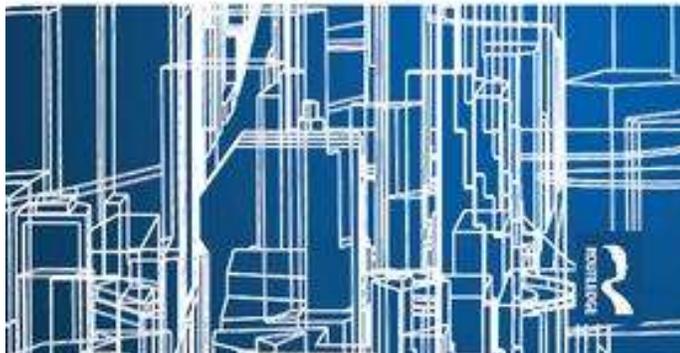
Power asymmetries in the framing of issues:  
those who have the deepest pockets marshal  
the best evidence → Instrumental use of  
quantification to obfuscate

# Sylvain Laurens

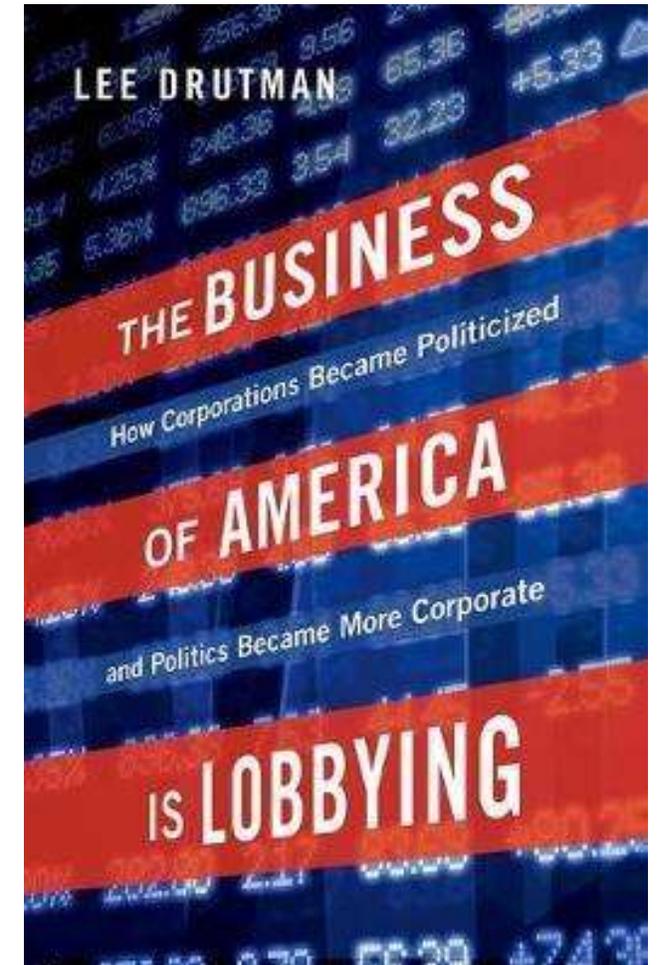


## LOBBYISTS AND BUREAUCRATS IN BRUSSELS CAPITALISM'S BROKERS

Sylvain Laurens



Lee Drutman



For both scholars a salient aspect of this power is lobbyists' access to more and better disseminated knowledge/science

“They have the data”





**“HIS MASTER’S VOICE”**

REG. U.S. PAT. OFF.

“Regulatory policy is increasingly made with the participation of experts, especially academics. A regulated firm or industry should be prepared whenever possible to co-opt these experts. This is most effectively done by identifying the leading expert in each relevant field and hiring them as consultants or advisors or giving them research grant or the like”

Owen, B. M., & Braeutigam, R., 1978 *The regulation game, : Strategic Use of the Administrative Process*, Ballinger Press

“This activity requires a modicum of finesse; it must not be too blatant, for the experts themselves must not recognize that they have lost their objectivity and freedom of action”

Thanks to Erik Millstone

Owen, B. M., & Braeutigam, R., 1978 The regulation game, : Strategic Use of the Administrative Process, Ballinger Press

**US news**

## Science institute that advised EU and UN 'actually industry lobby group'

**International Life Sciences Institute used by corporate backers to counter public health policies, says study**

**Arthur Neslen**

Mon 3 Jun 2019 03.00 BST



1,256



# Regulatory capture in the name of enlightenment?

Science and its institutions – especially when operating at the science – policy interface, appear vulnerable to forms of societal penetration and control where lobbyists present themselves as upholders of the values of the Enlightenment against science’s (and progress’) purported enemies.

Defending science from its defenders? Regulatory capture in the name of Enlightenment, work in progress (2019).

## Ethics washing made in Europe By Thomas Metzinger

On Tuesday, the EU has published ethics guidelines for artificial intelligence. A member of the expert group that drew up the paper says: This is a case of ethical white-washing

“... a compromise of which I am not proud, but which is nevertheless the best in the world on the subject”

<https://www.tagesspiegel.de/politik/eu-guidelines-ethics-washing-made-in-europe/24195496.html>

A commission of 52 members, “with only four ethicists alongside 48 non-ethicists – representatives from politics, universities, civil society, **and above all industry**”

OK to involve industry from the start to get the sector onboard but “The guidelines are lukewarm, short-sighted and deliberately vague”

“They ignore long-term risks, gloss over difficult problems …with rhetoric, violate elementary principles of rationality and pretend to know things that nobody really knows”

Expression such as “non-negotiable” and “Red Lines” had to be dropped for the sake of a “positive vision”

<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



The guidelines touch on hot issues such as

- citizens scoring,
- autonomous lethal weapons,
- covert AI systems,
- tracking of individuals...

<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



This amounts to “ethics washing = cultivating ethical debates to buy time, distract the public and to prevent or at least delay effective regulation

… industry is building one “ethics washing machine” after another”

Since China is already embarked in “digital totalitarianism” and little hope of strong regulation from the US, Europe bears the responsibility

The EU guidelines are good by comparison, but

“Because industry acts more quickly and efficiently than politics or the academic sector, there is a risk that, as with “Fake News”, we will now also have a problem with fake ethics”

# The innovation principle



English 

[Home](#) > [Research and innovation](#) > [Law and regulations](#) > [Innovation-friendly legislation](#)

## Ensuring EU legislation supports innovation

What the Innovation Principle is, how it was developed, links to Innovation Deals as well as the better regulation research and innovation tool.

# The innovation principle



**Ensuring EU legislation supports innovation**

## **What is the Innovation Principle?**

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The Innovation Principle is a tool to help achieve EU policy objectives by ensuring that legislation is designed in a way that creates the best possible conditions for innovation to flourish.

The principle means that in future when the Commission develops new initiatives it will take into account the effect on innovation.

This will ensure that all new EU policy or regulations support innovation and that the regulatory framework in Europe is innovation-friendly.

Against the principle of precaution:

“How an industry association wrote a new principle on innovation and succeeded in introducing this [innovation] principle into a number of European Union (EU) texts”

Garnett, Kathleen & Van Calster, Geert & Reins, Leonie. (2018). Towards an innovation principle: an industry trump or shortening the odds on environmental protection?. *Law, Innovation and Technology*. 10. 1-14. [10.1080/17579961.2018.1455023](https://doi.org/10.1080/17579961.2018.1455023).

“This is the first time an industry association has successfully tried to introduce a new principle into the EU’s legal order”

Garnett, Kathleen & Van Calster, Geert & Reins, Leonie. (2018). Towards an innovation principle: an industry trump or shortening the odds on environmental protection?. *Law, Innovation and Technology*. 10. 1-14. [10.1080/17579961.2018.1455023](https://doi.org/10.1080/17579961.2018.1455023).

Post truth

# The powerful agents of post-truth

Jaron Lanier



## Poisonous algorithms to stoke hatred and division

Yuval Noah Harari, Homo Deus 2015 & 21 Lessons for the 21st Century, 2018.

Jaron Lanier, 2018 Ten Arguments for Deleting Your Social Media Accounts Right Now

<https://www.theguardian.com/society/2018/aug/23/russian-trolls-spread-vaccine-misinformation-on-twitter>

"Have you seen those zombies who roam the streets with their faces glued to their smartphones? Do you think they control the technology, or does the technology control them?"

Yuval Noah  
Harari



Yuval Harari, 21 Lessons for the 21st Century, 2018, Jonathan Cape publisher; for autopoietic technology see also W. Brian Arthur, 2010, The Nature of Technology, Free Press.



From deepfake to Cambridge Analytica, to algorithmic abuse the scope for damage has expanded

## Deepfake videos 'double in nine months'



Rory Cellan-Jones  
Technology correspondent  
@BBCRoryCJ

🕒 7 October 2019



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**Donald J. Trump**   
@realDonaldTrump

Trump & the Russian intelligence excel at exploiting the new technologies for soft warfare

## **Twitter released 9 million tweets from one Russian troll farm. Here's what we learned.**

The massive data dump reveals how trolls disrupt and destabilize local and global politics.

By Aja Romano | @ajaromano | Oct 19, 2018, 12:40pm EDT

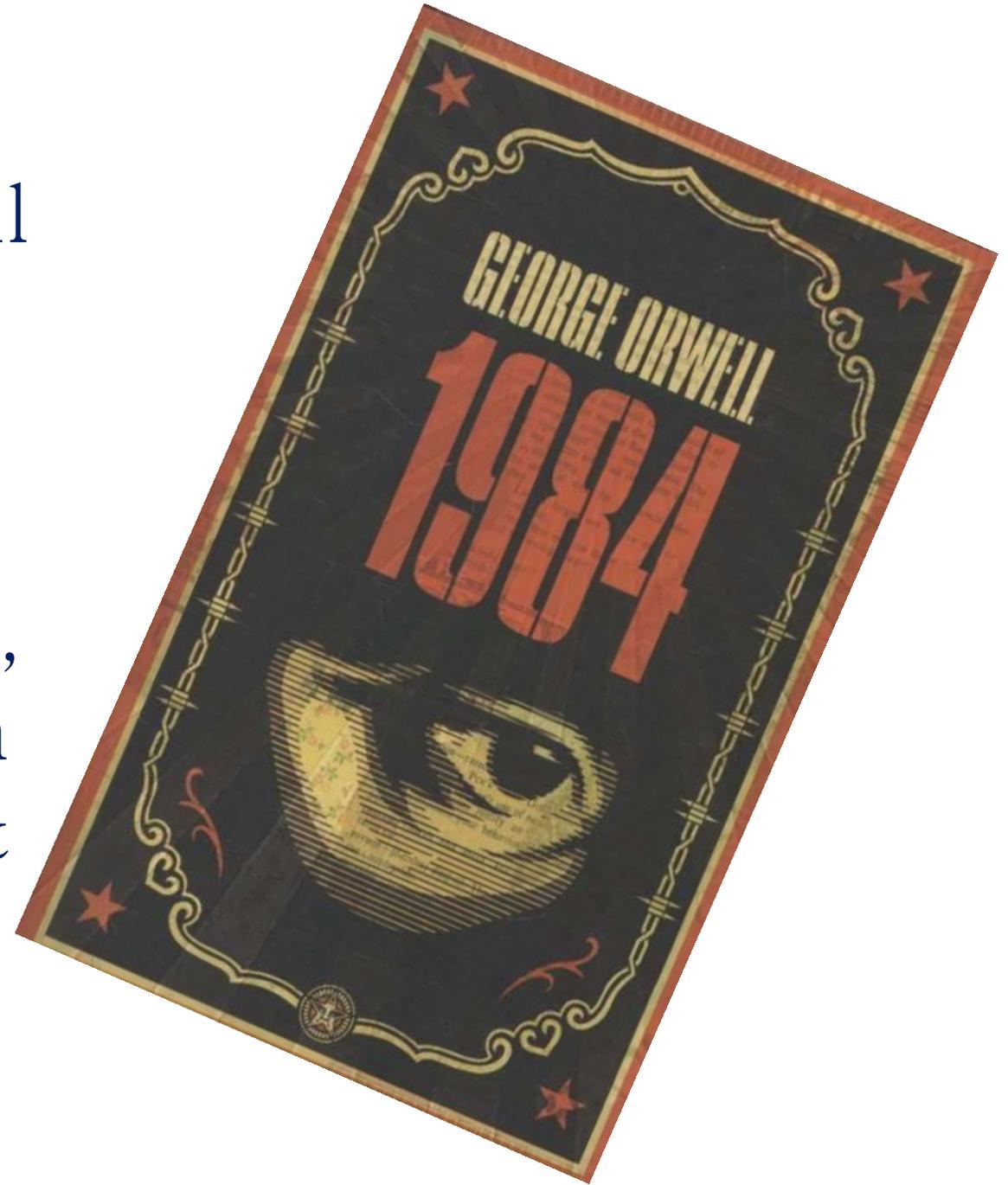


Whose dystopia:  
Huxley or Orwell?



George Orwell

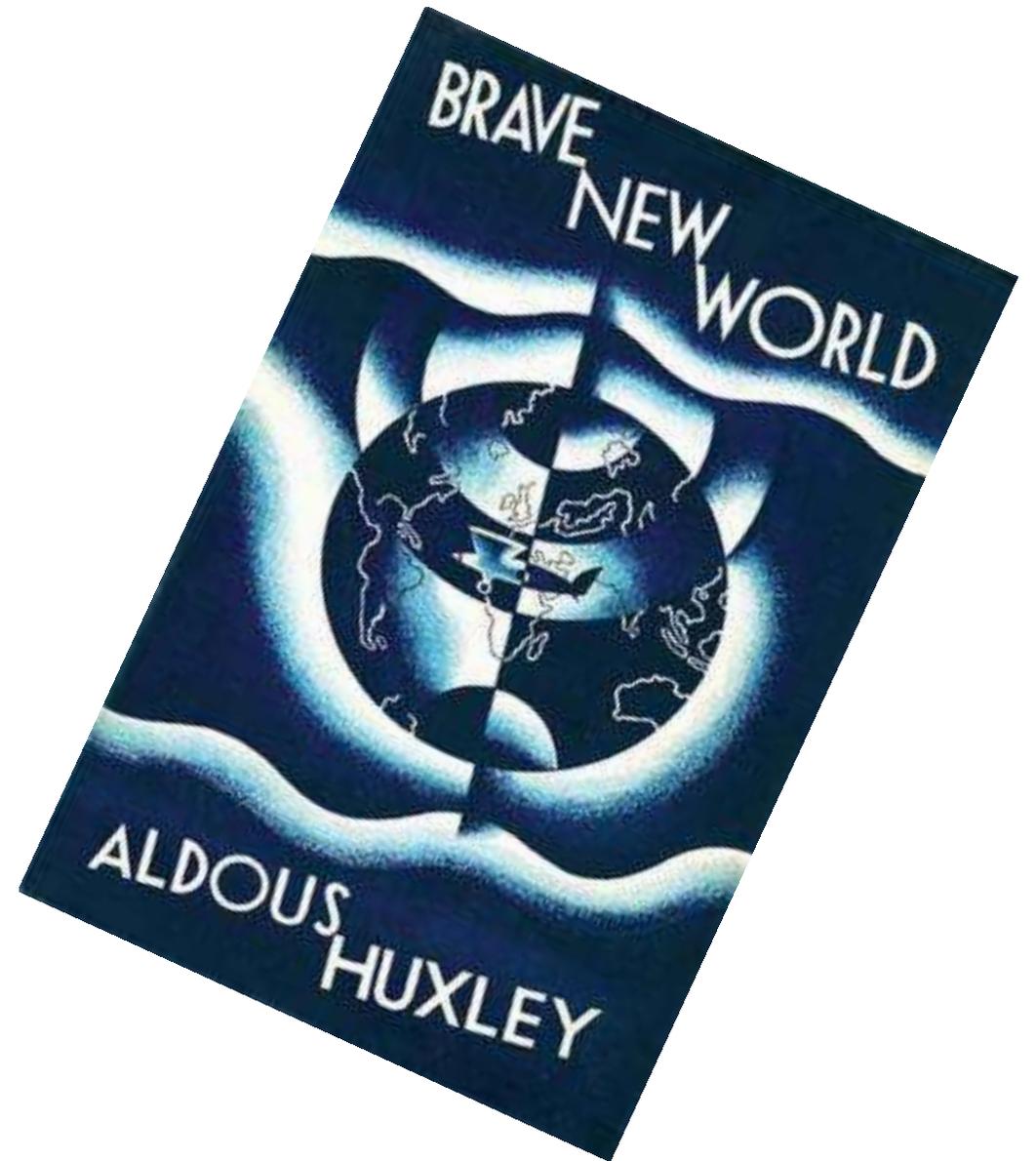
1949; a regimented society,  
Big Brother in charge of an  
omnipresent surveillance &  
propaganda machine





Aldous Huxley

1932; a regimented world where drug takes care of consent

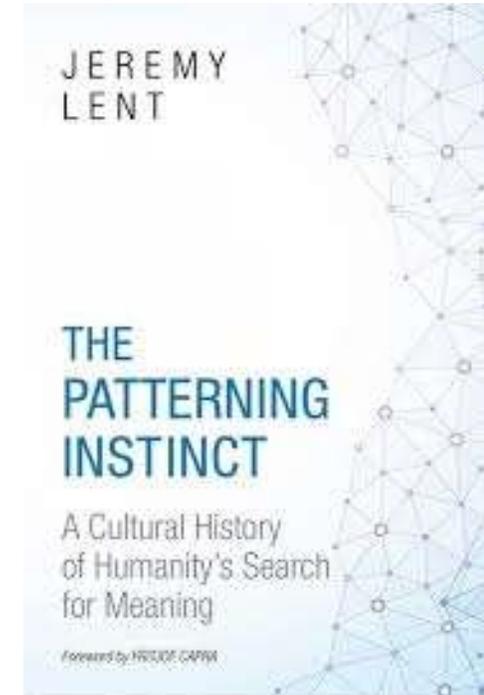
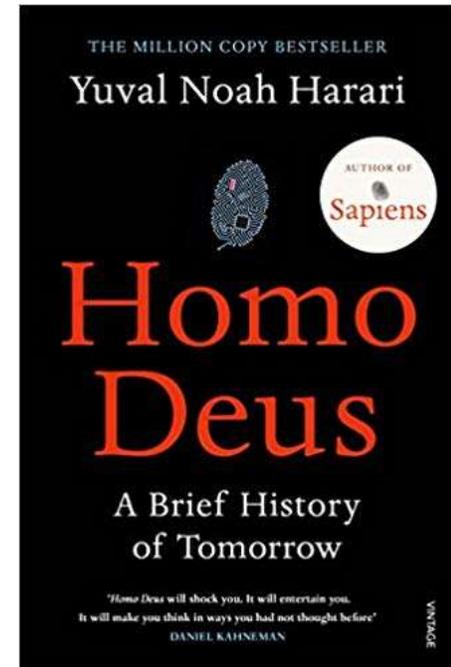


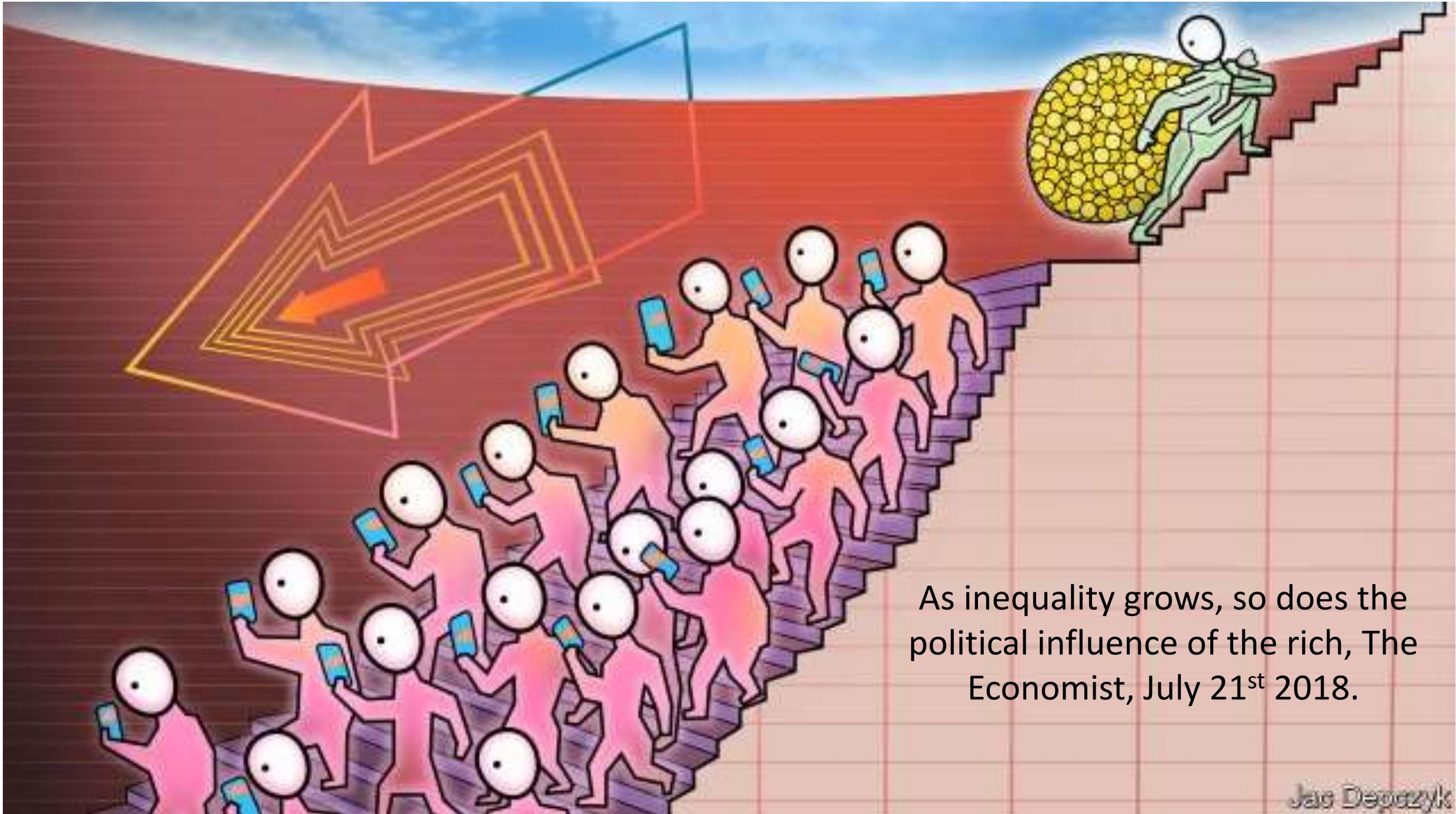
# Techno-spirit scenario?

An affluent super-technological and possibly trans-human/immortal minority, versus a useless and distracted majority left glued to its mobile phones and tablets

Y. N. Harari, *Homo Deus: a brief history of tomorrow*. Harvill Secker, 2016.

J. R. Lent, *The patterning instinct: a cultural history of humanity's search for meaning*. Prometheus Books, 2017.





As inequality grows, so does the political influence of the rich, The Economist, July 21<sup>st</sup> 2018.

The End



@andreasaltelli