

Integrity at times of crisis

Andrea Saltelli Open Evidence Research, Open University of Catalonia



INPhINIT PhD training sessions, Virtual, CaixaForum, September 17 2020





"la Caixa" Foundation

Where to find this talk: www.andreasaltelli.eu

Andrea **Saltelli**

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YouTube @YouTube



Jul 26, 2019

View on Twitter



Embed

Open Science

Open science is complex and conflicted

Existing tensions and historical perspective

Michal Polanyi and the republic of science

Norms and counter-norms

The take of Mirowski

Life in a world of algorithms

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 in a context of science's crisis

Evidence based policy and its problems

Post truth

Orwell or Huxley? Techno-split

Open science as a contested and conflicted field

A plurality of schools of thought



PERSPECTIVE ARTICLE

Front. Big Data, 10 December 2019 | https://doi.org/10.3389 /fdata.2019.00043

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





 \equiv LSE

Jefferson Pooley, February 21st, 2020, blogs.lse.ac.uk/: Plan S accelerates read-and-publish deals in the Global North. They lock in and exacerbate existing inequalities in scholarly publishing.

Open science is a quest for

democratic right to access publicly funded knowledge (e.g. Open Access to publications) …

... a 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

... 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



For Paul David open science was always a fragile social construction …

... 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, 1564 – 1642)



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: CUDOS, by R.K. Merton, a system of universal norms



Robert K. Merton

R. Merton, The sociology of science: Theoretical and empirical investigations, 1973.

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.

Journal of Empirical Research on Human Research Ethics

Normative Dissonance in Science: Results from a National Survey of U.S. Scientists

Melissa S. Anderson, Brian C. Martinson, Raymond De Vries

First Published December 1, 2007 Research Article Find in PubMed https://doi.org/10.1525/jer.2007.2.4.3

survey responses from 3,247 mid- and early-career scientists who had research funding from the U.S. National Institutes of Health



Communality: Scientists openly share findings with colleagues.

Counter-norm

Secrecy: Scientists protect their newest findings to ensure priority in publishing, patenting, or applications.



FIG. 3. Norm versus Counternorm Scores: Percent with Norm > Counternorm (dotted), Norm = Counternorm (striped), Norm < Counternorm (solid).

The republic of science, by Michal Polanyi; science and cold war, the market for ideas, science as selfpolicing...



Sputnik 1, 1957

Michal Polanyi



M. Polanyi, J. Ziman, and S. Fuller, 1962, "The republic of science: its political and economic theory," Minerva, vol. 38, pp. 1–32.

The same R.K. Merton realized later in life that norms have corresponding counter norms

Mitroff, I. I. 1974, Norms and Counter-Norms in a Select Group of the Apollo Moon Scientists: A Case Study of the Ambivalence of Scientists, American Sociological Review, 39, 579-595.

NORMS AND COUNTER-NORMS IN A SELECT GROUP OF THE APOLLO MOON SCIENTISTS: A CASE STUDY OF THE AMBIVALENCE OF SCIENTISTS*

IAN I. MITROFF

American Sociological Review 1974, Vol. 39 (August): 579-595

This paper describes a three and a half year study conducted over the course of the Apollo lunar missions with forty-two of the most prestigious scientists who studied the lunar rocks. The paper supports the Merton-E. Barber concept of sociological ambivalence, that social institutions reflect potentially conflicting sets of norms. The paper offers a set of counter-norms for science, arguing that if the norm of universalism is rooted in the impersonal character of science, an opposing counter-norm is rooted in the personal character of science. The paper also argues that not only is sociological ambivalence a characteristic of science, but it seems necessary for the existence and ultimate rationality of science.

Three-and-a-half-year study conducted over the course of the Apollo lunar missions with forty-two of the most prestigious scientists who studied the lunar rocks

The paper supports the Merton–E. Barber concept of sociological ambivalence, that social institutions reflect potentially conflicting sets of norms [We must] consider, first, how potentially contradictory norms develop in every social institution; next, how in the

institution of science conflicting norms generate marked ambivalence in the lives of scientists; and finally, how this ambivalence affects the actual, as distinct from the supposed, relations between men of science (Merton, 1963a:80).

- Solitariness (secrecy, miserism) is often used to keep findings secret in order to be able to claim patent rights… Instead of Communalism
- Particularism […] a real issue, particularly when you consider the ratio of researchers in rich countries compared with those in poor countries

Instead of Universalism

• Interestedness arises because scientists have genuine interests at stake in the reception of their research… Instead of Disinterestedness

• Dogmatism because careers are built upon a particular premise (theory) being true…

Instead of Organized Skepticism Back to open science: a 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.

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



S|S|S

Article

The future(s) of open science

Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss





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"

Article

The future(s) of open science

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Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss



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



Article

The future(s) of open science

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Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss



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

The future(s) of open science

SSS

Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss



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

How a neoliberal agenda has damaged science

Article

Philip Mirowski

The future(s) of open science

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

Social Studies of Science 2018, Vol. 48(2) 171-203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss

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MIROWSKI **SSS** Science Mart -PRIVATIZING AMERICAN SCIENCE

What is hence the danger for Mirowski?

Platform capitalism and the uberization of science

S|S|S

The future(s) of open science

Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss





Article

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

Platforms competing to become the 'Facebook for Science'

The future(s) of open science

Article

Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss



The future is with us already we as scientists already live in "a Philip Mirowski John J. Reilly Center, University of Notre Dame, Notre Dame, IN, USA 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

The future(s) of open science

Social Studies of Science 2018, Vol. 48(2) 171-203 © The Author(s) 2018 Reprints and permissions agepub.co.uk/iournalsPermissions.na DOI: 10.1177/0306312718772086 iournals.sagepub.com/home/sss (S)SAGE

SISIS

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

()

Article

Social Studies of Science 2018, Vol. 48(2) 171–203 © The Author(s) 2018 Reprints and permissions: sagepub.co.uk/journalsPermissions.nav DOI: 10.1177/0306312718772086 journals.sagepub.com/home/sss

SISIS

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

Corporate publishers have easily assimilated open access into their profit model.
Broader implications for a life in the algorithmic world



It is good!





ERIK BRYNJOLFSSON

It is bad!

<section-header>

Author of YOU ARE NOT A GADGET



A world run by algorithms and numbers? For many scholars it is very bad!



Alarm for Weapons of Math Destruction



Cathy O'Neil



O'Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

Opacity (also because of trade secrecy) of algorithms used to decide on recruiting, carriers (including of researchers), prison sentencing, paroling, custody of minors, political campaigns…

O'Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

Brauneis, R., & Goodman, E. P. (2018). Algorithmic Transparency for the Smart City. Yale Journal of Law & Technology, 20, 103–176. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3012499



Opacity coupled with opportunity for scale and damage and with non-appealability make them an instrument of oppression & inequality

Cathy O'Neil Google talk https://www.youtube.com/watch?v=TQHs8SA1qpk



Weapons of math destruction: opaque, harm, scale

- From ranking of higher education to the software used by judges and police,
- what are hackathons?
- what is 'clopening'





Producing numbers comes with obligations



Futures

Volume 116, February 2020, 102509



Essays

Ethics of quantification or quantification of ethics?

Andrea Saltelli

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

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Producing numbers comes with obligations

Humanities & Social Sciences Communications

ARTICLE

https://doi.org/10.1057/s41599-020-00557-0

OPEN

From sociology of quantification to ethics of quantification

Andrea Saltelli[®] ^{1⊠} & Monica Di Fiore[®] ^{2⊠}





COMMENT · 24 JUNE 2020

Five ways to ensure that models serve society: a manifesto

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



COMMENT • 24 JUNE 2020



Five ways to ensure that models serve society: a manifesto

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

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



Mind the assumptions

Assess uncertainty and sensitivity

Mind the hubris

Complexity can be the enemy of relevance

Mind the framing

Match purpose and context

Mind the consequences

Quantification can backfire.

Mind the unknowns

Acknowledge ignorance

SUPPLEMENTARY INFORMATION

1. Additional information and references >260 references



If open science is a solution which was the problem?

Predatory publishers (the Achilles heel of the APC model)

Predatory open access publishers https://beallslist.net

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





Dear Andrea Saltelli,

I hope everything is going well.



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





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

CITATION STACKING

In 2011, four Brazilian journals published seven review papers with hundreds of references to previous research (2009–10) in each others' journals. This raised their 2011 impact factors.



*Rev. Assoc. Med. B., Revista da Associação Médica Brasileira; J. Bras. Pneum., Jornal Brasileiro de Pneumologia; Acta Ortop. Bras., Acta Ortopédica Brasileira.

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 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: <u>http://ascb.org/dora/</u>; 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.

More recent initiatives



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 JOBS EVENTS RANKINGS STUDENT AB

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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

Let's zoom out now and …

Integrity in the context of \cdots

The crisis of science



onomi

…of expertise



Michael Gove seen by FT

… of our relation with technology



Ulrich Beck

What role does quantification play in all that



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 ^{a, b} ^A [⊠], Silvio Funtowicz ^a



Futures Volume 104, December 2018, Pages 85-90





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

Silvio Funtowicz

Andrea, Saltelli 🖾

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



Brow





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

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 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

Check for

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

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"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



Andrew Gelman https://statmodeling.stat.colum bia.edu/

https://statmodeling.stat.colum bia.edu/2019/03/20/retirestatistical-significance-thediscussion/


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



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. Smaldino¹ and Richard McElreath²

¹Cognitive and Information Sciences, University of California, Merced, CA 95343, USA ²Department 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 As in the real world, successful labs produce more 'progeny,' such that their methods are more often copied and their students are more likely to start labs of their own. Selection for high output leads to poorer methods and increasingly high false discovery rates.

Improving the quality of

research requires change at the institutional level.

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

Unintended effects of reforms

Good intentions going bad

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

TABLE 1. GROWING PERVERSE INCENTIVES IN ACADEMIA

Modified from Repetr (ners, comm, 2015) with nermission

Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, Marc A. Edwards and Siddhartha Roy, ENVIRONMENTAL ENGINEERING SCIENCE, 34(1), 2017

"Researchers rewarded for increased number of publications."

Intended effect

"Improve research productivity," provide a means of evaluating performance. Actual effect

"Avalanche of" substandard, "incremental papers"; poor methods and increase in false discovery rates leading to a "natural selection of bad science" (Smaldino and Mcelreath, 2016); reduced quality of peer review

Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, Marc A. Edwards and Siddhartha Roy, ENVIRONMENTAL ENGINEERING SCIENCE, 34(1), 2017

"Researchers rewarded for increased number of citations."

Actual effect

Intended effect

Reward quality work that influences others.

Extended reference lists to inflate citations; reviewers request citation of their work through peer review

Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, Marc A. Edwards and Siddhartha Roy, ENVIRONMENTAL ENGINEERING SCIENCE, 34(1), 2017

Actual effect

"Researchers rewarded for increased grant funding."

Intended effect

Increased time writing proposals and less time gathering and thinking about data. Overselling positive results and downplay of negative results.

"Ensure that research programs are funded, promote growth, generate overhead."

Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, Marc A. Edwards and Siddhartha Roy, ENVIRONMENTAL ENGINEERING SCIENCE, 34(1), 2017

Increase PhD student productivity

Actual effect

Intended effect

Lower standards and create oversupply of PhDs. Postdocs often required for entry-level academic positions, and PhDs hired for work MS students used to do.

Higher school ranking and more prestige of program.

Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, Marc A. Edwards and Siddhartha Roy, ENVIRONMENTAL ENGINEERING SCIENCE, 34(1), 2017

"Teachers rewarded for increased student test scores."
"Departments rewarded for increasing U.S. News ranking." *Intended effect*

"Improve teacher effectiveness."

"Stronger departments."

Actual effect

"Teaching to the tests; emphasis on short-term learning." Extensive efforts to reverse engineer, game, and cheat rankings.

Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, Marc A. Edwards and Siddhartha Roy, ENVIRONMENTAL ENGINEERING SCIENCE, 34(1), 2017

The crisis was predicted



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. Ethical issues? Tainted donations



Jeffrey Epstein & paedophilia



Koch brothers & climate

Sackler family & opioids

How Rich Donors Like Epstein (and Others) Undermine Science

ADAM ROGERS

SCIENCE 09.15.2019 07:00 AM

WIRED



Ethical issues? Reviewer-coerced citation NEWS · 06 FEBRUARY 2020

Highly cited researcher banned from journal board for citation abuse

Investigation finds that biophysicist Kuo-Chen Chou repeatedly suggested dozens of citations be added to papers.

Ethical issues? Seducing salaries The New York Times

U.S. Accuses Harvard Scientist of Concealing Chinese Funding



Prosecutors say Charles M. Lieber, the chair of Harvard's chemistry department, lied about contacts with a Chinese staterun initiative that seeks to draw foreign-educated talent.



Jan. 28, 2020

By Ellen Barry

"one of Harvard's scientific luminaries was in handcuffs, … false statement to federal authorities about his financial relationship with the Chinese … Thousand Talents program"

\$50,000 monthly salary, \$150,000 in annual in living expenses and more than \$1.5 million for a second laboratory in Wuhan

The End



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-vaccinemisinformation-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



③ 7 October 2019





Trump & the Russian intelligence and 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-spit 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.



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A Brief History of Tomorrow

'Hono Deus will shock you, It will entertain you. will make you think in ways you had not thought before' DANIEL KAHNEMAN

JEREMY



A Cultural History of Humanity's Search for Meaning

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