

# Knowledge challenges at the science-policy interface

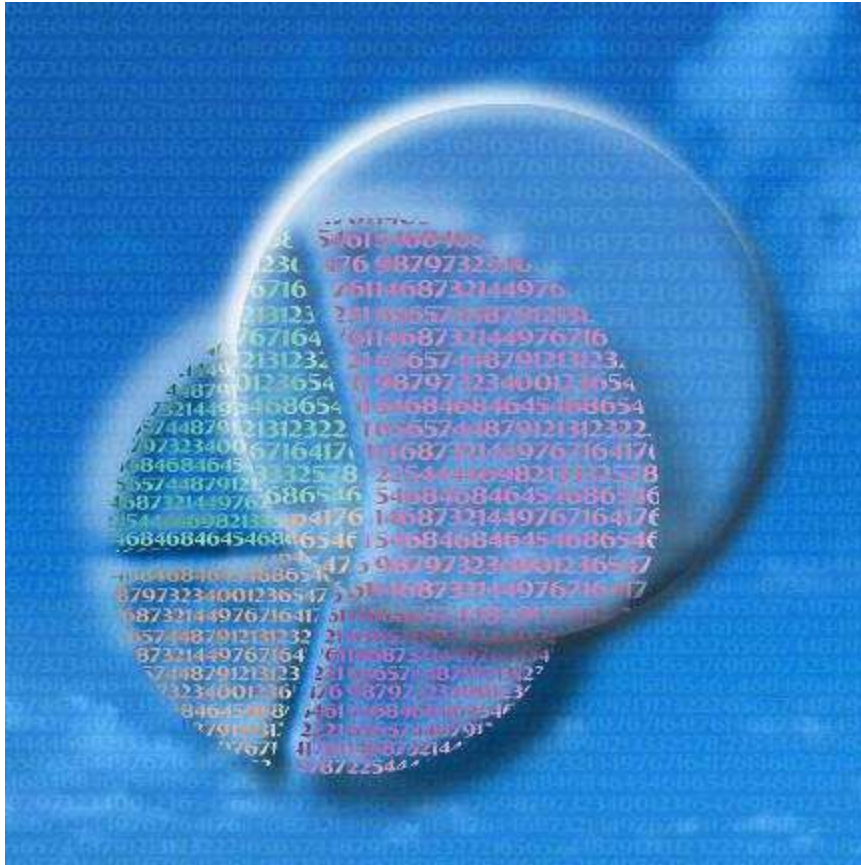
*Andrea Saltelli*

Centre for the Study of the Sciences and the Humanities (SVT) – University of Bergen (UIB)

Institut de Ciència i Tecnologia Ambientals (ICTA) – Universitat Autònoma de Barcelona (UAB)

European Environmental Agency,  
Copenhagen, Management Board Seminar  
2December 6, 2016

[andrea.saltelli@uib.no](mailto:andrea.saltelli@uib.no)



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21/11



andrea saltelli

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Lovely (also in the sense of 'of love') piece by an Italian scholar [@robertocalasso](https://twitter.com/robertocalasso):

[nybooks.com/articles/2016/...](https://nybooks.com/articles/2016/)



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**sensitivity analysis, sensitivity auditing, science for policy, impact assessment**

The problem



# 'Post-truth' named word of the year by Oxford Dictionaries

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**theguardian**

Alison Flood

Tuesday 15 November 2016 20.00 GMT



“The British people are sick of experts”, Michael Gove



“We now live in a post-factual democracy”, Nicholas Barrett



Hence the faults is with the politicians?



“Michael Gove, a Conservative Outer once close to Prime Minister David Cameron, said: “People in this country have had enough of experts.” Source: P. Stephens, Financial Times, June 23 2016, <https://www.ft.com/content/bfb5f3d4-379d-11e6-a780-b48ed7b6126f>  
See also <https://www.ft.com/content/82a1a548-3b93-11e6-8716-a4a71e8140b0#axzz4Hzb9D6Ql> e  
the fault is the





# How Trump Could Wage a War on Scientific Expertise

The mechanics of stripping empiricism out of America's regulatory systems

ED YONG

DEC 2, 2016

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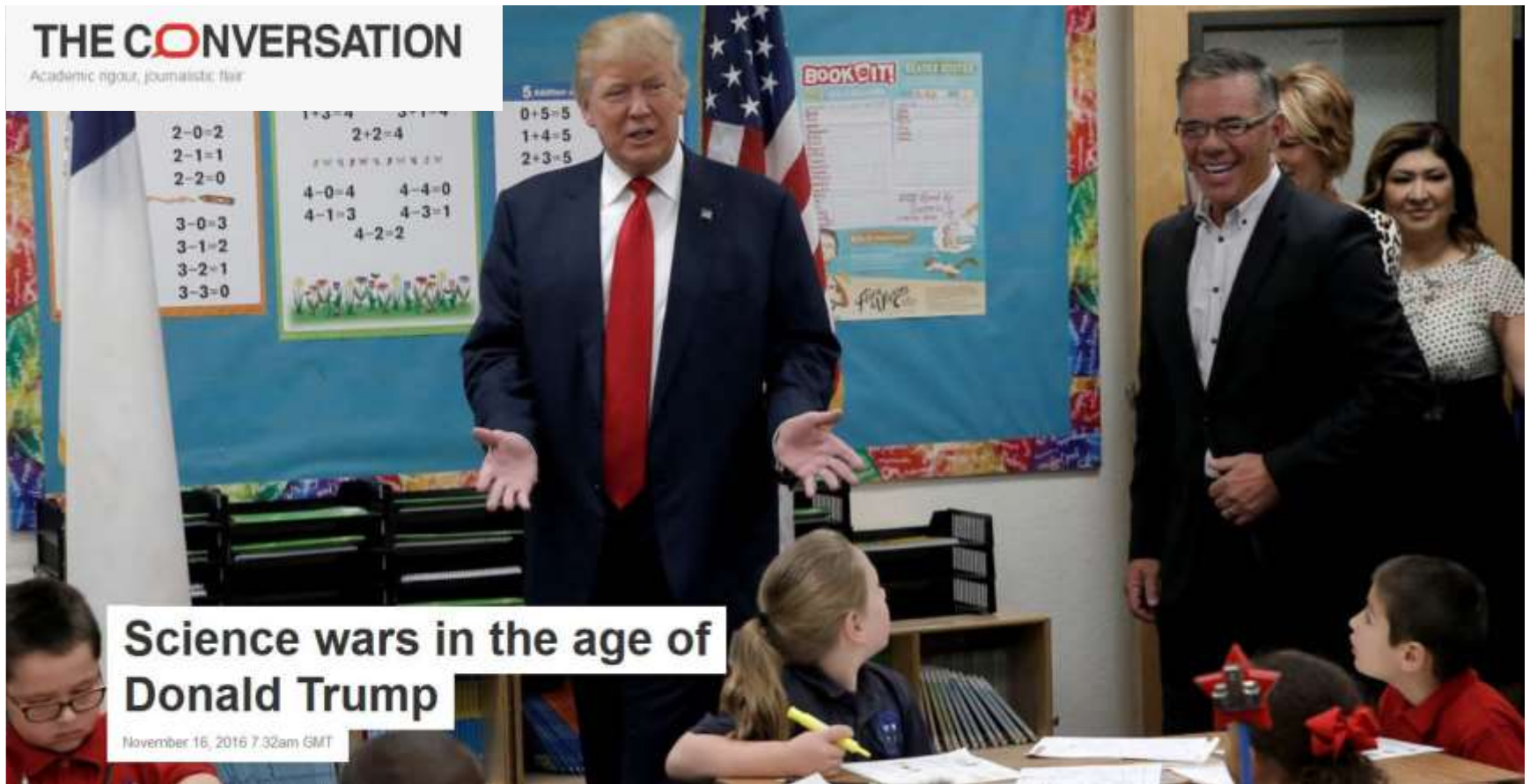
TEXT SIZE



But ...



# BREXIT and Trump's election unleashed a debate on post-truth, end of expertise, and ultimately a new season of science wars which may hide deeper troubles



Andrea Saltelli and Silvio Funtowicz, Science wars in the age of Trump, November 16, 2016  
<https://theconversation.com/science-wars-in-the-age-of-donald-trump-67594>



Right: “You disfigure science”

Left: “You are anti science”

The risk it to transform the crisis of science into an American party-political affair: the intellectual left against the ignorant right. See *The Climate Wars and the damage to science*, Matt Ridley, The Global Warming Policy Foundation, 2015, <http://www.thegwpf.com/content/uploads/2015/11/climate-wars.pdf>; and *The War On Science. Who's Waging It, Why It Matters, What We Can Do About It*, By Shawn Otto, <https://milkweed.org/book/the-war-on-science>

# A Plan to Defend against the War on Science

The challenge of creating a public able to parse evidence-free “facts” rests with the press, educators and other thought leaders

---

By Shawn Otto on October 9, 2016

**SCIENTIFIC  
AMERICAN**



Shawn Otto

The fault of  
philosophers?



“... a generation of university academics who have taught a corrosive brand of postmodernist identity politics that argues truth is relative, and that science is a “meta-narrative”...”

**SCIENTIFIC  
AMERICAN**

“By undermining science’s claim of objectivity, these postmodernists have unwittingly laid the philosophical foundation for the new rise of authoritarianism. Because if there is no objective evidence that has ultimate credibility, how is one to settle competing claims of truth, such as those made by Trump?”

**SCIENTIFIC  
AMERICAN**

The meta-  
narrative is  
dead!

Crooked  
Hilary!



“[...] Science is never partisan but it is inherently political, because its antiauthoritarian, evidence-based conclusions either confirm or challenge somebody’s cherished ideological or economic interests—and that is always political”

Partisan?  
Me?



Frederic Stanley "Rick" Mishkin, economist



How about a deeper crisis in the role of science and expertise?

An [instrumental?] distraction from societal challenges to democracy and the idea of science as “speaking truth to power”.



# The Causes

Is there a crisis?





# Sources 1:



## THE RIGHTFUL PLACE OF SCIENCE: **SCIENCE ON THE VERGE**

### CONTRIBUTORS

Alice Benessia  
Silvio Funtowicz  
Mario Giampietro  
Ângela Guimarães Pereira  
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Andrea Saltelli  
Roger Strand  
Jeroen P. van der Sluijs



## The Rightful Place of Science: Science on the Verge

Paperback – 20 Feb 2016

by [Andrea Saltelli](#) (Author), [Alice Benessia](#) (Author), & 7 more

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A crisis looms over the scientific enterprise. Not a day passes without news of retractions, failed replications, fraudulent peer reviews, or misinformed science-based policies.

### Science in crisis: from the sugar scam to Brexit, our faith in experts is fading

September 27, 2016 4:43pm AEST



The  
Economist

OCTOBER 19TH - 20TH 2013

economist.com

Washington's lawyer surplus  
How to do a nuclear deal with Iran  
Investment tips from Nobel economists  
Junk bonds are back  
The meaning of Sachin Tendulkar

# HOW SCIENCE GOES WRONG.

99  
Einsteinium

Unreliable research

## Trouble at the lab

Scientists like to think of science as self-correcting. To an alarming degree, it is not

Oct 19th 2013 | From the print edition

 Timekeeper

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The crisis has ethical,  
epistemological, methodological  
and even metaphysical dimensions;



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# SCIENCE ON THE VERGE

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# Identified points of friction:

- paradigm of evidence-based policy
- use of science to produce implausibly precise numbers and reassuring techno-scientific imaginaries
- use of science to ‘compel’ decision by the sheer strength of ‘facts’



THE RIGHTFUL  
PLACE OF SCIENCE:

## SCIENCE ON THE VERGE

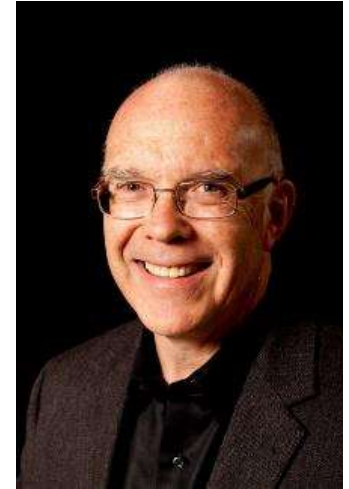
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- Generation of new data/ publications at an unprecedented rate
- Compelling evidence that the majority of these discoveries will not stand the test of time.



C. Glenn Begley



John P. A. Ioannides

“science has been challenged as an authoritative source of knowledge for both policy and everyday life, with noted major misdiagnoses in fields as disparate as forensics, preclinical and clinical medicine, chemistry, psychology and economics”



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Special Communication | September 12, 2016

## Sugar Industry and Coronary Heart Disease Research

**A Historical Analysis of Internal Industry Documents** FREE

**ONLINE FIRST**

Cristin E. Kearns, DDS, MBA<sup>1,2</sup>; Laura A. Schmidt, PhD, MSW, MPH<sup>1,3,4</sup>; Stanton A. Glantz, PhD<sup>1,5,6,7,8</sup>

[\[+\] Author Affiliations](#)

*JAMA Intern Med.* Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394

Text Size: [A](#) [A](#) [A](#)

See also <https://www.theguardian.com/society/2016/apr/07/the-sugar-conspiracy-robert-lustig-john-yudkin>, and the story of US President Dwight Eisenhower heart attack,...

“our findings suggest the industry sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in CHD [coronary hearth disease]”

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<http://archinte.jamanetwork.com/article.aspx?articleid=2548255>

# Institutions charged with science advice choose to ignore the crisis

OECD publishing

Please cite this paper as:

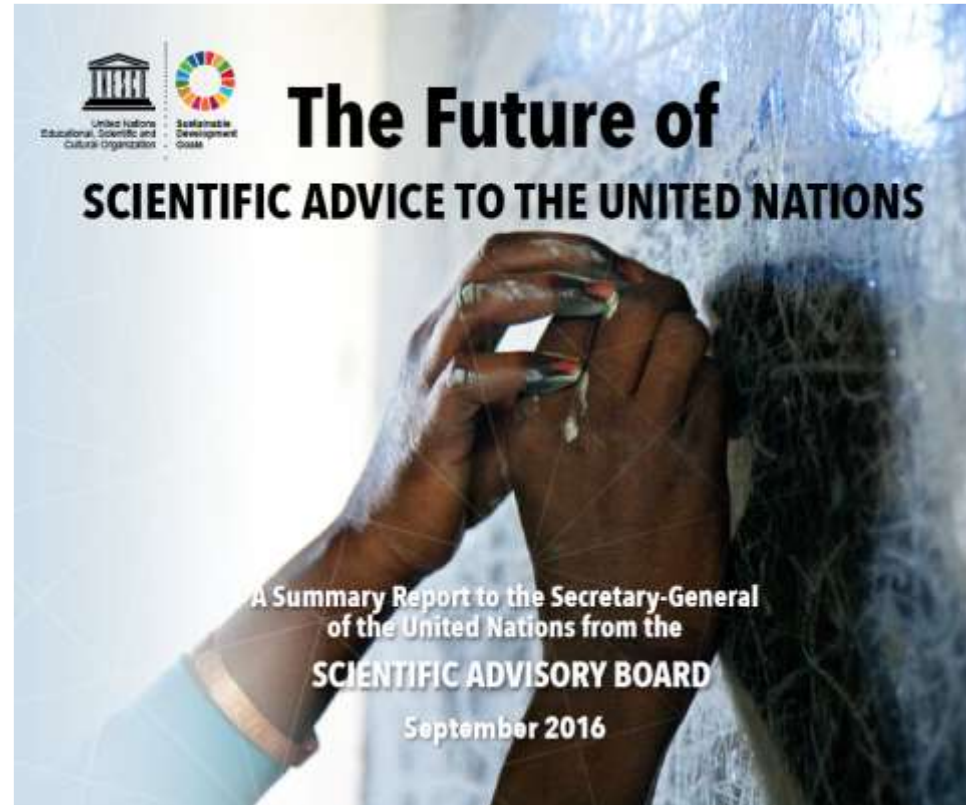
OECD (2015), "Scientific Advice for Policy Making: The Role and Responsibility of Expert Bodies and Individual Scientists", *OECD Science, Technology and Industry Policy Papers*, No. 21, OECD Publishing, Paris.  
<http://dx.doi.org/10.1787/5js3311jcpwb-en>

OECD Science, Technology and Industry  
Policy Papers No. 21

## Scientific Advice for Policy Making

THE ROLE AND RESPONSIBILITY OF EXPERT  
BODIES AND INDIVIDUAL SCIENTISTS

OECD





Causes of the crisis: failure to adhere to good scientific practice & the desperation to publish or perish.

In the book we have a different theory but ... read the book!



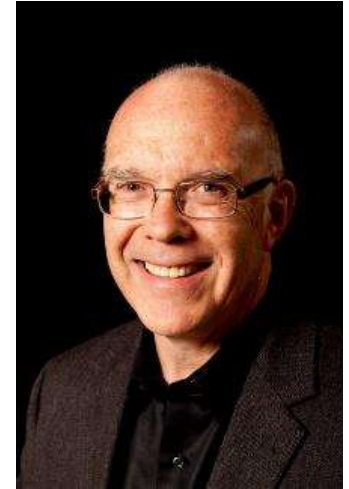
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C. Glenn Begley



John P. A. Ioannides

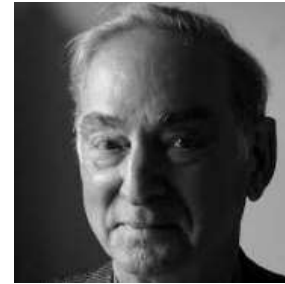
Begley, C. G., and Ioannidis, J. P., 2015, Reproducibility in Science. Improving the Standard for Basic and Preclinical Research, *Circulation Research*, 116, 116-126, doi: 10.1161/CIRCRESAHA.114.303819

Science/knowledge degenerates when it becomes a commodity for Ravetz (1971), Lyotard (1979) and Mirowski (2011).

Ravetz, J., 1971, *Scientific Knowledge and its Social Problems*, Oxford University Press, p. 22.

Lyotard, J.-F. 1979. *La Condition postmoderne. Rapport sur le savoir*, Paris : Minuit, Chapter 10.

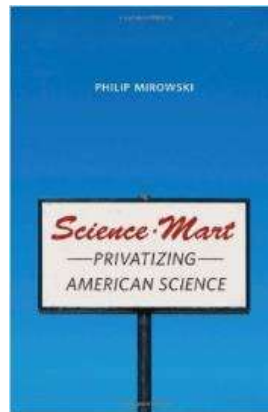
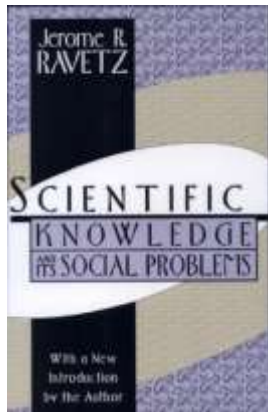
Mirowski, P. 2011. *Science-Mart: Privatizing American Science*, Harvard University Press.



Jerome R.  
Ravetz



Jean-François  
Lyotard



Philip  
Mirowski

In economics see the ‘Mathiness’ discussion: blogs of Paul Romer, Judith Curry and Erik Reinert’s ‘scholasticism’ paper.

See <https://paulromer.net/mathiness/>

<https://judithcurry.com/2015/08/12/the-adversarial-method-versus-feynman-integrity-2/>

[http://www.andreasaltelli.eu/file/repository/Full\\_Circle\\_scholasticism\\_2.pdf](http://www.andreasaltelli.eu/file/repository/Full_Circle_scholasticism_2.pdf)



Paul Romer



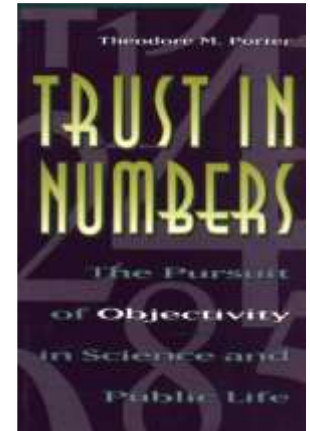
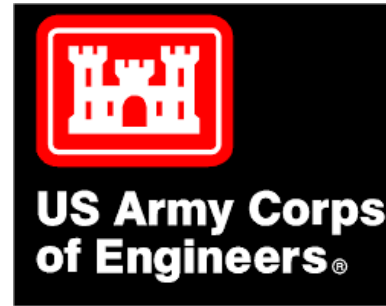
Judith Curry



Erik Reinert

# Quantification and trust

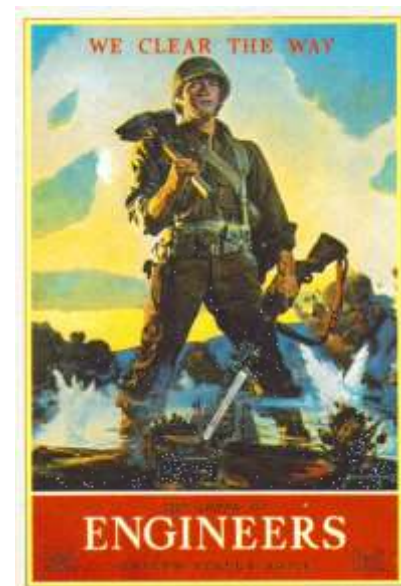
# Trust, authority and styles of quantification: two different stories



Theodore M. Porter, Trust in Numbers, The Pursuit of Objectivity in Science and Public Life, Princeton 1995.



Porter's story: Quantification needs judgment which in turn needs trust ...without trust quantification becomes mechanical, a system, and 'systems can be played'.



“Belinda Phipps, who took over at the Science Council last year, accused the sector of complacency and said the public trusted scientists only because they did not understand their work.”

Whipple, T., The Times, February 22, 2016

THE  TIMES

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Welcome to your preview of The Times

### Scientists ‘should take ethics oath like doctors’




Tom Whipple Science Editor

Published at 12:01AM, February 22 2016

Scientists need their own version of the Hippocratic oath and a regulation system similar to doctors to avoid a big scandal, the head of their standards body has said.

Studies suggest that a significant proportion of scientific papers are not repeatable

Monty Rakusen/Corbis

 Post a comment

“What struck me, coming into this sector is just how unregulated it is compared to the medical profession,” Ms Phipps said. “Think what damage a scientist could do if he or she behaved badly or fraudulently. The potential damage is enormous, yet there is almost no regulation.”

Whipple, T., The Times, February 22, 2016

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Monty Rakusen/Corbis

 Post a comment



## The elephant in the room we can't ignore

If Donald Trump were to trigger a crisis in Western democracy, scientists would need to look at their part in its downfall, says [Colin Macilwain](#).

16 March 2016



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If Donald Trump were to trigger a crisis in Western democracy, scientists would need to look at their part in its downfall, says [Colin Macilwain](#).

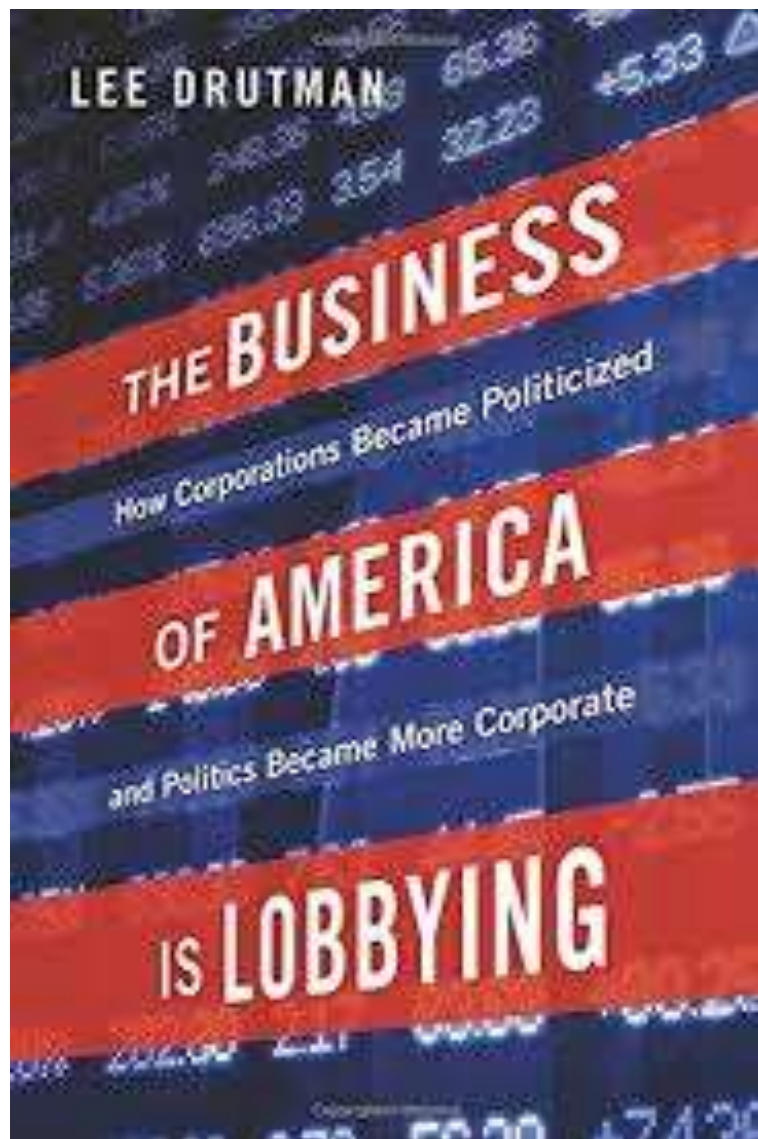
16 March 2016

“those senior scientists who do engage with the government or public — as scientific advisers, for example — often take up highly political positions without acknowledging that they are doing so.”

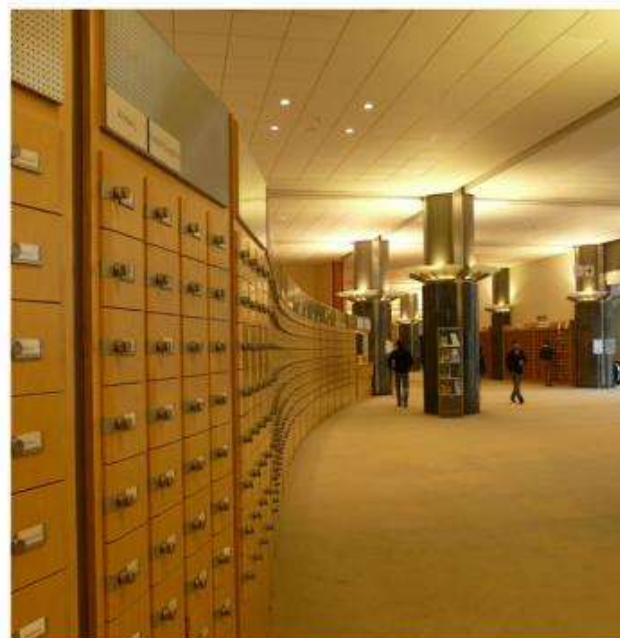
“leading scientific organizations do little except chase money and reinforce the ruling nexus of politics and finance — even since the financial crisis of 2008, which discredited the free-market philosophy that underpins that nexus.”



Science and lobbies and  
evidence based policy



Lee Drutman



l'ordre des choses

AGONE



Sylvain Laurens

Some quick read:

<http://www.nybooks.com/articles/2016/04/07/how-lobbyists-win-in-washington/>

<http://www.contretemps.eu/lectures/lire-extrait-courtiers-capitalisme-sylvain-laurens>



This piece describes in fact  
degenerations of the policy  
& regulatory apparatus  
which are present, not  
future!

# How Trump Could Wage a War on Scientific Expertise

The mechanics of stripping empiricism out of America's regulatory systems

ED YONG

DEC 2, 2016

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# The Solution





Bacon believed that  
in order to achieve  
progress “idols”  
should be swept  
away

"Tempore Patet Occulta Veritas"

=

'Time brings forth hidden truth',  
from the front

From the front page of the New Atlantis



## Many idols in the public discourse on science:

- The Cult of Science, inclusive of:
  - science as metaphysics,
  - scientists as nobler human beings;
- Positivistic, techno-optimistic paradigms;
- Deficit model;
- The idea ‘science’ speak with one voice;
- Science’s neutrality.



# New and old forms of engagement



Jeffrey Beall

Lois Gibbs

Timothy Gowers Marc Edwards

New forms of science: can the science used to discover and dominate nature be used to fix nature's wounds?

→ Post-normal science



Jerry Ravetz &  
Silvio Funtowicz  
~ 1988, Sheffield.

Funtowicz, S. O. & Ravetz, J. R. 1993. Science for the post-normal age. *Futures*, 25(7), 739–755.

Ravetz, J. R. and Funtowicz, S. O., 2015. “Science, New Forms of”, in Wright, J. D., (ed.), *International Encyclopedia of the Social and Behavioral Sciences*, 2nd edition, Vol. 21: 248–254. Oxford: Elsevier.

Funtowicz, S. and Ravetz, J. R., 2015. “Peer Review and Quality Control”, Wright, J. D., (ed.), *International Encyclopedia of the Social and Behavioral Sciences*, 2nd edition. Oxford: Elsevier.

# A PNS reading of the EEA as a boundary organization engaging in a culture of

## Quality

[extended peer communities, pedigrees for evidence based policy, ...]

## Reflexivity

[Challenging existing narratives, deficit model, ...]

## Humility

[Engagement, non hubris, ...]



## THE RIGHTFUL PLACE OF SCIENCE: SCIENCE ON THE VERGE

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**The problem:** Evidence in a storm?

Brexit & end of fact, post-truth word of the year, Trump and the war on scientific expertise

A populist backlash to obliterate science as pride of modernity?

Faults of post-modernist philosophers and their relativism?





**The Causes:** Science's existential crisis. Dysfunctional evidence for policy. Science and lobbies, science and inequality, [Science, innovation & the megamachine for next time]

Whose responsibility for the erosion of trust?

**The Solution & the Way:** EEA as a boundary organization. New forms of science and new forms of quality control. [Responsible quantification for next time]



# END

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