

# Crisis? Surely you're joking

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Post Normal Science Symposium,  
Barcelona, UOC @ Tibidabo  
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Thanks to



UNIVERSITY OF BERGEN



Rachel  
Carson  
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ENVIRONMENT AND SOCIETY



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# Plan of the talk

Our 'now' is in a deep and rapid transformation  
that has science as one of its drivers

The drivers and the implications can be seen more  
clearly with post normal science lenses ...

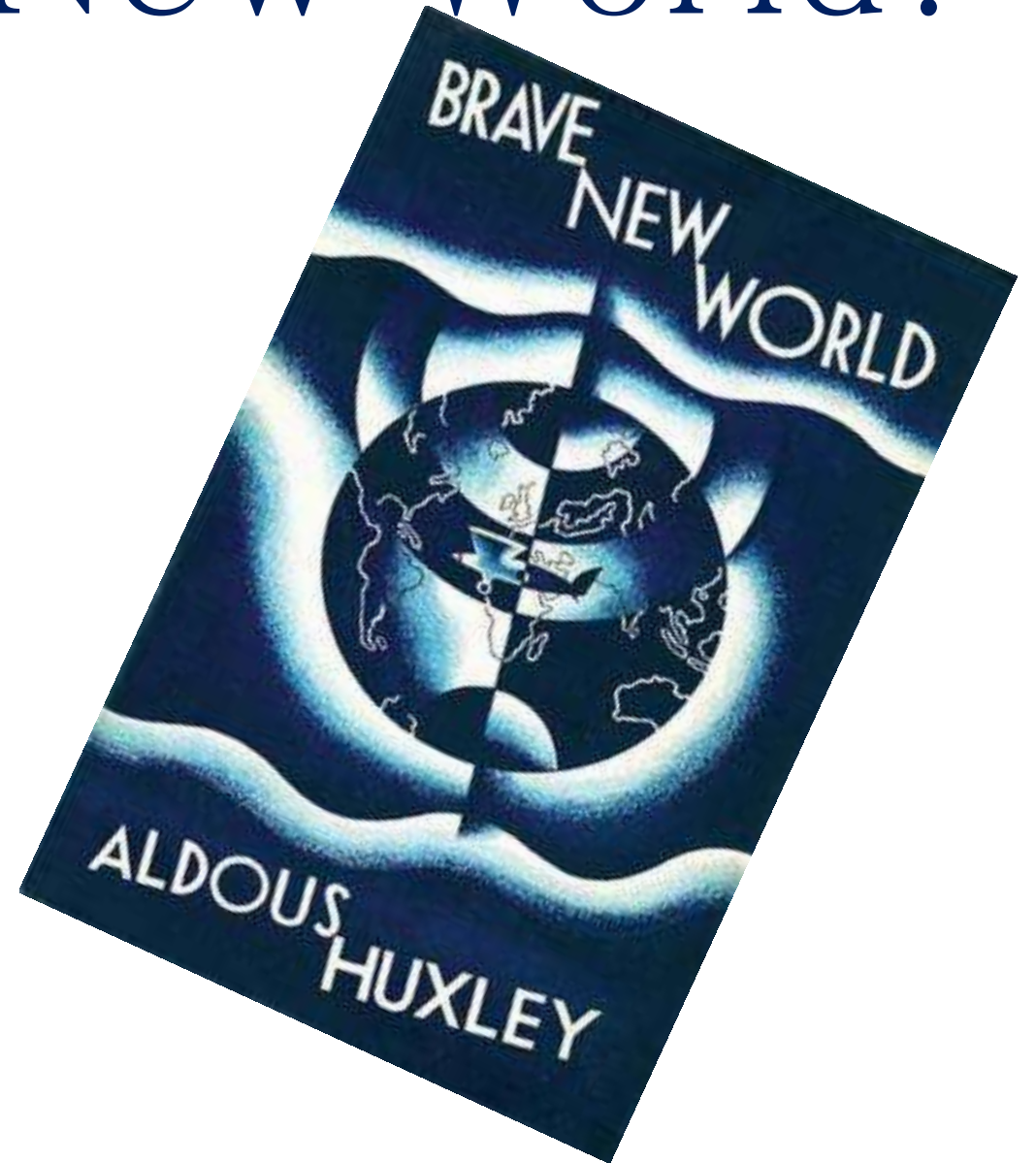
... which offer alternative avenues for resistance  
and reform

# A new Brave New World?



Aldous Huxley

SCI-FI; a totally regimented world  
1932 where drug takes care of  
consent



Continuing a  
conversation started in  
Tübingen

There is a crisis in the quality control of science  
which won't be fixed soon

Science's establishment between denial & technical  
fixes

PNS predicted and diagnosed the crisis and its  
ethical dimension

What to do?

[http://timms.uni-tuebingen.de/tp/UT\\_20170925\\_001\\_pns3\\_0001](http://timms.uni-tuebingen.de/tp/UT_20170925_001_pns3_0001)

EBERHARD KARLS  
UNIVERSITÄT  
TÜBINGEN



A triple crisis



There was once upon a time  
an interface between science,  
policy and technology

This is no longer an interface.  
It has filled all the available  
space...



...permeating all discussions  
on human condition

Majone, G. Evidence, argument, and persuasion in the policy process. Yale University Press, 1989.

A social system theory  
reading

Social evolution leads us toward  
functionally differentiated societal  
systems enhancing  
communication (e.g. Love as a generalized  
symbolic medium of communication) ... and much  
more

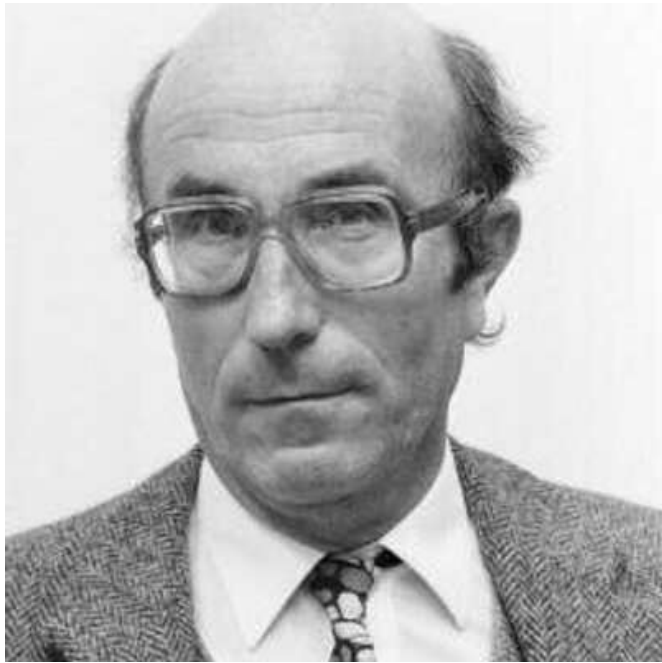


Niklas Luhmann

Moeller, H. G. Luhmann explained. Open Court Publishing Company, 2006.  
Niklas Luhmann, Love as Passion, 1987, Harvard University Press

Science/innovation/technology = a system with a life of its own;  
humans as compulsive communicators

Lewis Mumford's 'Technological compulsiveness'



Niklas Luhmann



Lewis Mumford

# MIT Technology Review

LEO  
TUCKER  
THE FUTURE  
OF FLIGHT

THE  
FUTURE  
OF  
MUSIC

THE  
FUTURE  
OF  
MUSIC



**You Promised Me Mars Colonies.  
Instead, I Got Facebook.**

We've stopped solving big problems.  
Meet the technologists who refuse to give up. ...

The Brave New  
World we are  
entitled to?

Who controls whom?

"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.

Lewis Mumford explained in 1934 how well the 'machine' integrates with capitalism

CULTURAL PREPARATION

23

4: The Influence of Capitalism

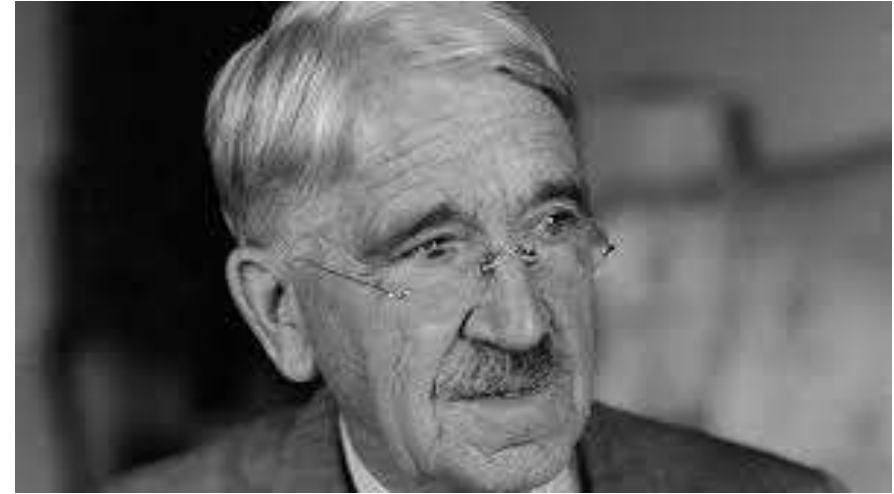
The romanticism of numbers had still another aspect, important

Lewis Mumford, 1934, Techniques and Civilization, ROUTLEDGE & KEGAN PAUL LTD, p. 23-31 of the 1955 edition.



From pragmatists to anarchists (Peter Kropotkin, Mikhail Bakunin), from the fathers of the ecological movement to post-modern thinkers: a common concern about mastering science and technology

“Here lies the contradiction of our civilization. The potentiality of science as the most powerful instrument of control which has ever existed puts to mankind its one outstanding present challenge”



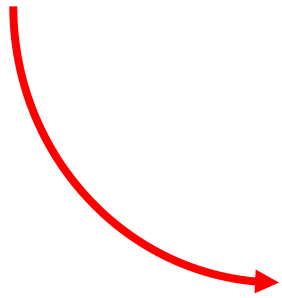
John Dewey

J. Dewey, Science and society, in 'John Dewey: The Later work , 1931-1932 Vol. 6

“Science, which should have been the wind of truth to clear the air, has polluted the air, helped to brainwash, and provided weapons for war.”



Paul Goodman



Now resurgent concern for military/authoritarian apps

# Techies' fury at being drafted for Trump army

Working for the Pentagon is prompting staff revolts in Silicon Valley

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Danny Fortson, San Francisco

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November 4 2018, 12:01am, The Sunday Times

“From Amazon to Google, rank-and-file employees are revolting against their employers for taking the powerful tools they helped to build and selling them for unexpected purposes, from apprehending illegal immigrants to supercharging America’s war machine”



Doubts about the scientific quantification of the impact of new technologies



Fritz Schumacher

Langdon Winner



E. F. Schumacher, 1973, *Small Is Beautiful. Economics as if People Mattered*, Penguin Perennial.

Winner, L., 1986. *The Whale and the Reactor: a Search for Limits in an Age of High Technology*. The University of Chicago Press, 1989 edition.

Funtowicz, S.O. and Ravetz, J.R. (1994). The worth of a songbird: Ecological economics as a post-normal science. *Ecological Economics* 10(3), 197-207.

For Lyotard the grand narrative of the relation between knowledge/science and power has come to an end



Jean-François Lyotard

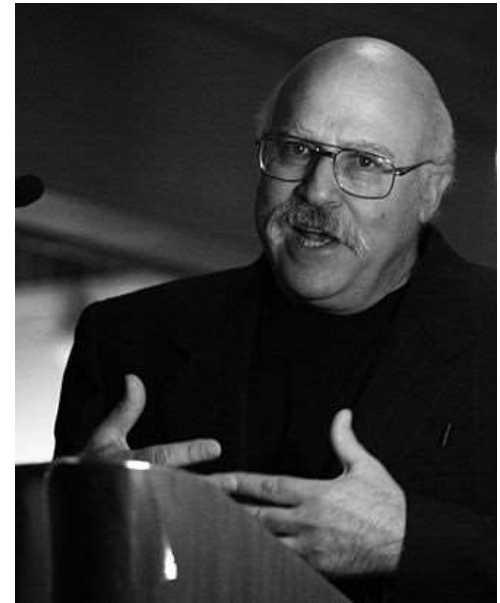
Lyotard, J.-F. 1979. La Condition postmoderne. Rapport sur le savoir, Paris : Minuit.

“Solutions to the problem of knowledge are solutions to the problem of social order...

Trust in Science and trust in the prevailing social order are linked.”



Simon Schaffer



Steven Shapin

Shapin, S., Schaffer, S., 1985, Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life, Princeton, 2011 Edition

# So far:

The crisis is triple: science, technology and policy; it has to be triple; an announced crisis

Communication our destiny, made ineluctable by a self-organizing 'machine' efficiently coupled to capital



Divided we stand

For the laity: all becomes a conspiracy

For the science community: denial

For the lobbyists: cut regulation

Saltelli, A., 2018, Why science's crisis should not become a political battling ground, *Futures*, 104, 85-90.

Saltelli, A., Funtowicz, S., 2017, What is science's crisis really about? *Futures*, 91, 5-11.

# A new breed of science wars, predicted in 2016



January 27, 2017

## To tackle the post-truth world, science must reform itself

Andrea Saltelli, *University of Bergen* and Silvio Oscar Funtowicz, *University of Bergen*

Scientists must bear some responsibility for the post-truth era and the current crisis in democracy.



November 16, 2016

## Science wars in the age of Donald Trump

Andrea Saltelli, *University of Bergen* and Silvio Oscar Funtowicz, *University of Bergen*

Is the election of Donald Trump going to reignite a futile war between science and anti-science?

# What the present science war looks like:

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

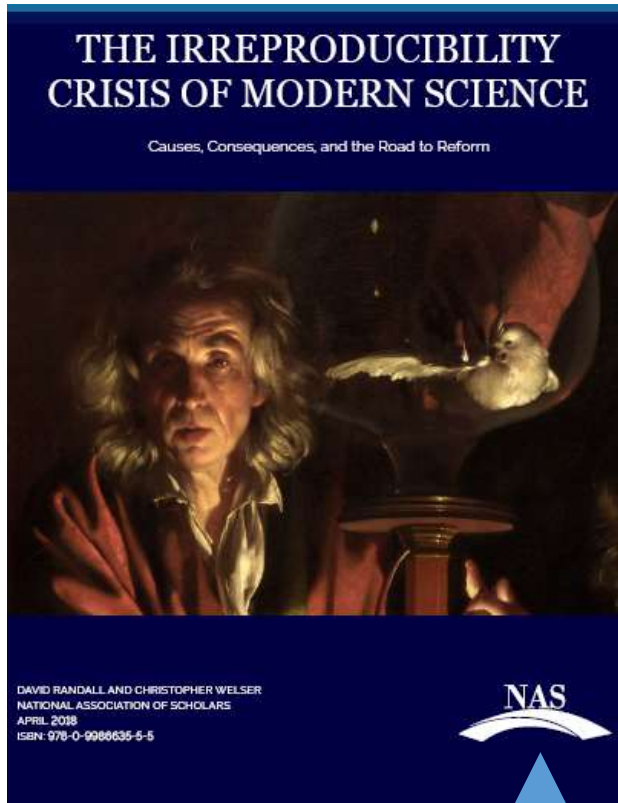
Daniele Fanelli

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. Instead of inspiring younger generations to do more and better science, it might foster in them cynicism and indifference. Instead of inviting greater respect for and investment in research, it risks discrediting the value of evidence and feeding antiscientific agendas.”

On the other side: (conservatives, corporations)



Crisis? Yes, due to progressives' assault on higher education with ideologies such as “neo-Marxism, radical feminism, historicism, post-colonialism, deconstructionism, post-modernism, liberation theology”

National Association of Scholars

# THE IRREPRODUCIBILITY CRISIS OF MODERN SCIENCE

Causes, Consequences, and the Road to Reform



DAVID RANDALL AND CHRISTOPHER WELSER  
NATIONAL ASSOCIATION OF SCHOLARS  
APRIL 2018  
ISBN: 978-0-9988635-5-5



“Congress should pass an expanded Secret Science Reform Act to prevent government agencies from making regulations based on irreproducible research ...”

THE GLOBAL WARMING  
POLICY FOUNDATION

Director: Dr Benny Peiser



Common Sense on  
Climate Change

# PEER REVIEW

## Why skepticism is essential

Donna Laframboise

Date: 27/10/16 | Global Warming Policy Foundation

“If half of published, peer-reviewed papers ‘may simply be untrue’, half of the papers cited by the IPCC may also be untrue”

For scholars of science and technology studies:  
defend science in order to defend the planet

*The New York Times Magazine*

“It was as though the ice was  
sending me a message…”



Ava Kofman, Oct. 25, 2018, Bruno Latour, the Post-Truth Philosopher, Mounts a Defense of Science, New York Times. <https://www.nytimes.com/2018/10/25/magazine/bruno-latour-post-truth-philosopher-science.html>



This is not a larger or  
faster version of the  
old crisis



Salem witch  
trials



#jewsdid911



13. Cover of a popular French edition of the *Protocols*, c. 1934



14. Cover of another popular French edition, c. 1934

Zion protocols

deepfake



Instead of cultural  
evolution of the mind →  
mind hacking

Jaron Lanier



Instead of science fostering social discovery →  
poisonous algorithms (purposeful or otherwise)

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>

Instead of a strategy of  
confusion → confusion  
without strategy

# Recap:

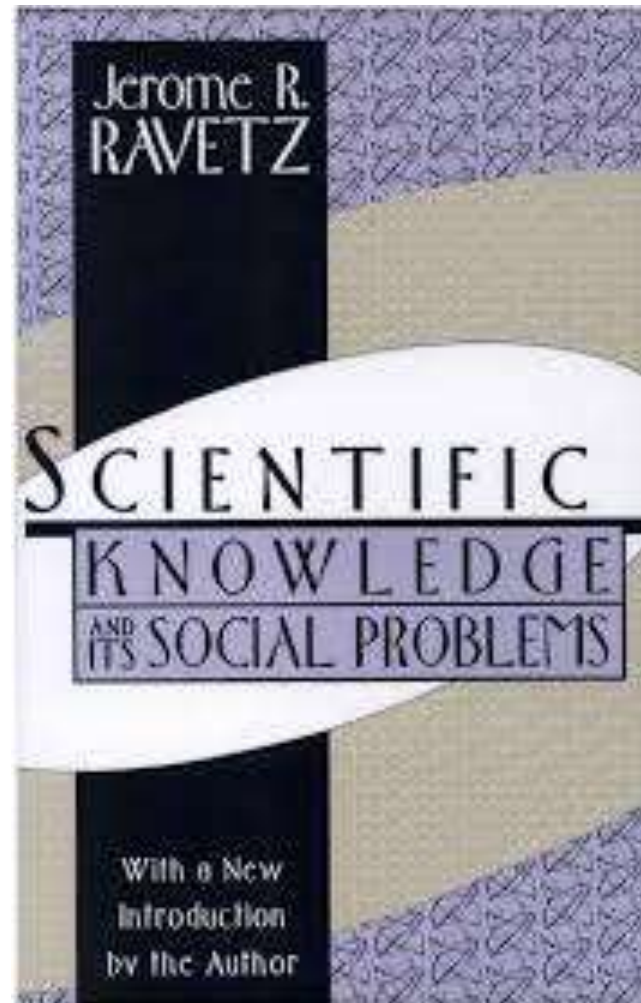
*A divisive crisis*

*A different crisis*

A role for post normal  
science,  
“neither value-free nor  
ethically neutral”

Funtowicz, S. O., and Ravetz, J. R. 1990, Post-normal science: A new science for new times, Scientific European, October 1990, p. 20-22, available here: <https://bit.ly/2FkSsGb>

The most complete diagnosis of the present crisis was offered by post normal science already in its foundational works

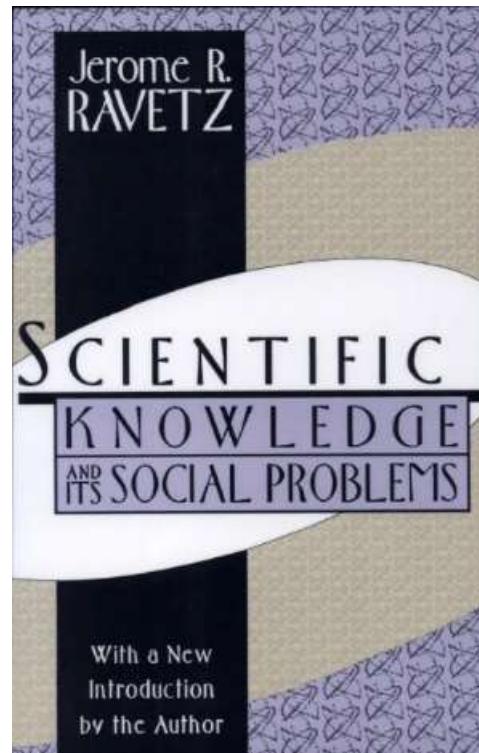


<http://www.andreasaltelli.eu/file/repository/Bits.pdf>



p.22: [...] The problem of quality control in science is at the centre of the social problems of the industrialized science of the present period.”

Ravetz, J., 1971, Scientific Knowledge and its Social Problems, Oxford University Press, available here; <https://bit.ly/2K7qGvD>



Jerome R.  
Ravetz

# Quality as fitness

A critique of cost/benefit and risk analyses; against reductionism (Majone's decisionism)

The need for craft skills in using numbers; NUSAP (Jeroen van der Sluijs)

Available here: <https://bit.ly/2DC2vVs>



The maturing of  
structural  
contradictions

# Contradictions between:

The public image of science and its roles (example: illuministic versus colonial/imperialistic science)

Real and acknowledged uncertainty in science's pronouncements (technological hubris, techno-optimism, ecomodernism; the scourge of implausible quantifications)

Ravetz, J. R. Postnormal Science and the maturing of the structural contradictions of modern European science. *Futures* 43, 142–148 (2011).

Contradictions between:

Technological progress and technological risk

The quality arrangements of little science and big or mega science

Ravetz, J. R. Postnormal Science and the maturing of the structural contradictions of modern European science. *Futures* 43, 142–148 (2011).

Majone, G. Evidence, argument, and persuasion in the policy process. Yale University Press, 1989.

Contradictions between:

Democratic aspirations and elitist practices,  
aggravated by present proletarianization of  
**research** (Jerry's opening; "One can even imagine a bifurcation within  
science, between the socially elite grantholders, ... and the non-elite  
researchers, hoping in vain for social mobility or even for job security")

Ravetz, J. R. Postnormal Science and the maturing of the structural contradictions of modern European science. *Futures* 43, 142–148 (2011).

# Contradictions between ideals and incentives in research practices



Ravetz, J. R. Postnormal Science and the maturing of the structural contradictions of modern European science. *Futures* 43, 142–148 (2011).

... but this is a minority  
report



Nobel and Holberg Prize to advocates/practitioners of cost benefit analyses; new enlightenment frenzy...



William Nordhaus



Cass Sunstein



Steven Pinker

<https://www.sciencemag.org/news/2018/10/roles-ideas-and-climate-growth-earn-duo-economics-nobel-prize>

<https://www.vox.com/future-perfect/2018/10/22/18001014/cass-sunstein-cost-benefit-analysis-technocracy-liberalism>

Steven Pinker, 2018, Enlightenment Now, Penguin.

Where will this lead?

Where will this lead?

Techno-split (Lent, Harari, Lanier)

Rich- versus poor-man science

Transhumanism for the well off

Where will this lead?

Collapse

In politics: nativism, nationalism, authoritarianism,  
politics terrible simplifiers ...)

In science: war of all against all (see example of grievance  
study hoax)

The grievances study hoax <https://areomagazine.com/2018/10/02/academic-grievance-studies-and-the-corruption-of-scholarship/>

Where will this lead?

The science system keeps running:

Open Science, 'cOAlition S', but read Philip Mirowski critique on Open Science as a panacea for all of science's problems, as a favour to corporate interests, the dangers of a Uberization of Science (platform capitalism), gamification, etc.

<https://ec.europa.eu/research/openscience/index.cfm>

<https://www.theguardian.com/science/political-science/2018/jun/29/elsevier-are-corrupting-open-science-in-europe>

<https://www.nature.com/articles/d41586-018-07386-x?>

Mirowski's paper here: <https://www.insis.ox.ac.uk/event/crisis-what-crisis-science>

Better hopes?  
Avenues for resistance  
and Reform

# Silvio Funtowicz: a Reformation for science

Funtowicz, S. & Ravetz, J. R. Peer review and quality control. *Int. Encycl. Soc. Behav. Sci.* 11179–11183 (2015)

<https://theconversation.com/to-tackle-the-post-truthworld-science-must-reform-itself-70455>

[http://www.andreasaltelli.eu/file/repository/Saltelli\\_London\\_0.pdf](http://www.andreasaltelli.eu/file/repository/Saltelli_London_0.pdf)



“By "Reformation" I mean simply an upheaval of belief that is of religious depth, but that does not involve destroying the common faith, but to purge and reform it...”



Paul Goodman

Paul Goodman, 1970, *New Reformation, Notes of a Neolithic Conservative*, PM press (2010 Edition).



“we are not going to give up the mass faith in scientific technology that is the religion of modern times; and yet we cannot continue with it, as it has been perverted.”



Paul Goodman

Paul Goodman, 1970, *New Reformation, Notes of a Neolithic Conservative*, PM press (2010 Edition).

# A post-normal agenda for resistance:

- (1) Recast our public conversation about science – e.g. science isn't a victim
- (2) Seek inspiration in the radical 1970s-era movements that sought to change the world by changing first science itself – turn the deficit model on itself; privilege work with the NGO's and the scientific proletariat rather than with powerful institutions and lobbyists

A post-normal agenda for resistance:

(3) Fight knowledge asymmetries; offer expertise to the weaker stakeholders; help them to shape the questions asked of science

(4) Fight methodological corruption, e.g. deconstructing shoddy quantifications, with NUSAP, sensitivity auditing ...

Saltelli, A., Guimarães Pereira, Â., Van der Sluijs, J.P. and Funtowicz, S., 2013, 'What do I make of your latinorum? Sensitivity auditing of mathematical modelling', *Int. J. Foresight and Innovation Policy*, (9), 2/3/4, 213–234.

# An example of resistance: Number for Policy, an antidote to the rhetoric of evidence based policy

[Matthias Kaiser, THE SOCIAL ORGANIZATION OF SCIENCE.](#)

[Andrea Saltelli, The case of the p-test and science reproducibility problems.](#)

[Silvio Funtowicz, Prodromes of post-normal science.](#)

[Jeroen P. van der Sluijs, Knowledge Quality Assessment, an intro to The Guidance & NUSAP.](#)

[Ragnar Fjelland, Reductionism and complexity.](#)

...

<http://www.andreasaltelli.eu/presentations/#Course>

The End



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