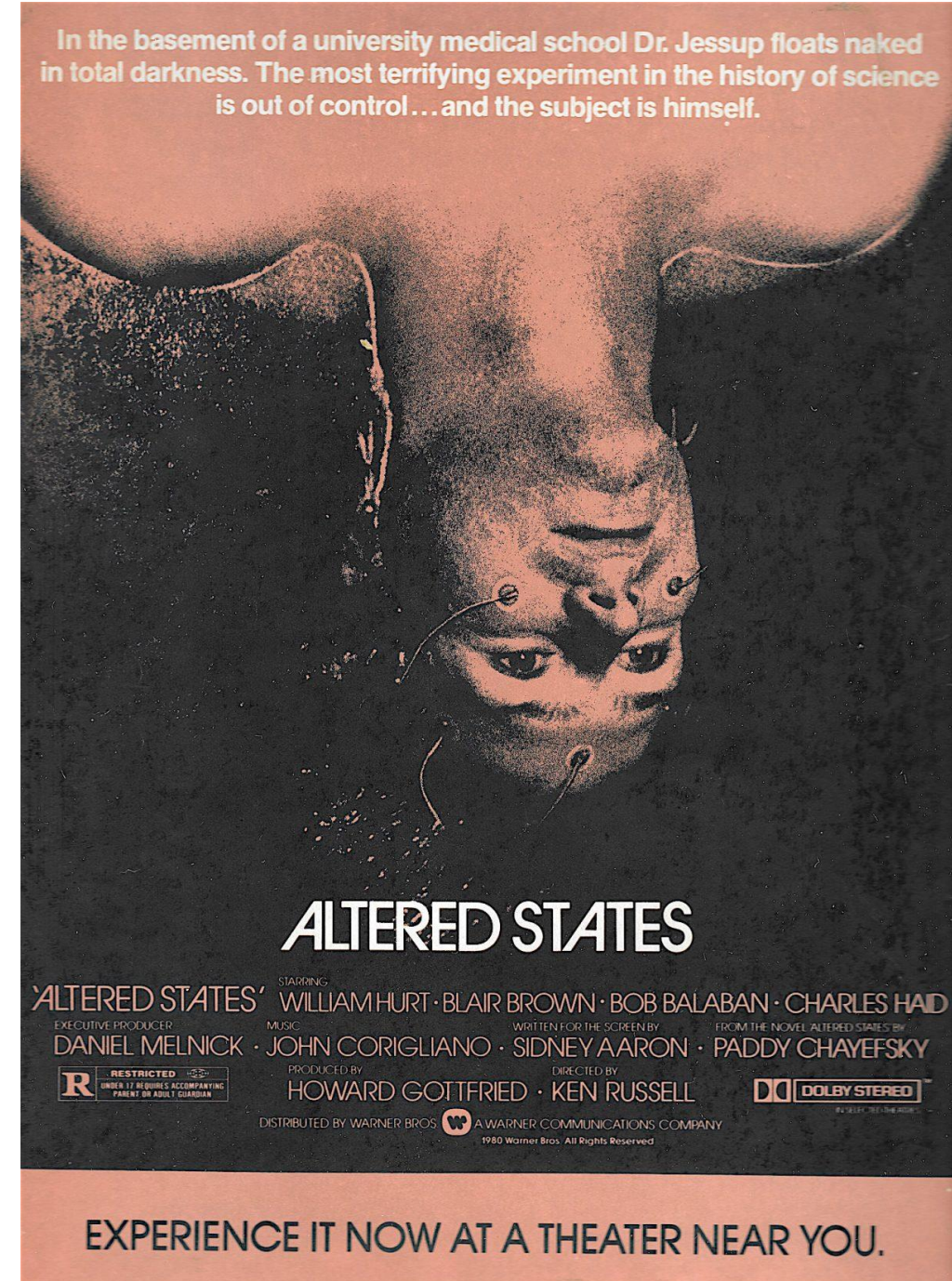


# Altered States: Cartesian and Ricardian dreams

Andrea Saltelli  
Open Evidence Research,  
Open University of Catalonia

Seminar with Erik Reiner and  
Mario Giampietro at the  
Uncomfortable Knowledge Hub

April 14, 2021





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

Andrea  
Saltelli[HOME](#)[ABOUT ME](#)[PUBLICATIONS](#)[NEWS & VIDEOS](#)[RESOURCES](#)

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NEVER PARIBUS

## Tweets by @AndreaSaltelli

andrea saltelli Retweeted

 **I-site ULNE**  
@isiteULNE

#statistiques #probabilités #modélisation  
#prédiction Isabelle Bruno du #CERAPS  
@univ\_lille @CNRS\_HdF @ScPoLille nous parle  
des dérives de la #quantophrénie dans un article à  
lire sur le media @FR\_Conversation  
[https://twitter.com/FR\\_Conversation/status/1302651033164881920](https://twitter.com/FR_Conversation/status/1302651033164881920)

♡ ↗

Sep 7, 2020

 **andrea saltelli**  
@AndreaSaltelli

Pour mes amis francophones. Honoured to be co-author of a statactivist like Isabelle Bruno du #CERAPS @univ\_lille @CNRS\_HdF @ScPoLille @OpenEvidence @UOCNews  
Statistiques et modèles mathématiques : doit-on

Embed

[View on Twitter](#)

# Altered States: Cartesian and Ricardian dreams

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**Erik S. Reinert**

Tallinn University of Technology

UCL Institute for Innovation and Public Purpose

**Monica di Fiore**

Institute for Cognitive Sciences and Technologies, Consiglio Nazionale delle Ricerche

**Andrea Saltelli**

Open Evidence Research, Universitat Oberta de Catalunya (UOC)

**Jerome R. Ravetz**

Institute for Science, Innovation and Society, University of Oxford

WORKING PAPER

WP 2021/07



UCL Institute for  
Innovation and  
Public Purpose



UCL

# Separate but related stories

Cartesian dream:  
possess and domination  
of nature



The 'procedural utopia':  
grounding social harmony and  
progress in calculations







Francis Bacon  
(1561–1626)

Magnalia Naturae, in  
the New Atlantis  
(1627), '*Wonders of  
nature, in particular  
with respect to human  
use*'

We call Cartesian dream the idea  
of man as master and possessor  
of nature, of prediction and  
control, of Bacon's wonders of  
science and of Condorcet's  
mathematique sociale...



René Descartes  
(1596–1650)  
Discourse on Method  
(1637)



Nicolas de Caritat, marquis de  
Condorcet  
(1743– 1794)  
'Sketch for a Historical Picture of  
the Progress of the Human Spirit'



Francis Bacon  
(1561–1626)

Magnalia Naturae, in the New Atlantis (1627),  
*‘Wonders of nature, in particular with respect to human use’*

The prolongation of life; The restitution of youth in some degree; The retardation of age; The curing of diseases counted incurable; The mitigation of pain; More easy and less loathsome surgeries; The increasing of strength and activity; The increasing of ability to suffer torture or pain; The altering of complexions, and fashions of dresses; The altering of statures; The altering of features; The exalting of the intellectual parts; Versions of species; Transplantation of plants; Making of new instruments of husbandry; The destruction of noxious animals, and putting of others upon another body, or upon another place; The acceleration of maturations; Acceleration of the ripening of fruits; The retardation of putrefaction; Acceleration of the ripening of seeds; The retardation of germination; Making rich composts for the use of husbandry; The alteration of the winds of the air, and raising of tempests; Great alteration of the humidity and dryness of the air, and raising of tempests; Turning crude and watery substances into clear and unctuous substances; Drawing of new foods out of substances not now in use; Making new threads for apparel; and new stuffs, such as paper, glass, &c; Natural divinations; Deceptions of the senses; Greater pleasures of the senses; Artificial minerals and cements.



The study of letters leading to “doubts and errors”;

Comparing “disquisitions of the ancient moralists to very towering and magnificent palaces with no better foundation than sand and mud”;

Condemnation of humanities and exaltation of mathematics.



René  
Descartes  
(1596–1650)

Discourse on  
Method (1637)



“I perceived it to be possible to arrive  
at knowledge highly useful in life; and  
in room of the Speculative Philosophy  
[...]



René  
Descartes  
(1596–1650)

Discourse on  
Method (1637)



“to discover a Practical, by means of which, knowing the force and action of fire, water, air, the stars, the heavens, and all the other bodies that surround us, [...]we might also apply them [...]

and thus render ourselves the lords and possessors of nature.”



René  
Descartes  
(1596–1650)

Discourse on  
Method (1637)

In the formulation of Condorcet: “All the errors in politics and in morals are founded upon philosophical mistakes, which, themselves, are connected with physical errors” (Ninth Epoch)



Nicolas de Caritat, marquis de  
Condorcet  
(1743– 1794)

‘Sketch for a Historical Picture of  
the Progress of the Human Spirit’

Overpopulation? War due to scarcity of resources? Will not happen because technical progress and ethical progress will go hand in hand. Man will understand that his duty “will consist not in the question of giving existence to a greater number of beings, but happiness.” (Tenth Epoch)



Nicolas de Caritat, marquis de Condorcet  
(1743– 1794)

‘Sketch for a Historical Picture of the  
Progress of the Human Spirit’



‘Mathématique sociale’: We still use today terms such as ‘Condorcet method’, ‘Condorcet winner’, ‘Condorcet–ranking procedure’



Nicolas de Caritat,  
marquis de Condorcet  
(1743– 1794)  
,

Feldman, J., 2005, Condorcet et la mathématique sociale: enthousiasmes et bemols, Mathematics and Social Sciences, 172(4), 7–41, <http://www.ehess.fr/revue-msh/pdf/N172R955.pdf>

Munda G. (2007) – Social multi-criteria evaluation, Springer–Verlag, Heidelberg, New York, Economics Series



Condorcet's  
algorithms and  
Descartes'  
Geometry: the  
dream always had a  
quantification  
agenda

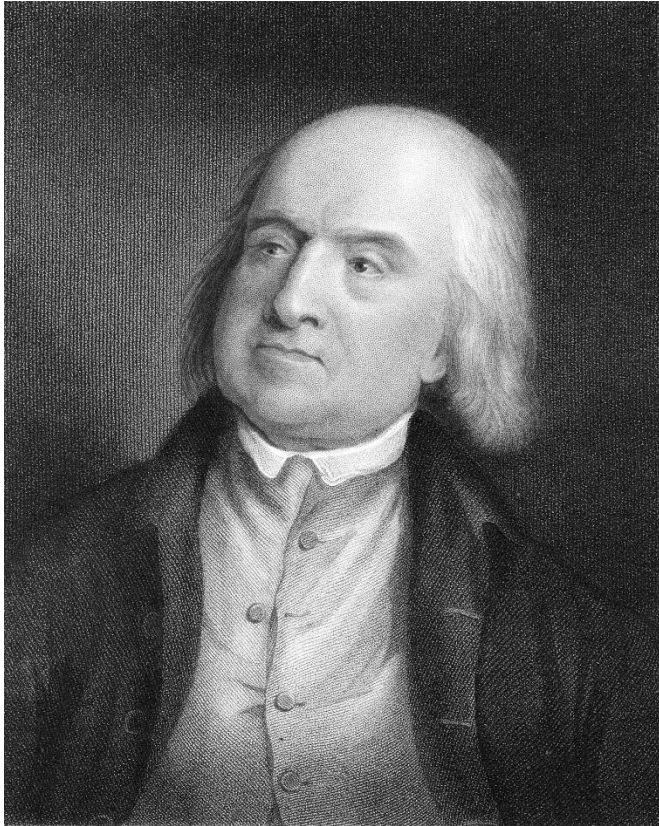




Condorcet's Mathématique sociale  
had its continuation in Bentham's  
utilitarianism

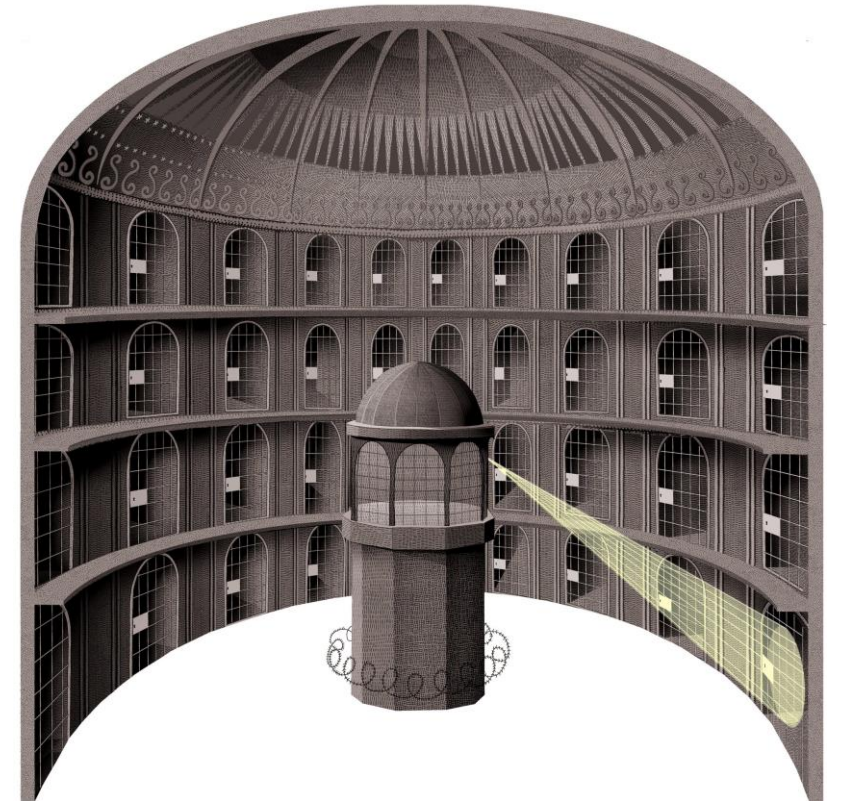


Marquis de  
Condorcet  
(1743– 1794)



Jeremy Bentham  
(1748–1832)

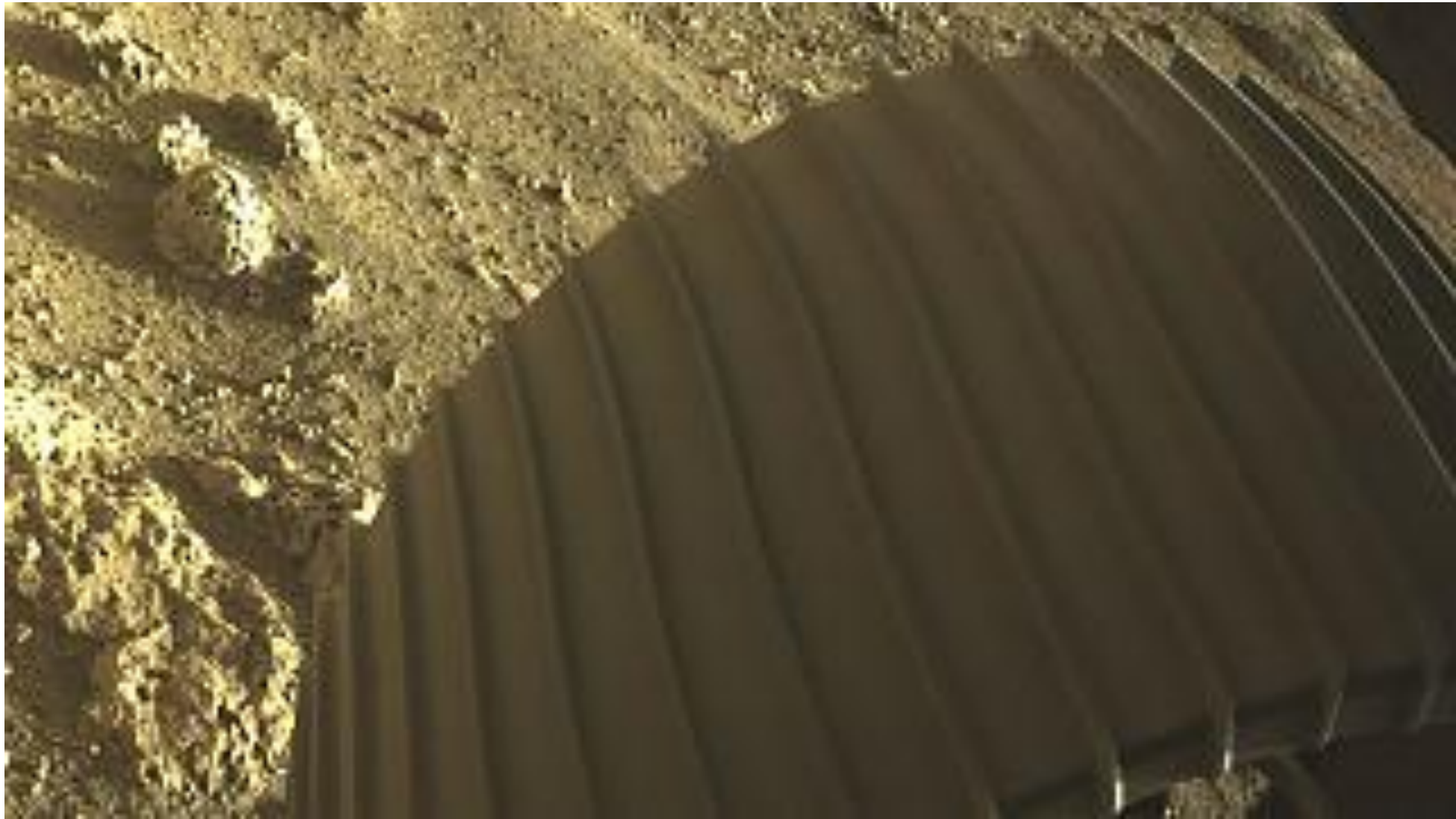
Panopticon



Artwork: Adam Simpson, New York Times



The success of  
the Cartesian  
dream



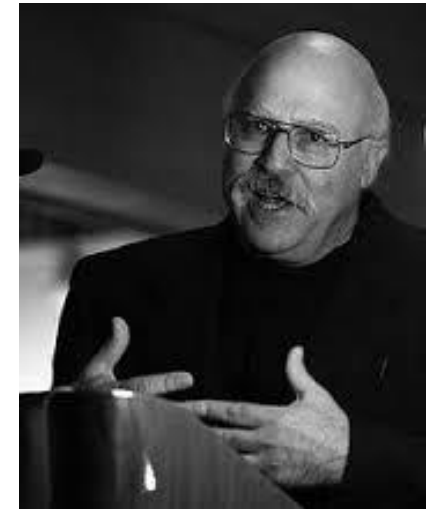
February 18, 2021, Landing of Perseverance on Mars

If you are a natural scientists you were nourished and trained in the Cartesian dream, (S. Toulmin: ‘The hidden agenda of modernity’)



Stephen Toulmin

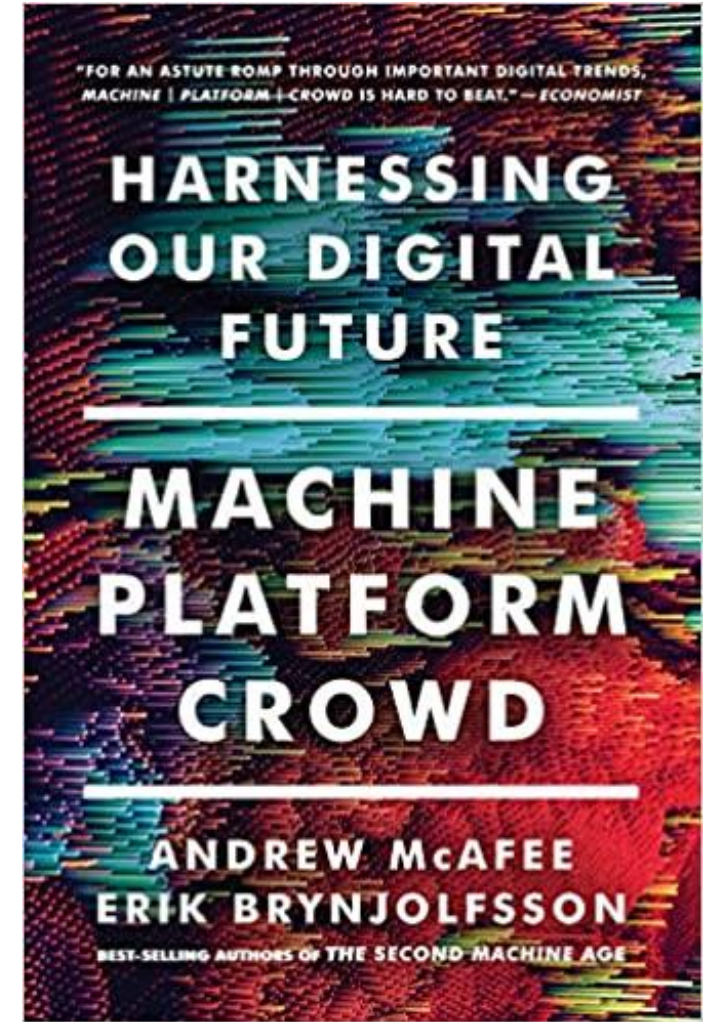
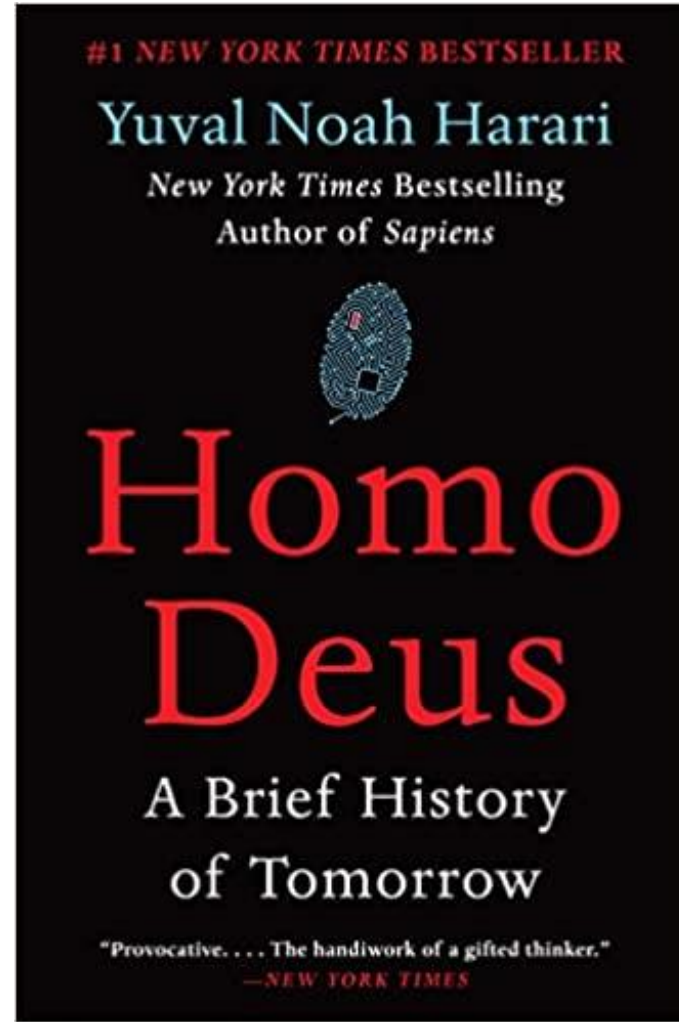
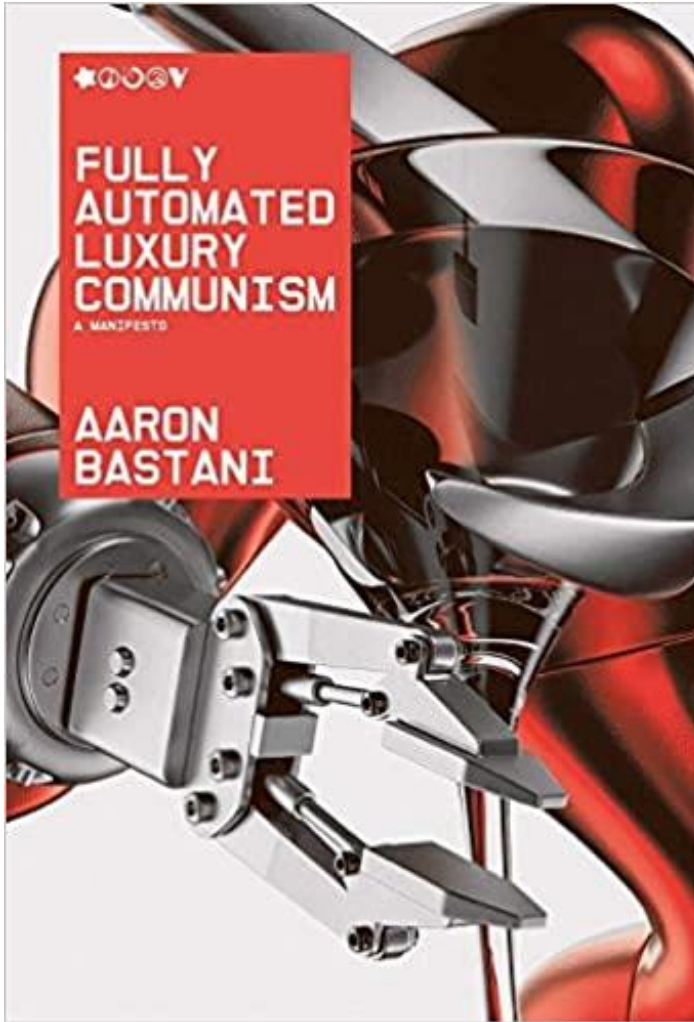
The dream was spectacularly successful, in all fields of endeavor, leading to what Steven Shapin calls ‘invisible science’



Steven Shapin

Steven Shapin, 2016, Invisible Science, The Hedgehog Review: Vol. 18 No. 3 (Fall 2016).





The prevailing ‘sociotechnical imaginary’  
(Jasanoff, 2015)

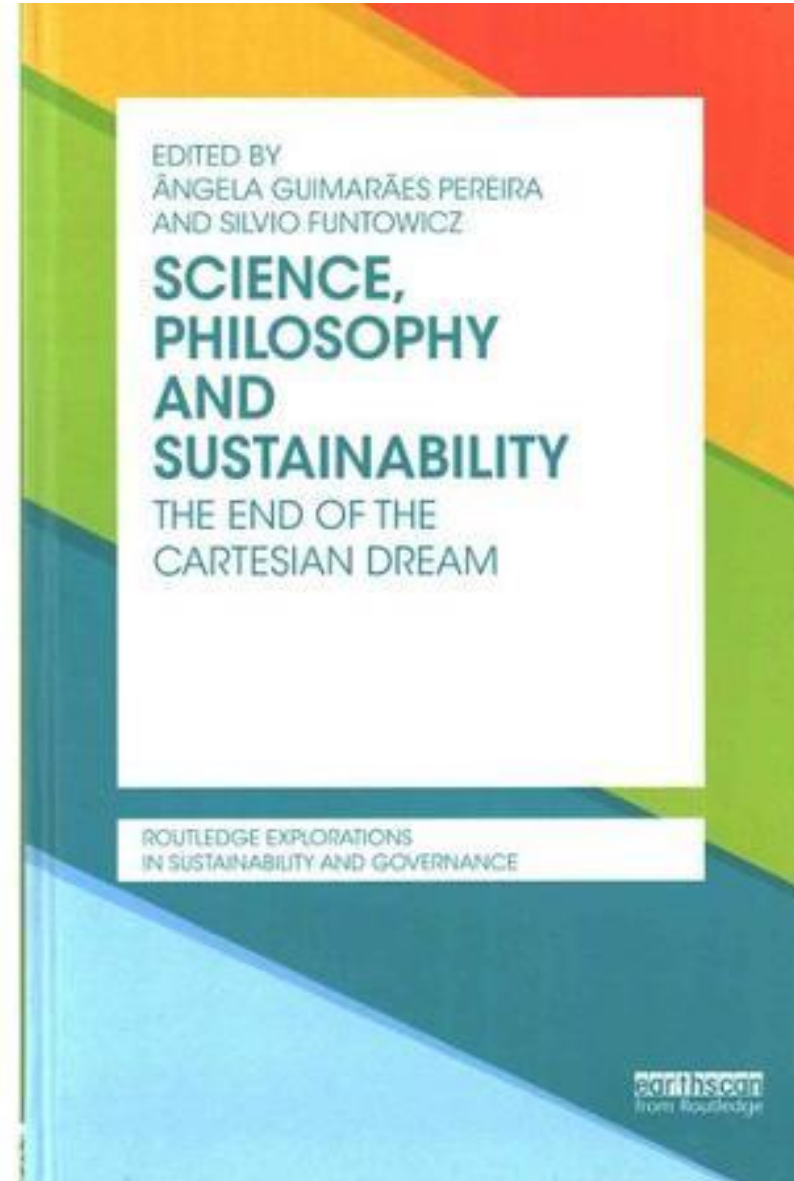
# Minority views



Ravetz, J, R, 2015,  
Descartes and the  
rediscovery of ignorance,

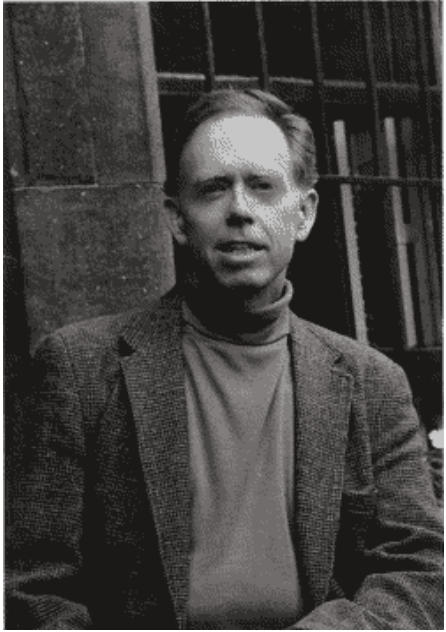
in

Guimarães Pereira, Â, and  
Funtowicz, S, Eds, 2015,  
The end of the Cartesian  
dream, Routledge.





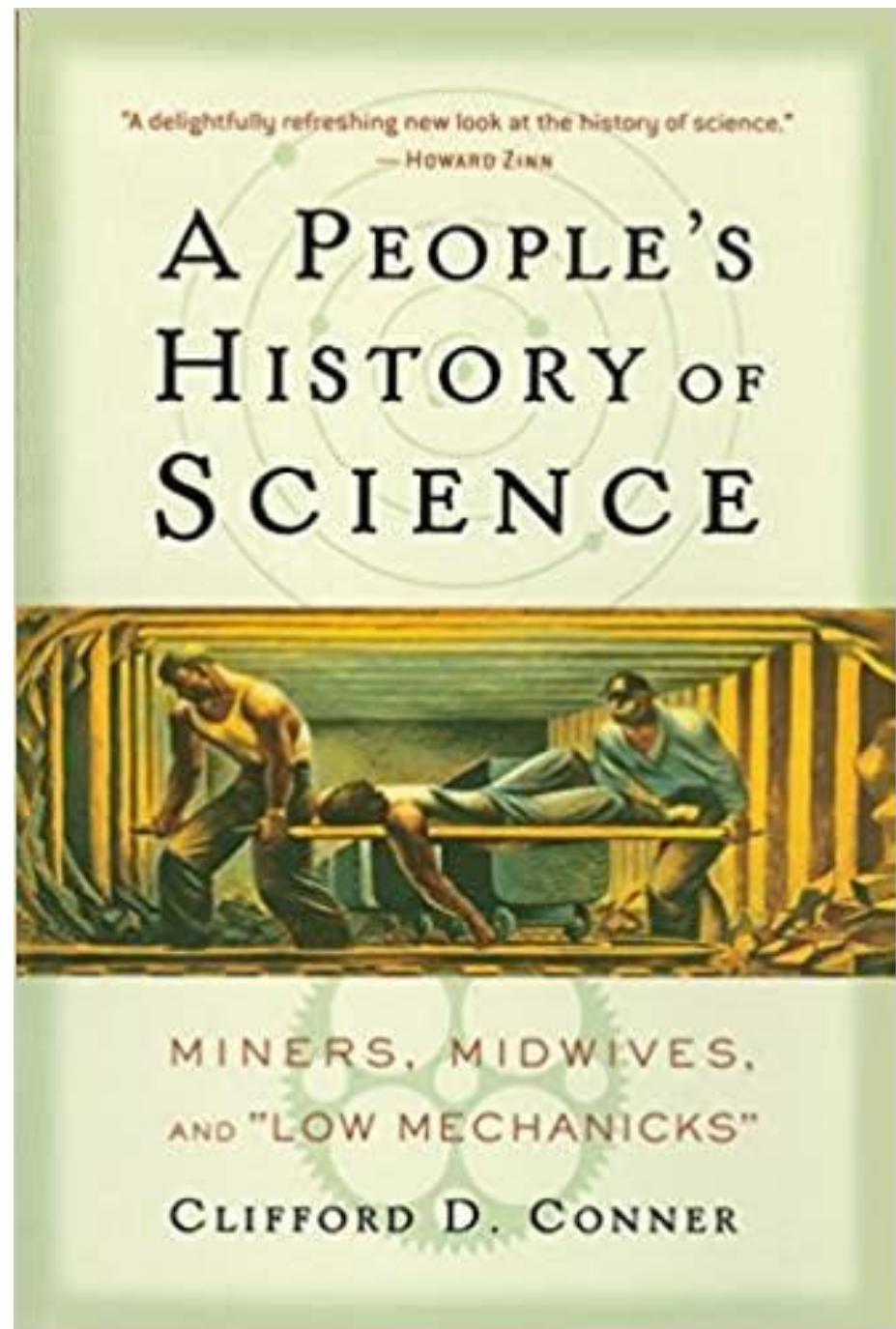
# A different vision



Clifford D. Conner

An antidote to a vision of the history of science as the fruit of the intuition of great (mostly) men

‘Knowing what’ was often only possible after ‘knowing how’ had been discovered



Many voices of alarm as  
to misuse of quantification

...

via numbers, visible and  
invisible...

Blurring lines:

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



Elizabeth  
Popp Berman

E. Popp Berman and D. Hirschman, *The Sociology of Quantification*: Where Are We Now?, *Contemp. Sociol.*, vol. in press, 2017.



And an explosion of works, from within  
and without, from many disciplines

Humanities & Social Sciences  
Communications



Article | [Open Access](#) | Published: 19 August 2020

## From sociology of quantification to ethics of quantification

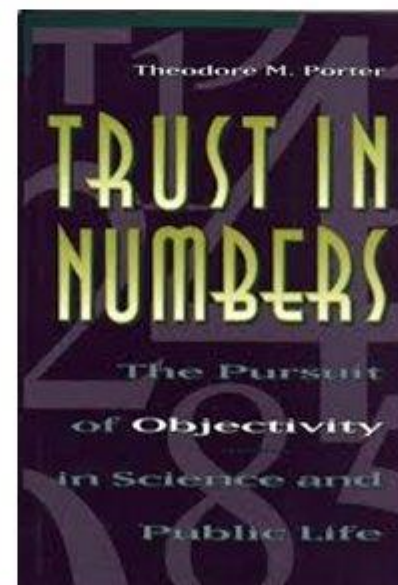
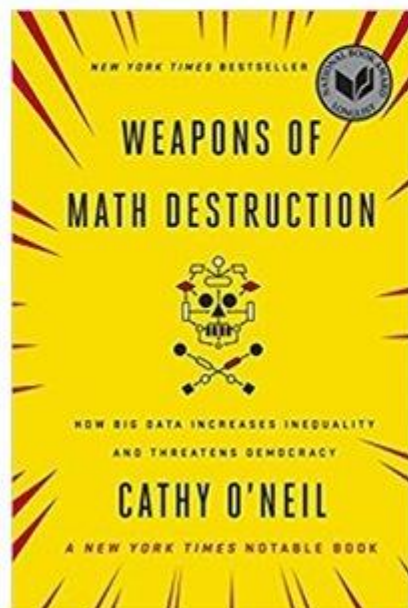
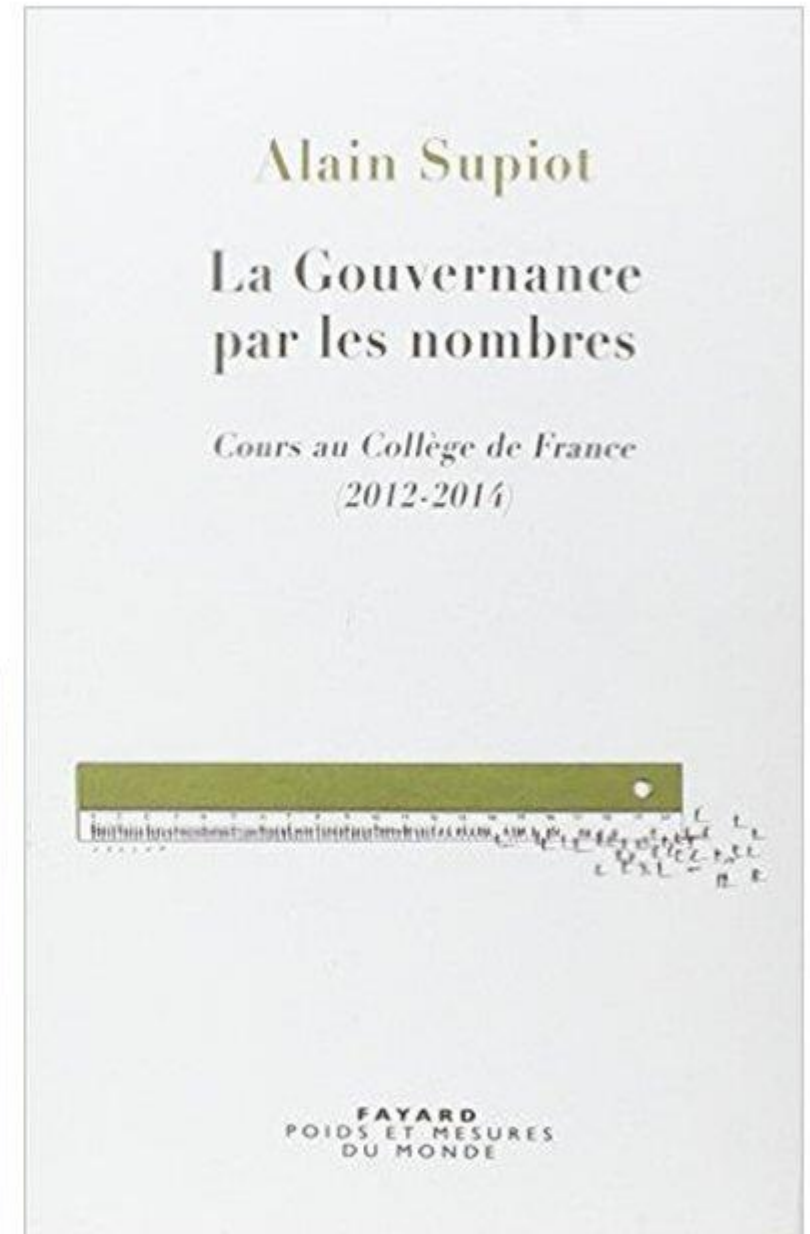
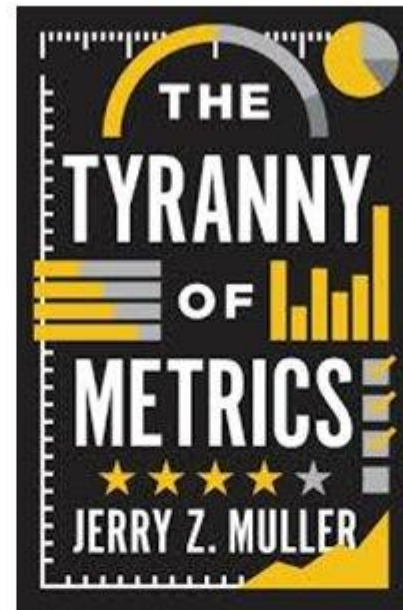
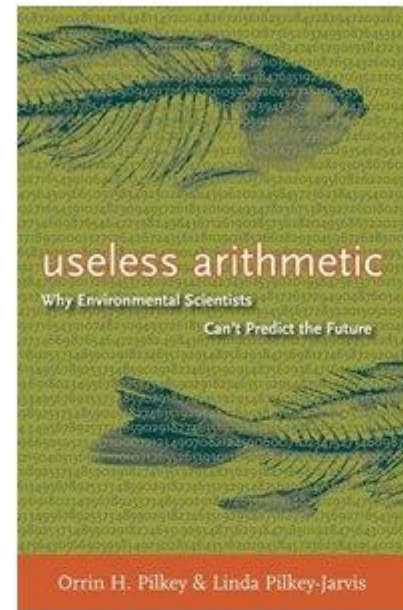
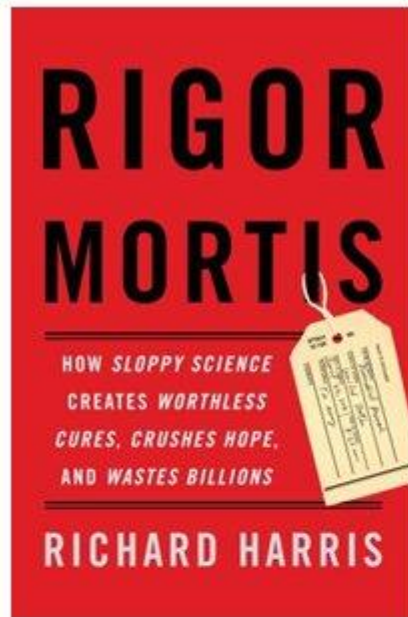
Andrea Saltelli  & Monica Di Fiore 



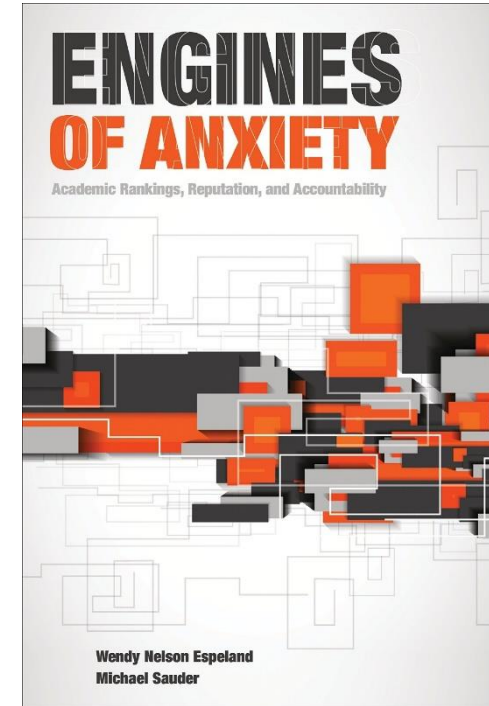
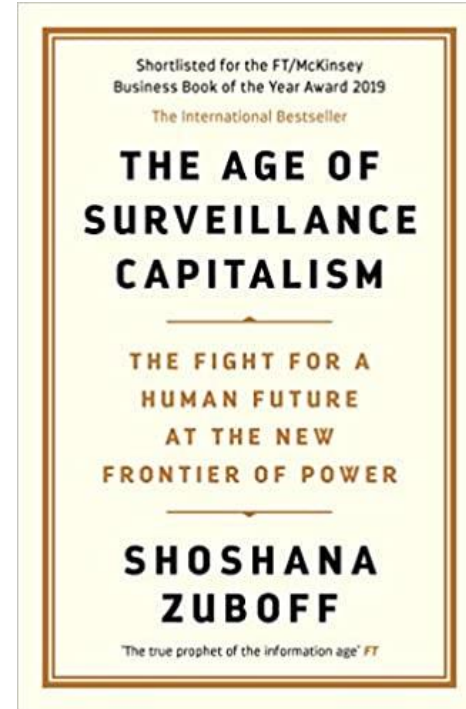
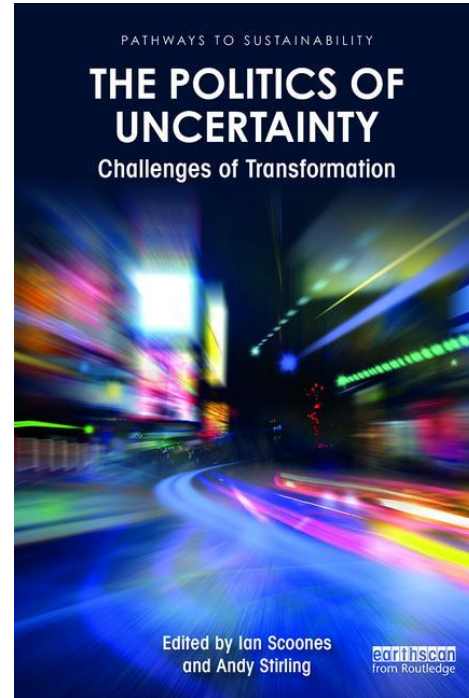
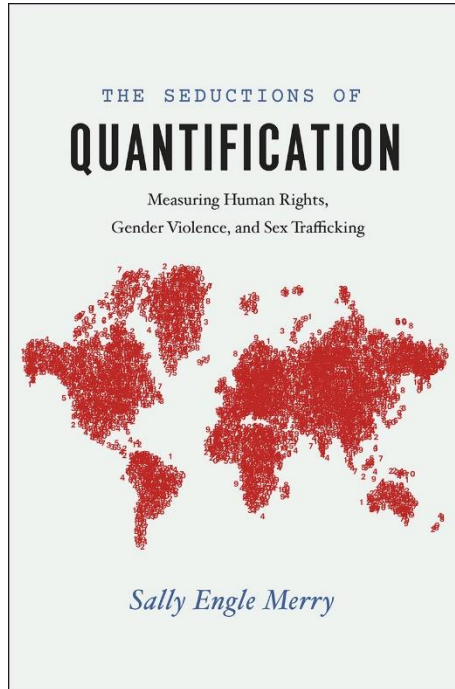
*Humanities and Social Sciences Communications* **7**, Article number: 69 (2020) | [Cite this article](#)

**852** Accesses | **25** Altmetric | [Metrics](#)

# Algorithms, models, metrics, statistics...



# Algorithms, models, metrics, statistics...





Numbers and their ‘reactivity’  
(Espeland and Sauder, 2016)

Incumbent numbers affect what society will  
measure in the future (Merry 2016)

Numbers “create the environment that  
justifies their assumptions”  
(O’Neil, 2016)

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



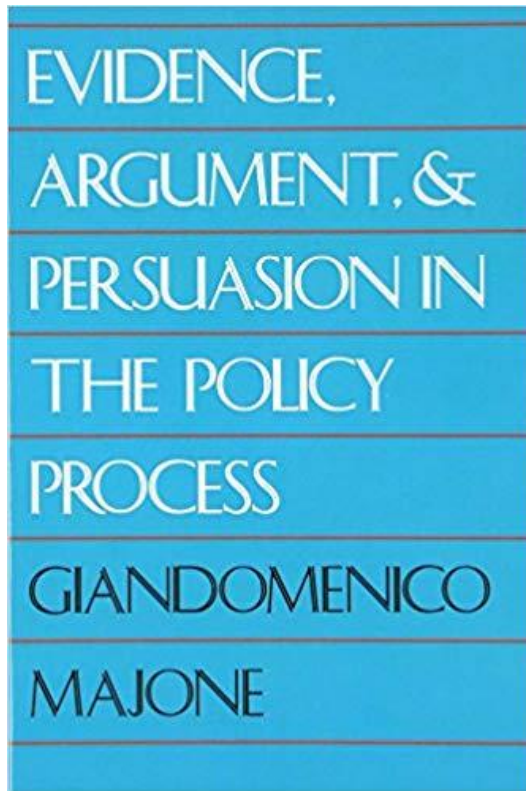
Andrew Stirling

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

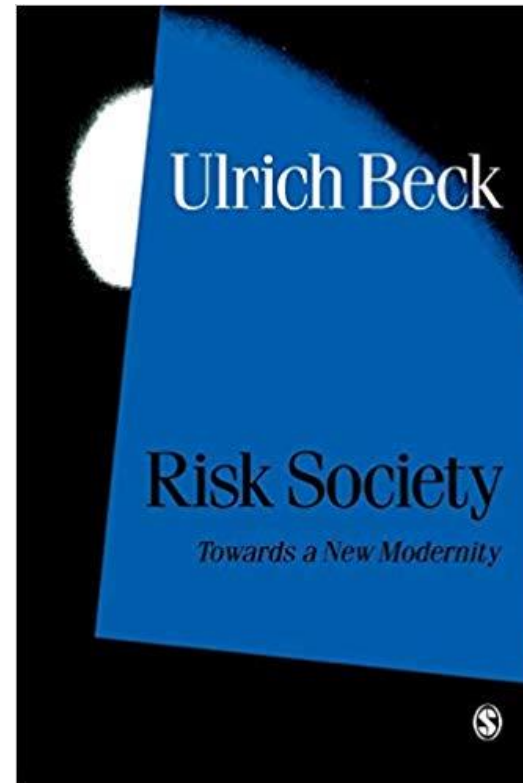
# From Ulrich Beck to Giandomenico Majone: the technique is never neutral



Ulrich Beck  
(1944 –2015)



1989



1992 (1986)



Environmental Science & Policy

Volume 106, April 2020, Pages 87-98



The technique is never neutral. How  
methodological choices condition the  
generation of narratives for sustainability

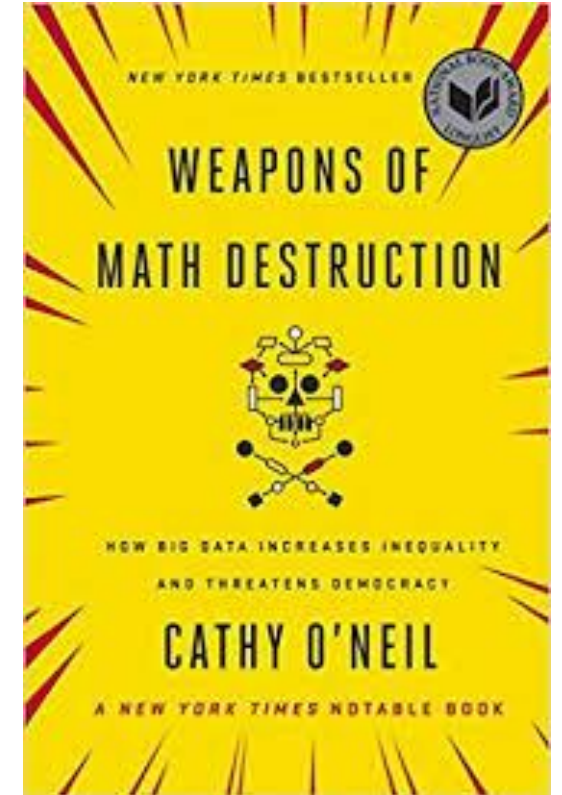
Andrea Saltelli <sup>a, b</sup> ✉, Lorenzo Benini <sup>c</sup>, Silvio Funtowicz <sup>a</sup>, Mario Giampietro <sup>d, e</sup>, Matthias Kaiser <sup>a</sup>,  
Erik Reinert <sup>a, f</sup>, Jeroen P. van der Sluijs <sup>a, g, h</sup>



# Alarm for Weapons of Math Destruction



Cathy O'Neil



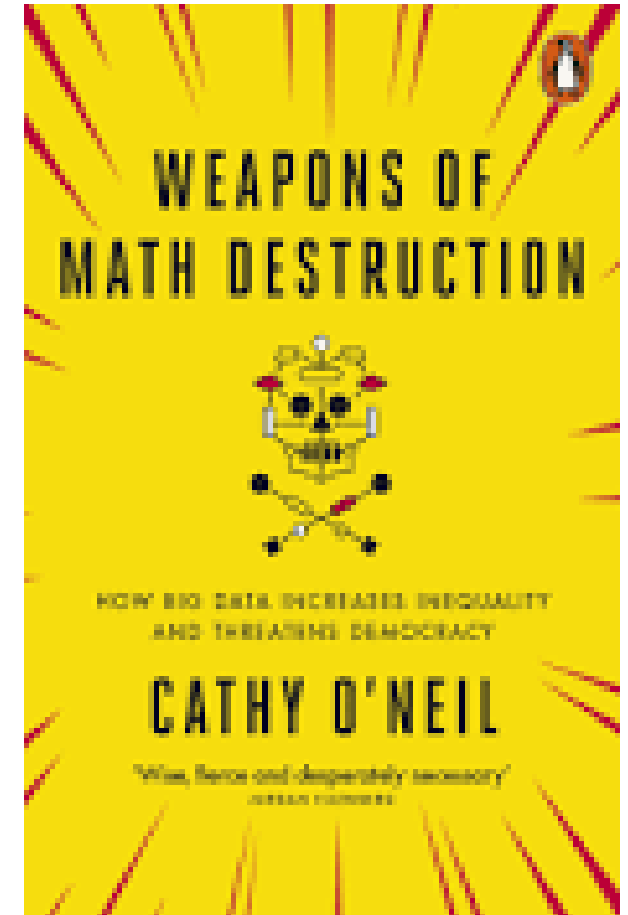
O'Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

Weapons of math destruction:  
opaque, harm, scale

Hackathons to  
reverse  
engineering  
proprietary  
software &  
uncover  
normative bias

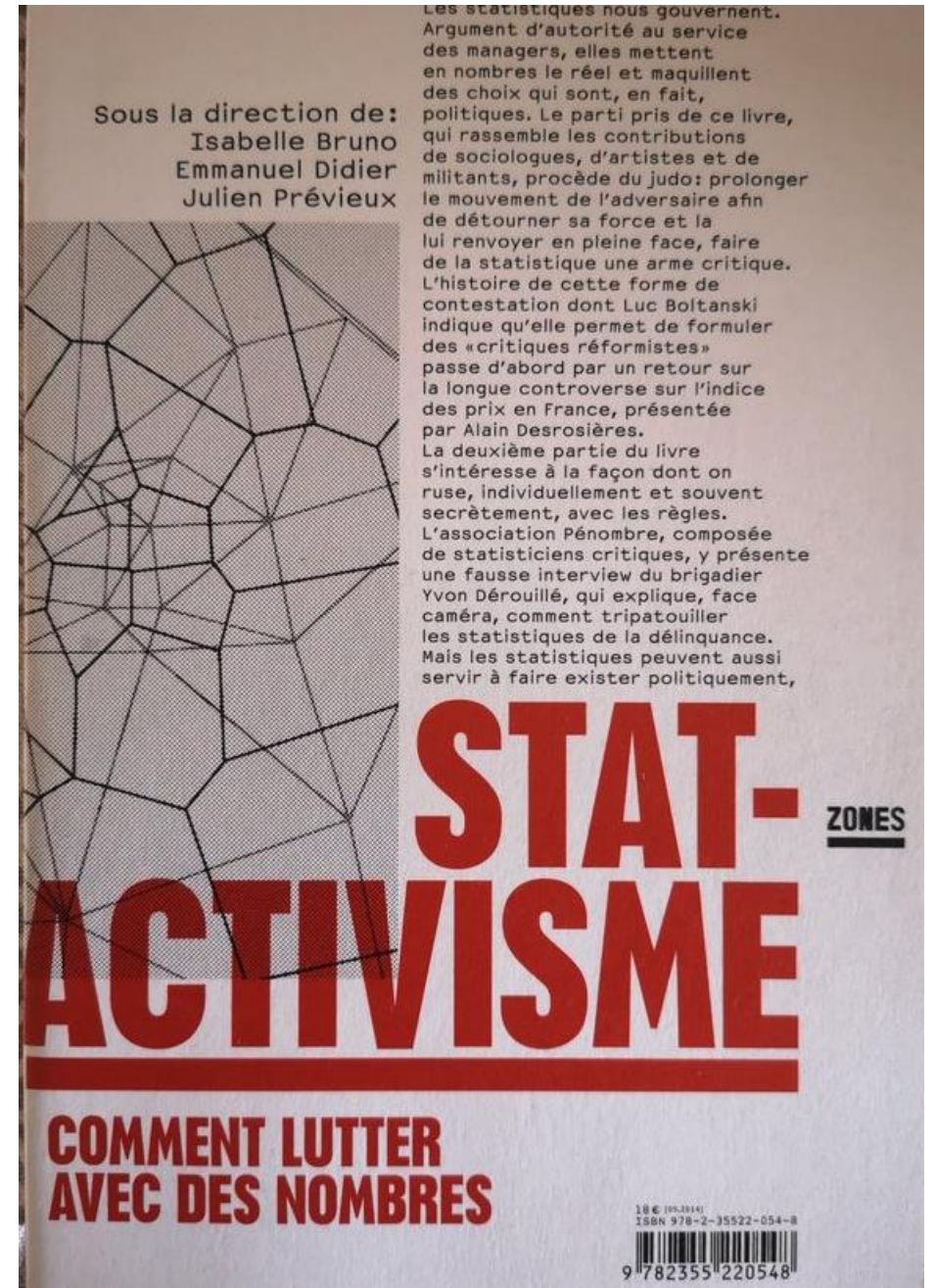


Cathy O'Neil



# 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





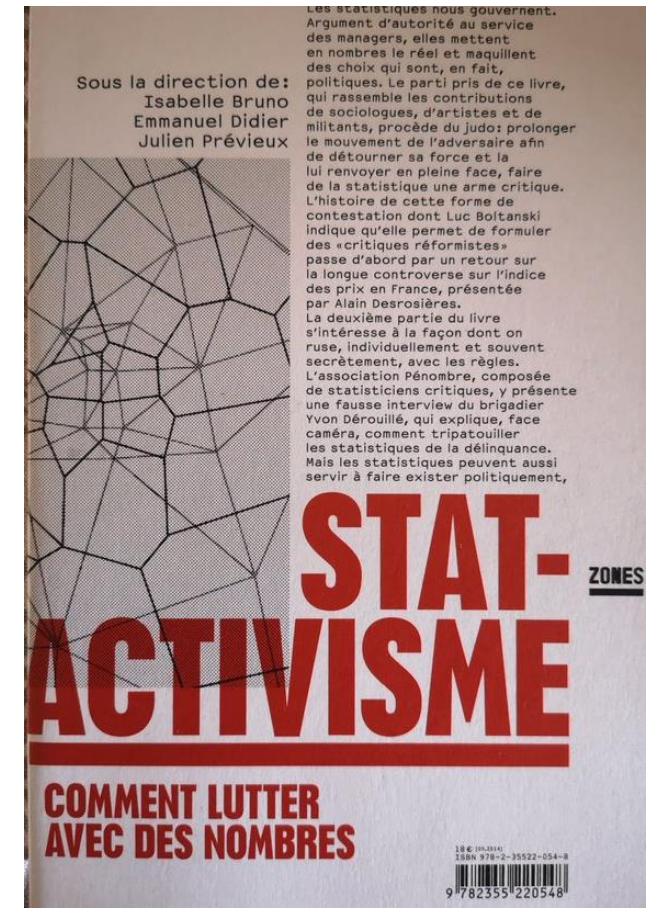
# How to be a "statactiviste"?

E.g.: Deconstruct existing metrics, including using irony (Pierre Bourdieu, *Les héritiers*).



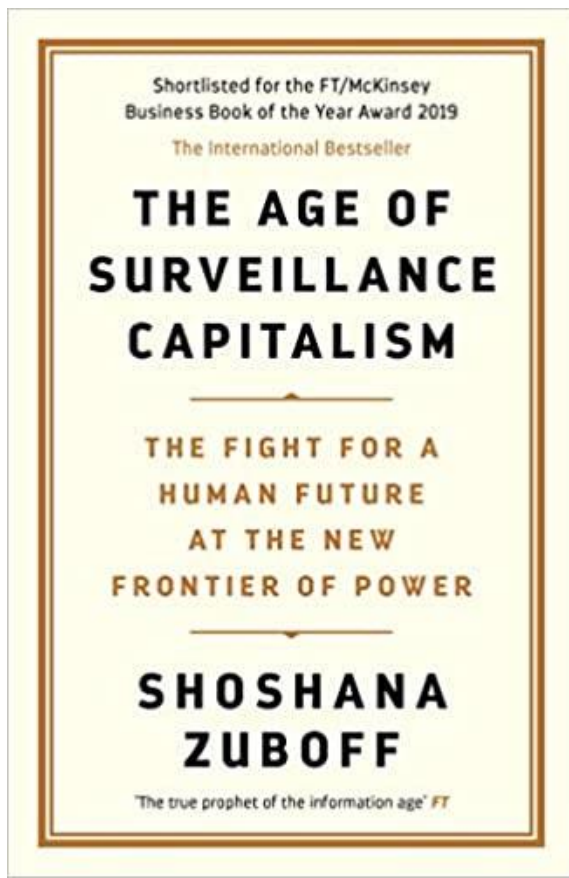
La sociologie,  
ça doit être  
rigolo

(Sociology must be fun)

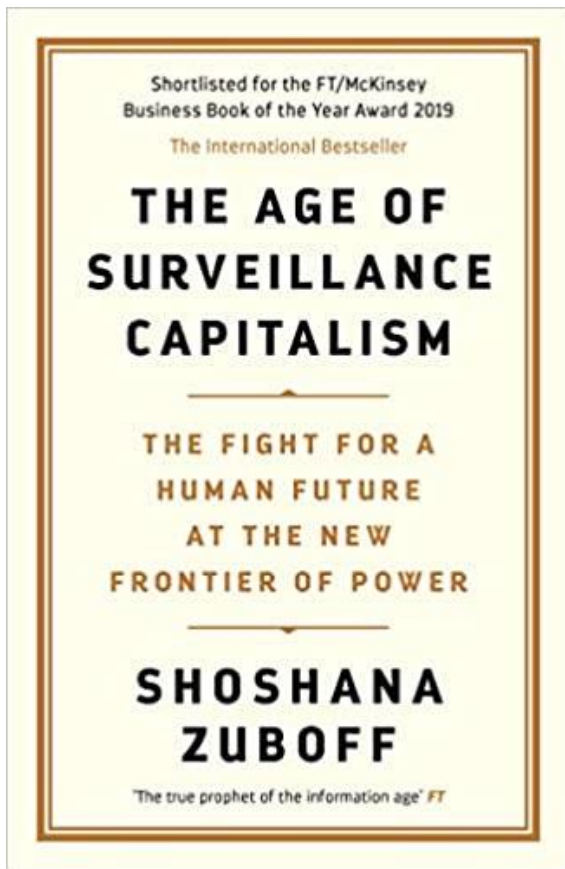




A project of domination of consumers and voters is made possible by artificial intelligence, big data & cognitive psychology

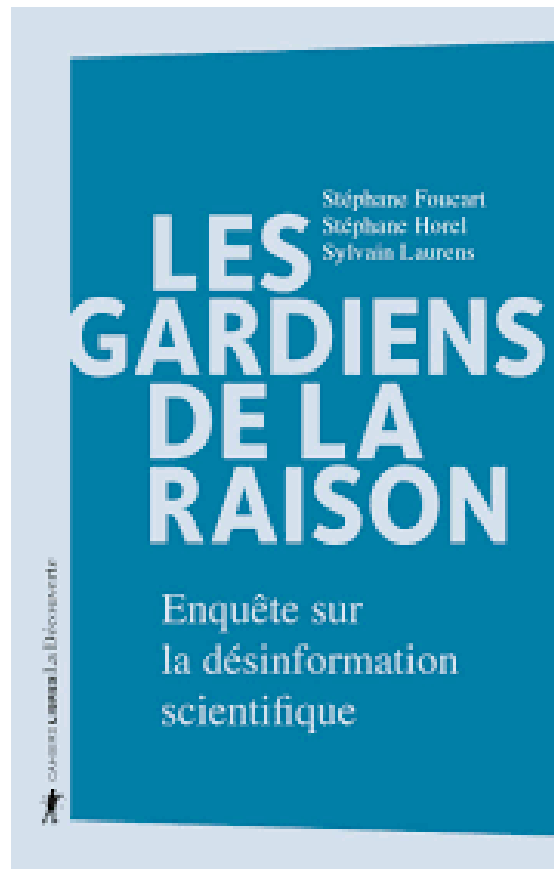


Inequality, power asymmetries and the world of surveillance capitalism



Chapters 11 & 12

Instrumentarian  
power



Chapter 10

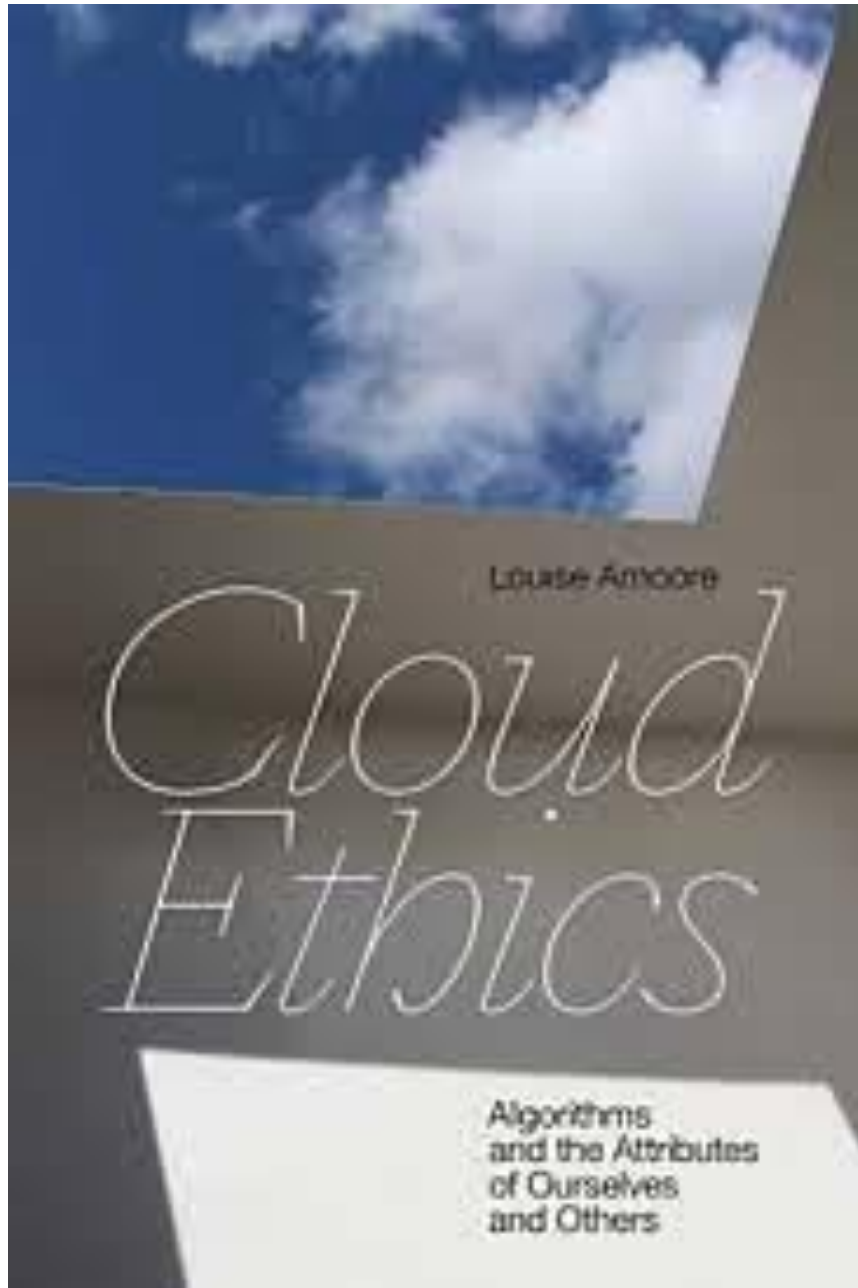
*Néorationalism d'importation*

*La trollisation de l'espace  
public*

Cognitive psychology  
and evolutionary  
psychology

A project of domination?





Making algorithms  
'good' or 'transparent'  
is beyond the point.  
Algorithms create new  
norms of good or bad.

Algorithm =  
ethicopolitical  
arrangement of  
values, assumptions,  
and propositions about  
the world



Louise Amoore

The banner features a blue background with a faint image of a computer mouse on the left and a wavy line across the bottom. The LSE logo is in the top right corner.

# LSE Research Online



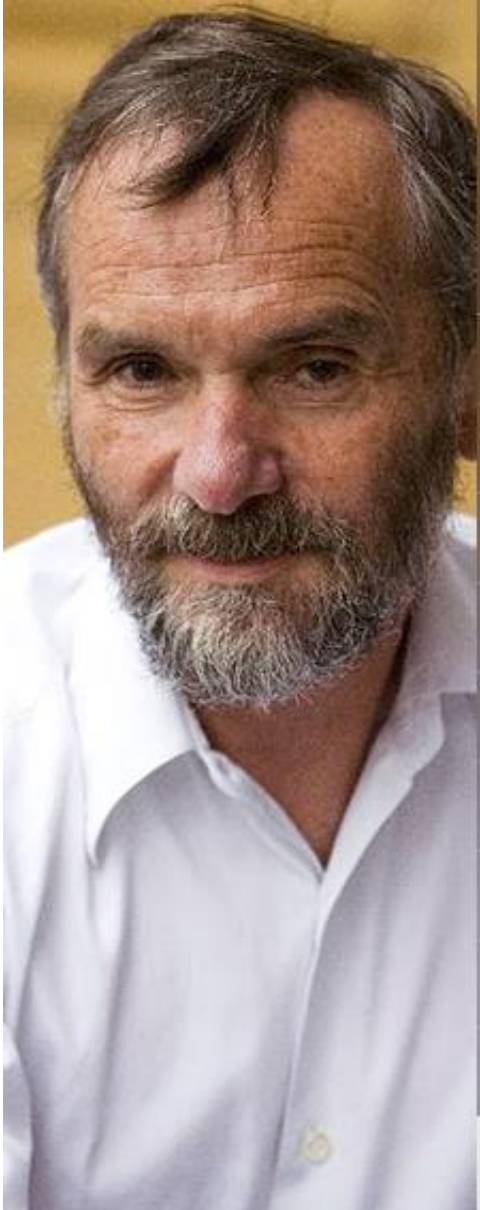
THE LONDON SCHOOL  
OF ECONOMICS AND  
POLITICAL SCIENCE ■

[Nick Couldry](#) and Ulises Mejias

**Data colonialism: rethinking big data's  
relation to the contemporary subject**

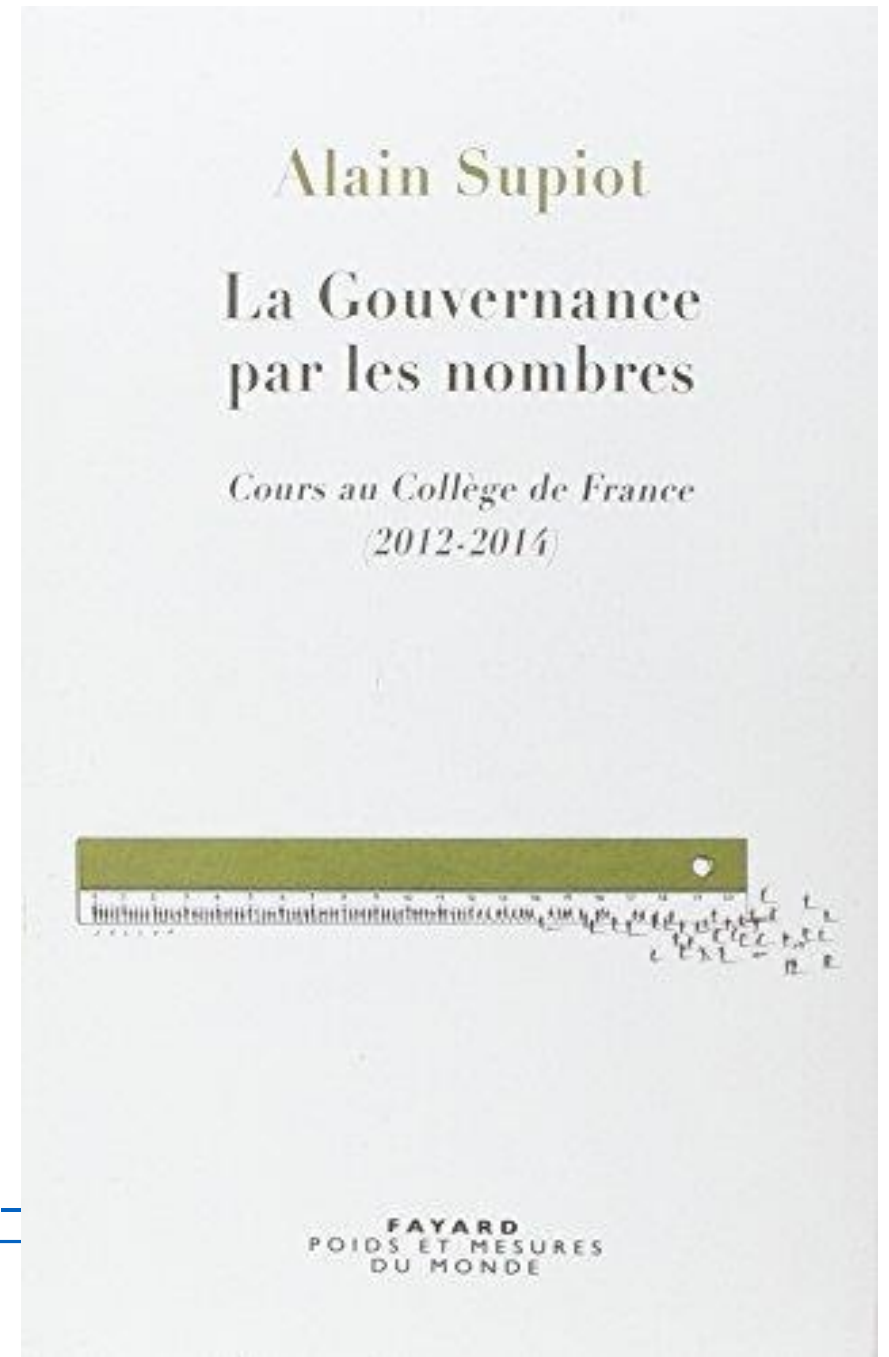
**Article (Accepted version)  
(Refereed)**

# Alain Supiot



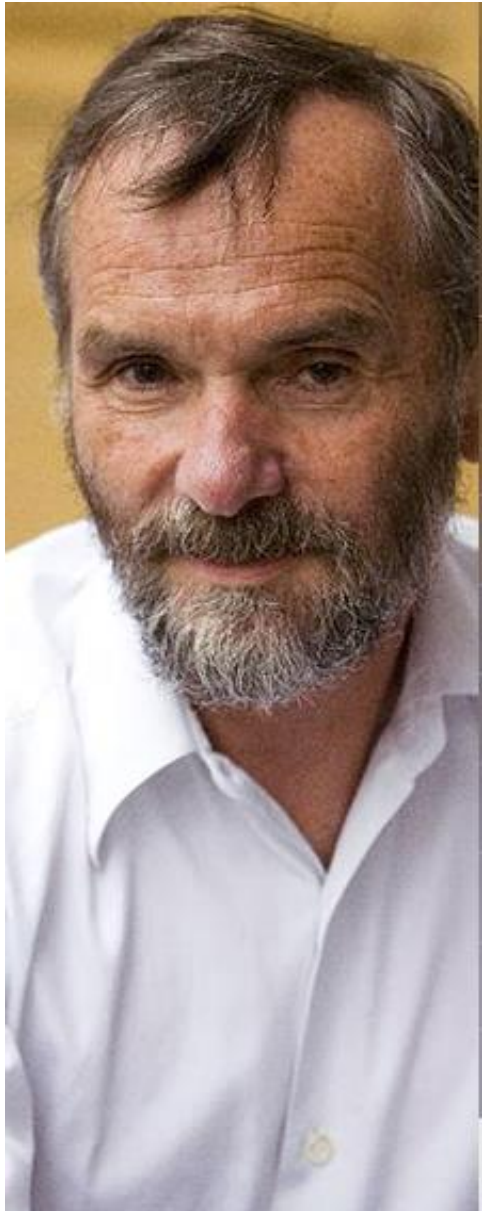
An indictment of the  
Total Market and the  
normative uses of  
economic quantification

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





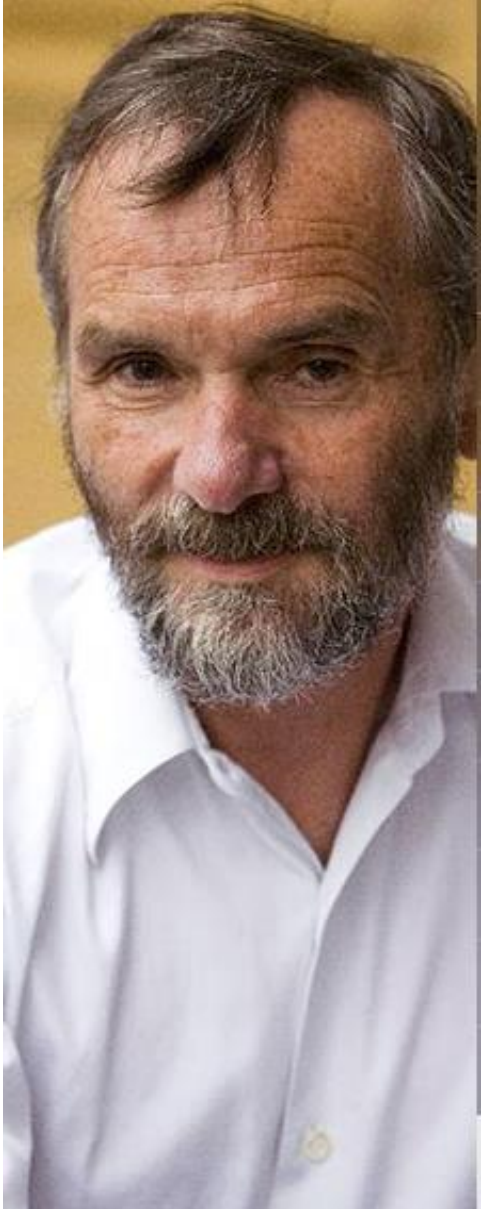
# Alain Supiot



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

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

# 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

# Statistical and mathematical modelling



Error Statistics Philosophy

# ERROR



## A. Saltelli (Guest post): What can we learn from the debate on statistical significance?

Posted on November 22, 2019 by Mayo



**Professor Andrea Saltelli**

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

*What can we learn from the debate on statistical significance?*

# SIGNIFICANCE

Business

Culture

Politics

## Cargo-cult statistics and scientific crisis

Written by Philip B. Stark and Andrea Saltelli on 05 July 2018. Posted in [Science](#)



Statistics in the  
wake of the  
reproducibility  
crisis

# Statistical wars?

# 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.



Illustration by David Parkins



**nature**



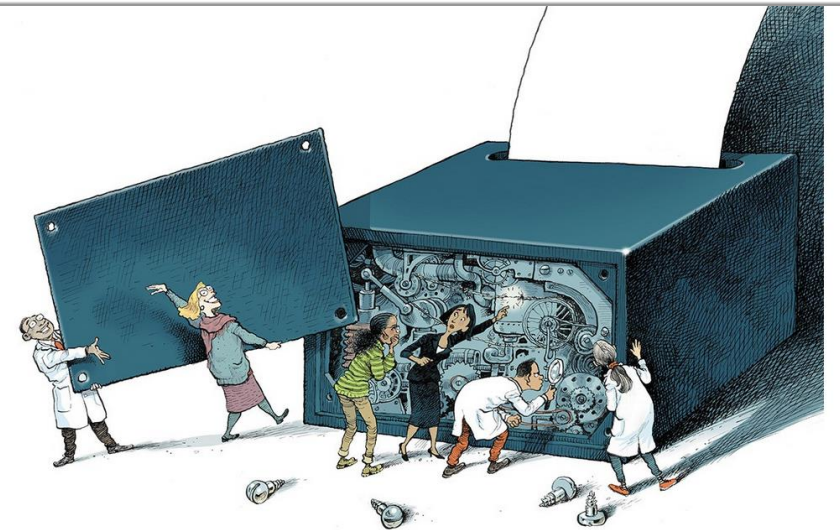


# Five ways to ensure that models serve society: a

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

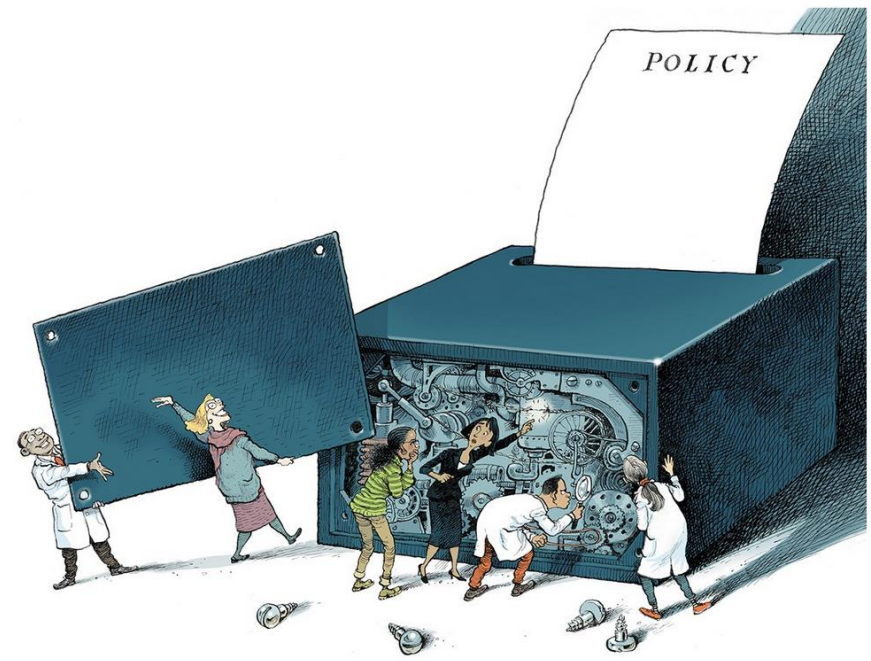
Match purpose and context

## Mind the consequences

Quantification can backfire.

## Mind the unknowns

Acknowledge ignorance



### SUPPLEMENTARY INFORMATION

1. [Additional information and references](#) >260 references

# Why ethics of quantification is needed now

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---

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Tallinn University of Technology, Estonia;  
UCL Institute for Innovation and Public Purpose;  
Davis Center at Harvard University, United States

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**Jayati Ghosh**

University of Massachusetts Amherst, United States;  
UCL Institute for Innovation and Public Purpose

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**Rainer Kattel**

UCL Institute for Innovation and Public Purpose

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**Ingrid H. Kvangraven**

Department of Politics, University of York

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**Erik S. Reinert**

Tallinn University of Technology, Estonia;  
UCL Institute for Innovation and Public Purpose

---

**Andy Stirling**

Science Policy Research Unit, University of Sussex

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**Ting Xu**

School of Law at the University of Essex

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**UCL Institute for  
Innovation and  
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WORKING PAPER  
WP 2021/05



... our world is structured by numbers, visible and invisible, where truth is conveyed and reality constructed

Numbers are seductive, performative, confer to their masters' epistemic power and legitimacy

Governing the modern state, or even contesting it, without numbers is impossible

Access & production of numbers reflect and reinforce power imbalances



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Public Purpose**

WORKING PAPER  
WP 2021/05



# The End



@andreasaltelli