Ethics of quantification

Andrea Saltelli
Centre for the Study of the Sciences and the Humanities (SVT), University of Bergen (UIB), and Open Evidence Research, Open University of Catalonia

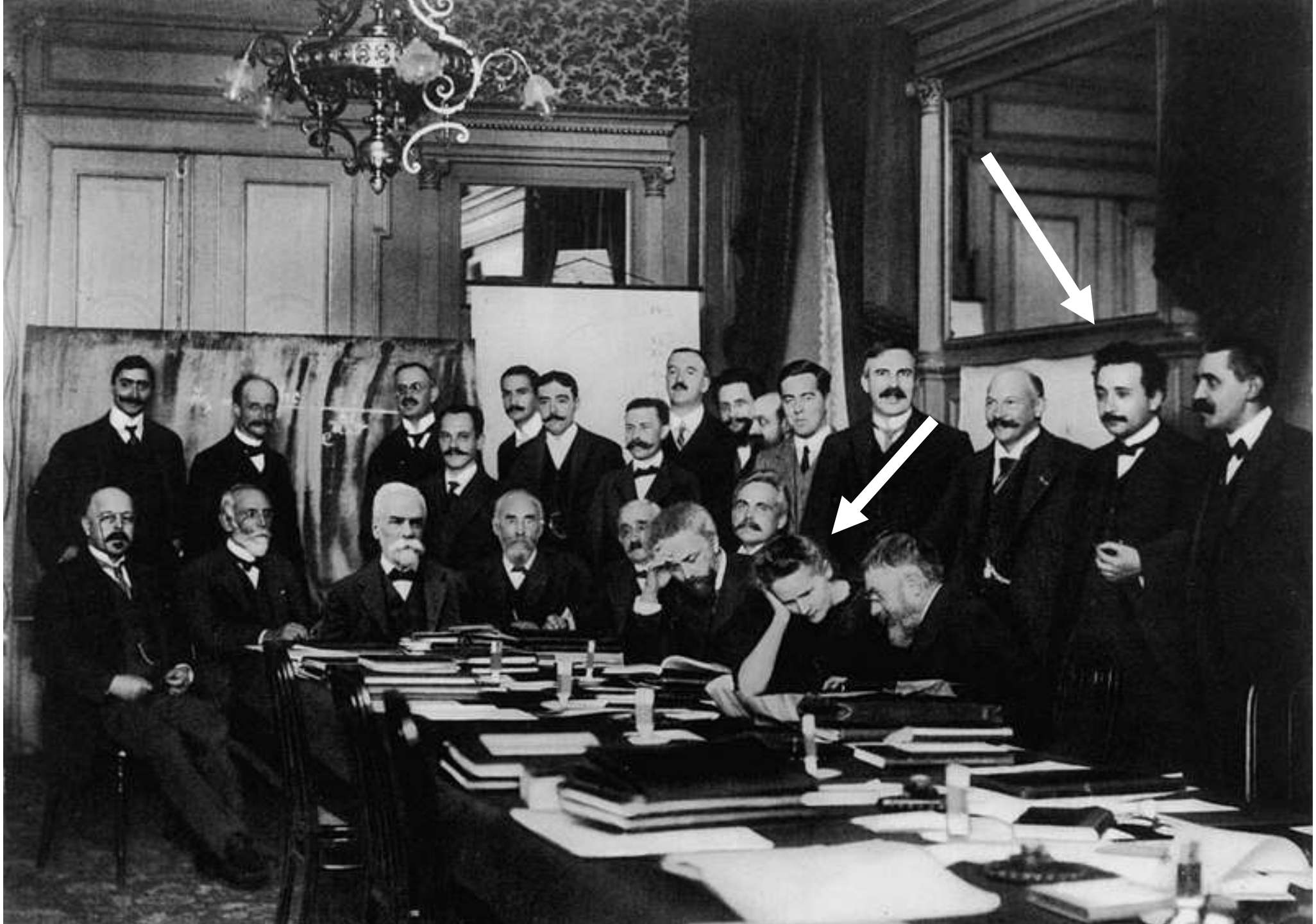
MNF990 / Theory of Science and Ethics, Bergen,
HIB Lille aud, Thormøhlens gate 55, February 13, 2020

Where to find this talk: www.andreasaltelli.eu

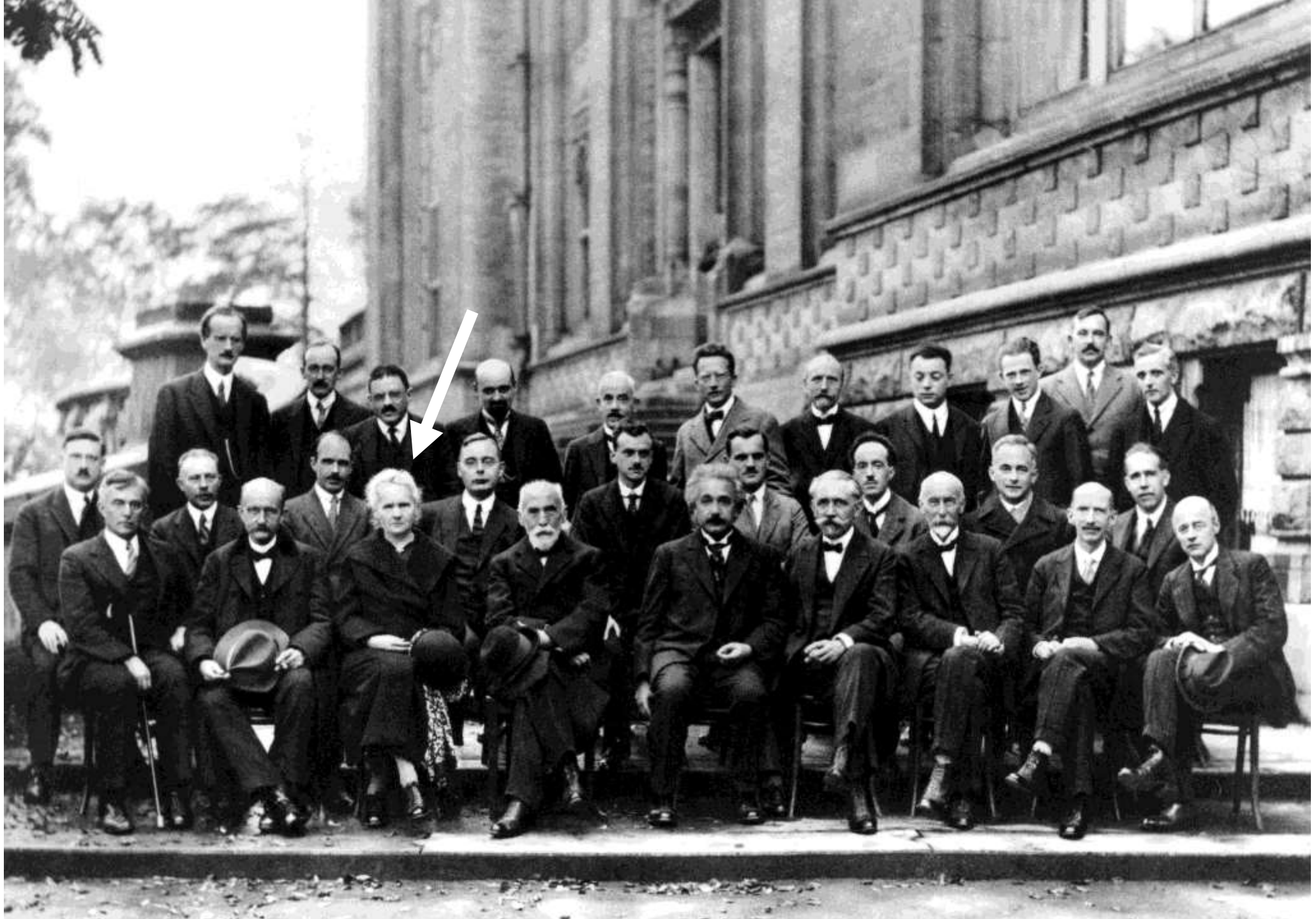
- Where are the women?
- Quantification and the roots of the Cartesian dream
- Extraordinary success of the dream
- Science's ethos
- Alarms from some quarters …
- … but a reassuring sociotechnical imaginary in the mainstream
- What recipes for an ethics of quantification?
  - NUSAP
  - Sensitivity auditing
- Numbers and trust
- The take of different authors
- An example of poor quantification: consequentialism?

So many men,
so few women

1911



1927



Lise Meitner

The first person to understand nuclear fission;

She did not win the Nobel prize 1944 for chemistry which went to her colleague Otto Hahn

Lise Meitner
1878- 1968

Rosalind Elsie Franklin

Her X-ray images led to the discovery of the DNA double helix structure;

Nobel in Medicine 1962 to J. Watson, F. Crick and M. Wilkins;

She should have ideally been awarded a Nobel Prize in Chemistry (according to J. Watson)

Rosalind Elsie Franklin
1920-1958

Eunice Foot (1819–1888)

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CLIMATE HOME NEWS

Meet the woman who first identified the greenhouse effect

Published on 02/09/2016, 5:58pm

Eunice Foote demonstrated the heat-trapping properties of carbon dioxide at a scientific conference in 1856, newly digitised records show

By Megan Darby

Irish physicist John Tyndall is commonly credited with discovering the greenhouse effect, which underpins the science of climate change.

ART. XXXI.—*Circumstances affecting the Heat of the*
by EUNICE FOOTE.

(Read before the American Association, August 23d, 1

MY investigations have had for their object to
different circumstances that affect the thermal actio
of light that proceed from the sun.

Several results have been obtained.

First. The action increases with the density o
is diminished as it becomes more rarified.

The experiments were made with an air-pump a
drical receivers of the same size, about four inc
ter and thirty in length. In each were placed two t
and the air was exhausted from one and condensed
After both had acquired the same temperature they
in the sun, side by side, and while the action of t
rose to 110° in the condensed tube, it attained on
other. I had no means at hand of measuring the d
densation or rarefaction.

The observations taken once in two or three min
follows:

Exhausted Tube		Condensed Tu	
In shade.	In sun.	In shade.	
75	80	75	
76	82	78	
80	82	80	
83	86	82	
84	88	85	

This circumstance must affect the power of the
different places, and contribute to produce their fo
the summits of lofty mountains.

Secondly. The action of the sun's rays was found
in moist than in dry air.

In one of the receivers the air was saturated wit
in the other it was dried by the use of chlorid of ca
Both were placed in the sun as before and the
follows:

Dry Air.		Damp Air.	
In shade.	In sun.	In shade.	
75	75	75	
78	88	78	
82	102	82	
82	104	82	
82	105	82	
83	108	92	

CIRCUMSTANCES

Affecting the Heat of the Sun's Rays.

BY MRS. EUNICE FOOTE.

Quantifications and the roots of the Cartesian dream

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 purgings; The increasing of strength and activity; The increasing of ability to suffer torture or pain; The altering of complexions, and fatness and leanness; The altering of statures; The altering of features; The increasing and exalting of the intellectual parts; Versions of bodies into other bodies; Making of new species; Transplanting of one species into another; Instruments of destruction, as of war and poison; Exhilaration of the spirits, and putting them in good disposition; Force of the imagination, either upon another body, or upon the body itself; Acceleration of time in maturations; Acceleration of time in clarifications; Acceleration of putrefaction; Acceleration of decoction; Acceleration of germination; Making rich composts for the earth; Impressions of the air, and raising of tempests; Great alteration; as in induration, emollition, &c; Turning crude and watery substances into oily 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.

Magnalia Naturae, in the New Atlantis (1627),

'Wonders of nature, in particular with respect to human use'

Francis Bacon (1561-1626)

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;
[…]
Drawing of new foods out of substances not now in use; Making new threads for apparel; and new stuffs, such as paper, glass, etc.; 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 […], 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.”

http://www.bartleby.com/34/1/6.html

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’

http://oll.libertyfund.org/titles/1669

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’

http://oll.libertyfund.org/titles/1669

‘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 mathematique 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

Closer to our times the dream was couched in the ‘Endless Frontier’ metaphor by Vannevar Bush, 1945:

Vannevar Bush
(1890–1974)

“One of our hopes is that after the war there will be full employment. […] To create more jobs we must make new and better and cheaper products […] founded on […] basic scientific research. […the] Government […] opened the seas to clipper ships and furnished land for pioneers. Although these frontiers have more or less disappeared, the frontier of science remains.”

Bush, V. (1945) Science: the endless frontier, United States Office of Scientific Research and Development, U.S. Govt. print office.

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

Robert K. Merton

Michal Polanyi

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

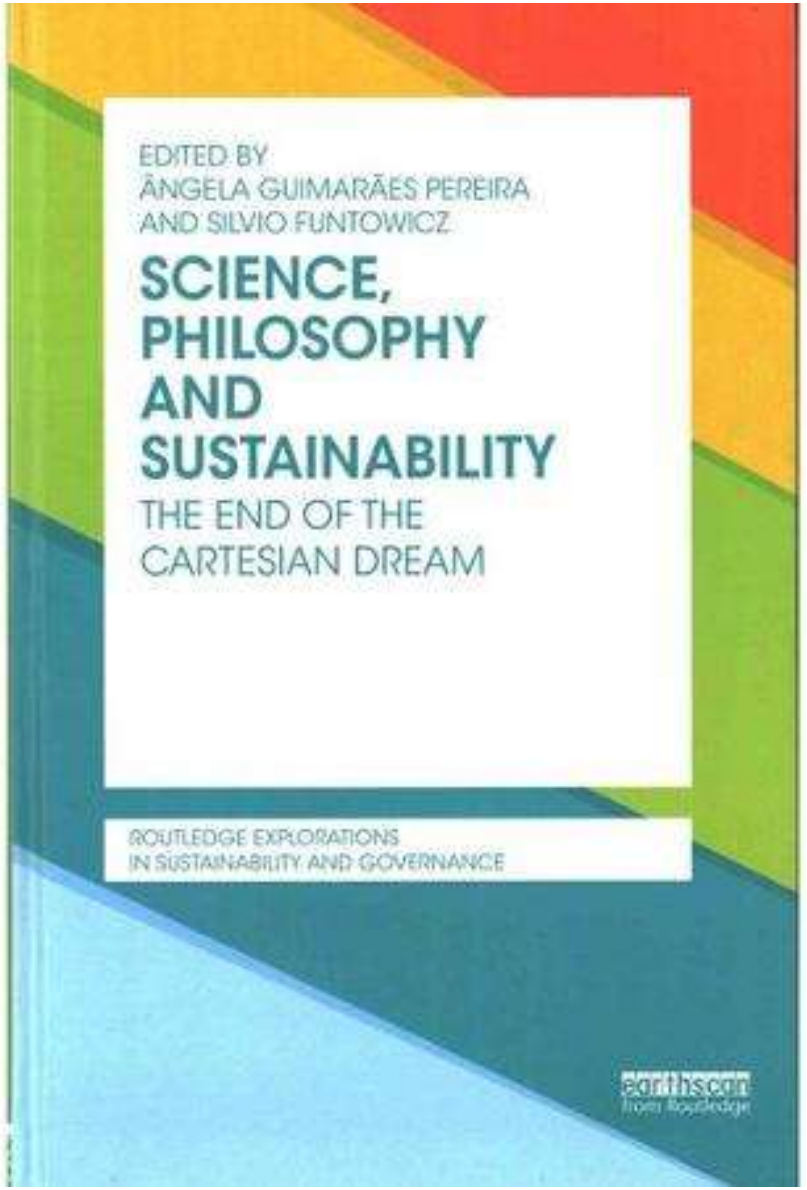
Communalism – the common ownership of scientific discoveries, according to which scientists give up intellectual property rights in exchange for recognition and esteem (Merton actually used the term Communism, but had this notion of communalism in mind, not Marxism);

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.

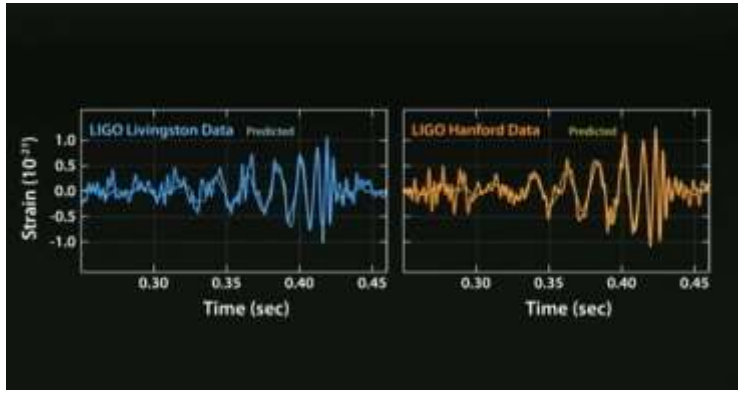
Some reading on the Cartesian Dream



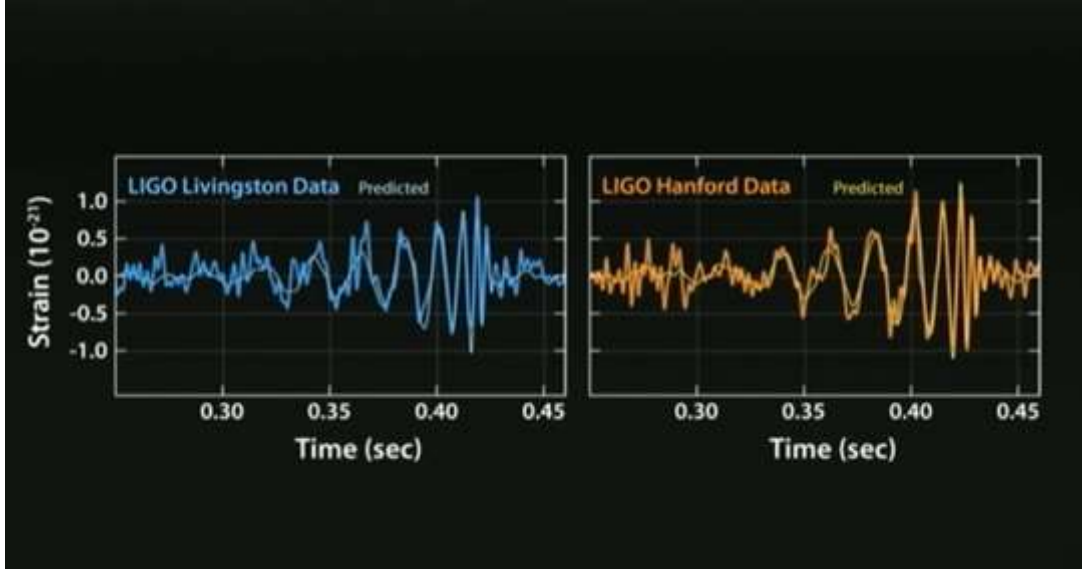
Ravetz, J., R., 2015, Descartes and the rediscovery of ignorance, in Guimarães Pereira, Â., and Funtowicz, S., Eds., 2015, The end of the Cartesian dream, Routledge.

The success of the Cartesian dream

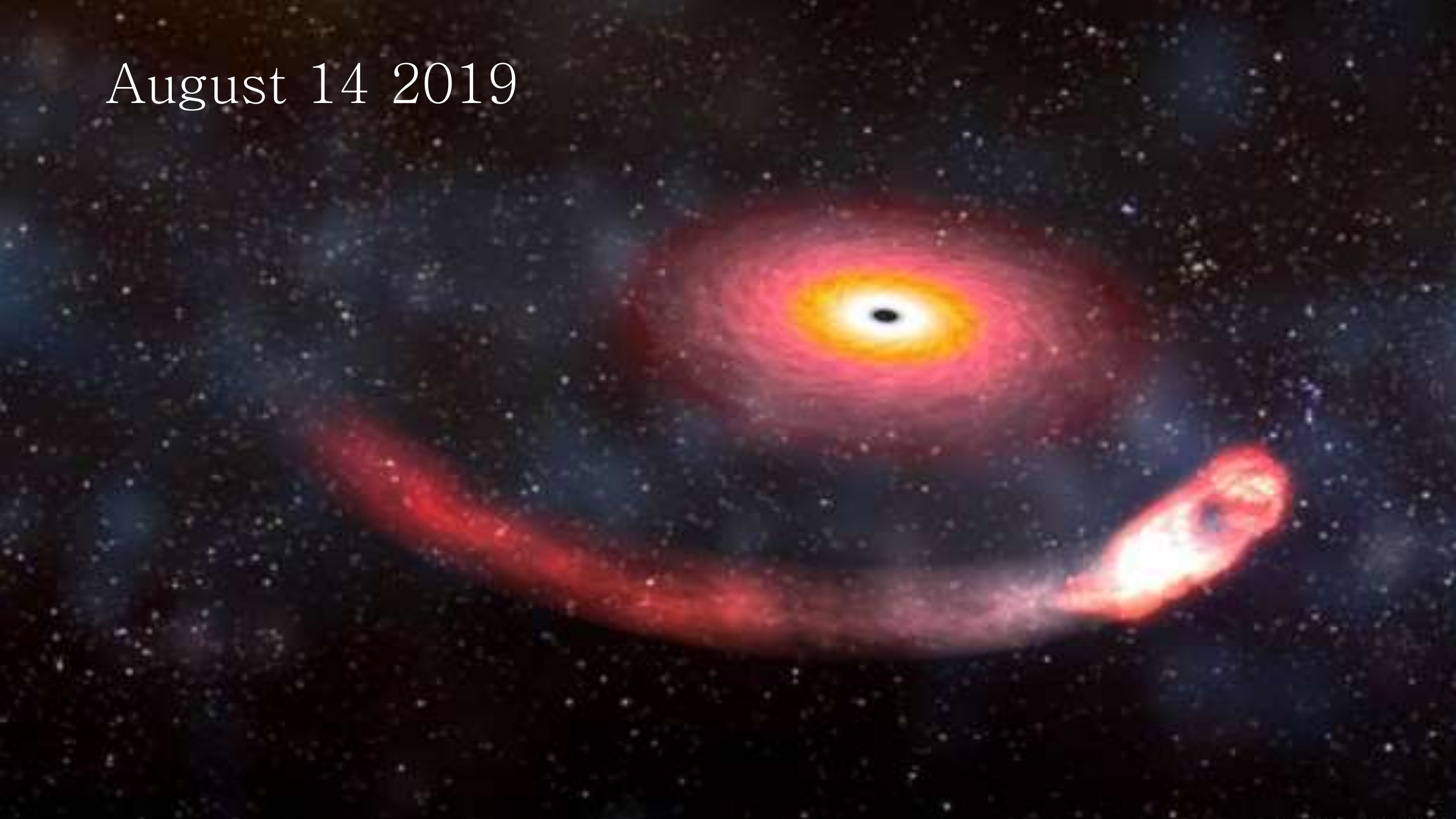
The keeping of the promise: Gravitational waves, from J. Weber's cylinder to LIGO



A Madman Dreams of Tuning Machines: The Story of Joseph Weber, the Tragic Hero of Science Who Followed Einstein's Vision and Pioneered the Sound of Space-Time, By Maria Popova, https://www.brainpickings.org/2016/04/25/black-hole-blues-janna-levin-joseph-weber/



https://www.brainpickings.org/2016/04/25/black-hole-blues-janna-levin-joseph-weber/

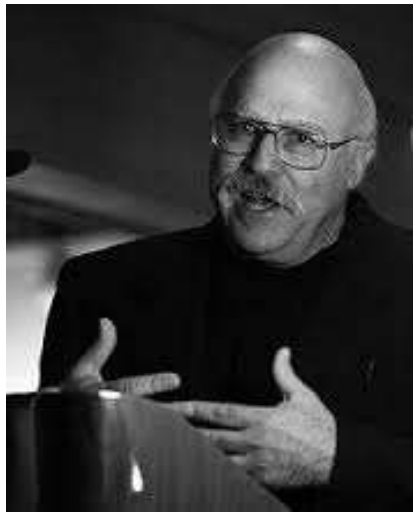

August 14 2019

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

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

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

Stephen Toulmin



Steven Shapin

Many voices of alarm as to misuse of quantification

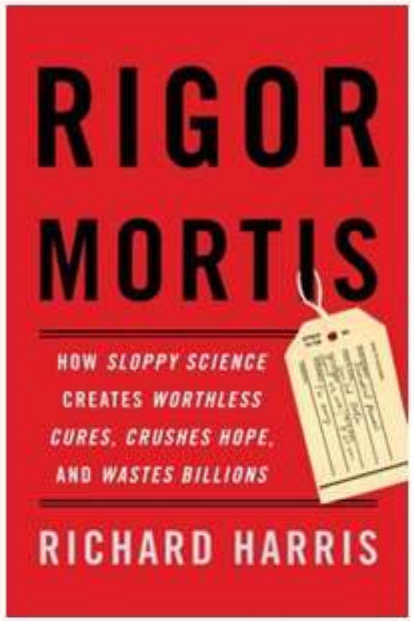
Blurring lines:

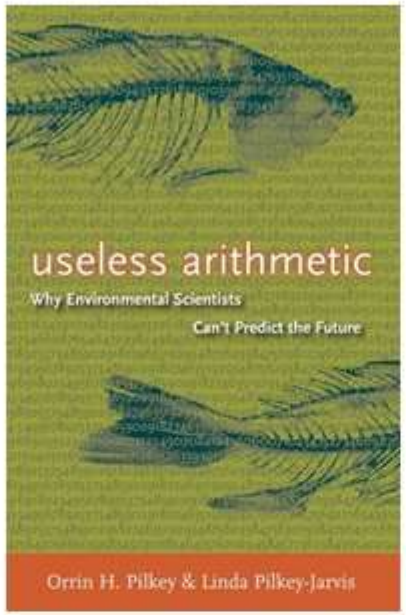
"what qualities are specific to rankings, or indicators, or models, or algorithms?"

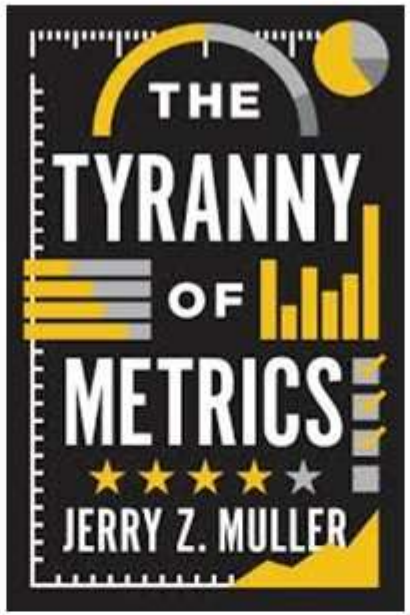
Elizabeth Popp Berman

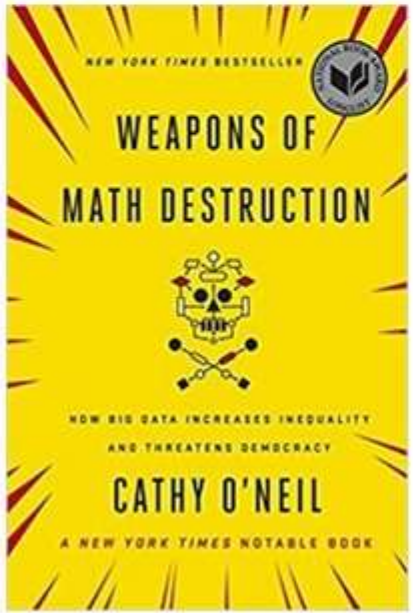
E. Popp Berman and D. Hirschman, The Sociology of Quantification: Where Are We Now?, Contemp. Sociol., vol. in press, 2017.

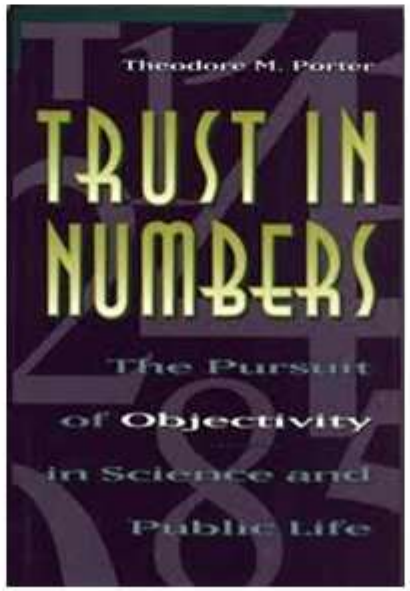
Algorithms, models, metrics, statistics…











Futures

Volume 116, February 2020, 102509

Essays

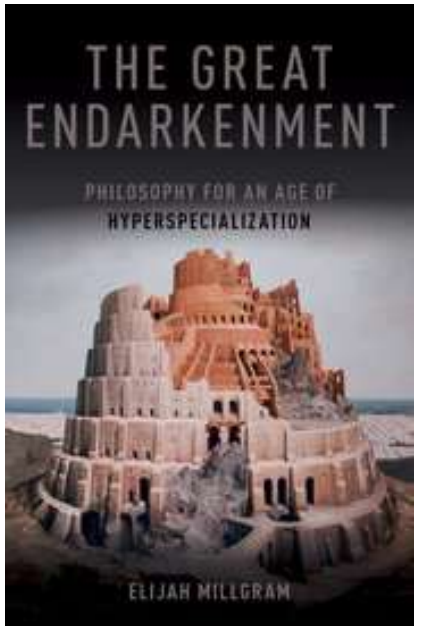
Ethics of quantification or quantification of ethics?

Andrea Saltelli

⊞ Show more

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

Abandon the dream of a “procedural utopia”, a machinery to take the right decision based on a set of logical rules and methods



E. Millgram The Great Endarkenment, p. 23

This dream started with Condorcet's Mathématique sociale; Bentham's utilitarianism;

Then the afterwar 'decisionism' (G. Majone) – the idea that decisions can always systematically arrived at given a modicum of computation, and is still dominating

The critique of Andrew Stirling:

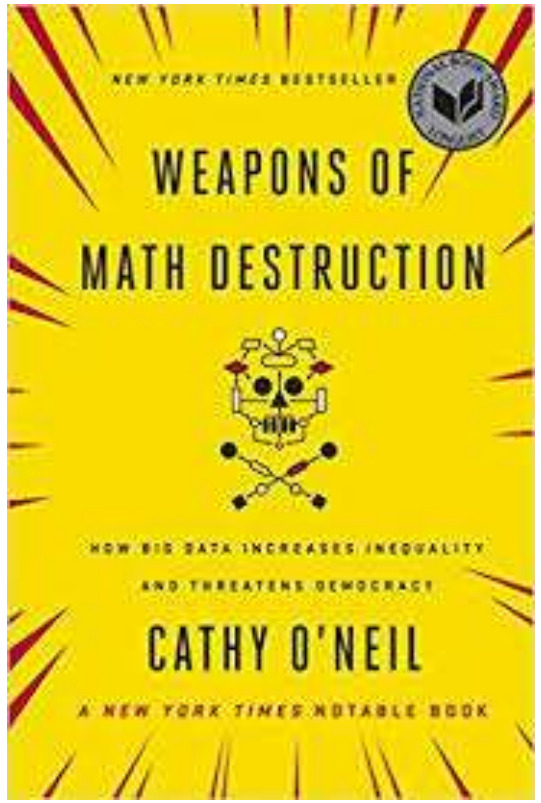
Andrew Stirling

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

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

Alarm for Weapons of Math Destruction

Cathy O’Neil

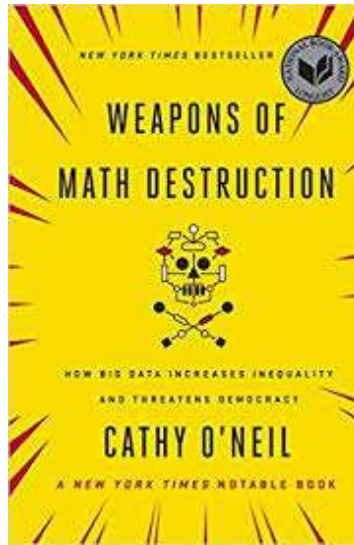


O’Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

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…

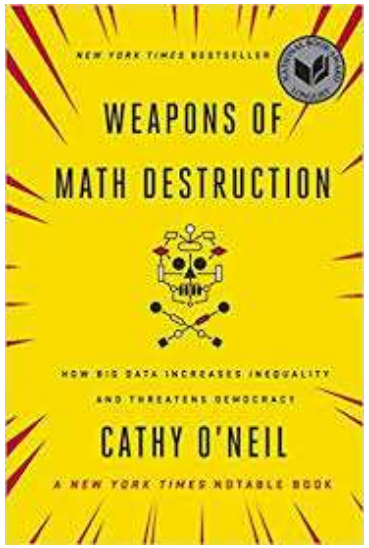
O'Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

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



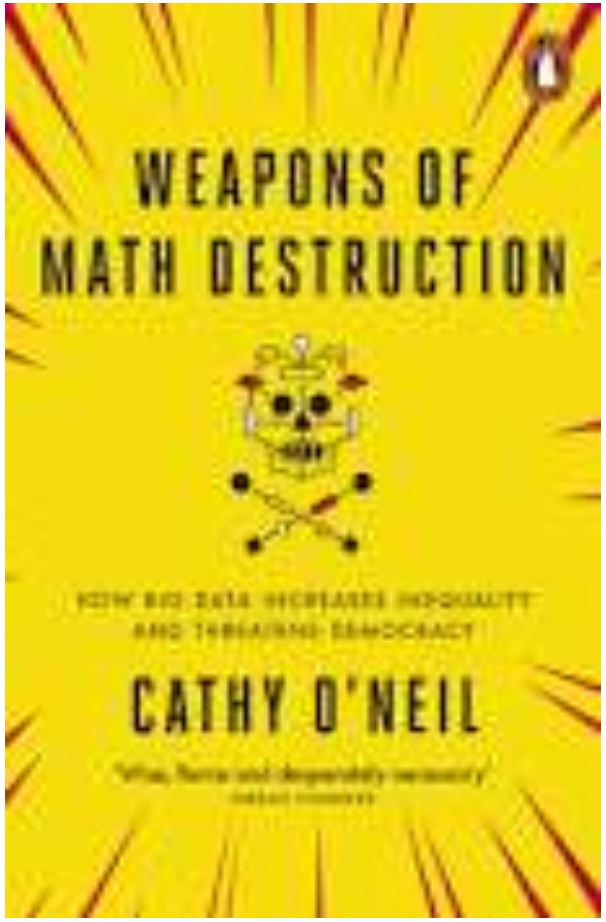
Opacity coupled with opportunity for scale and damage and with non-appealability make them an instrument of oppression & inequality

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



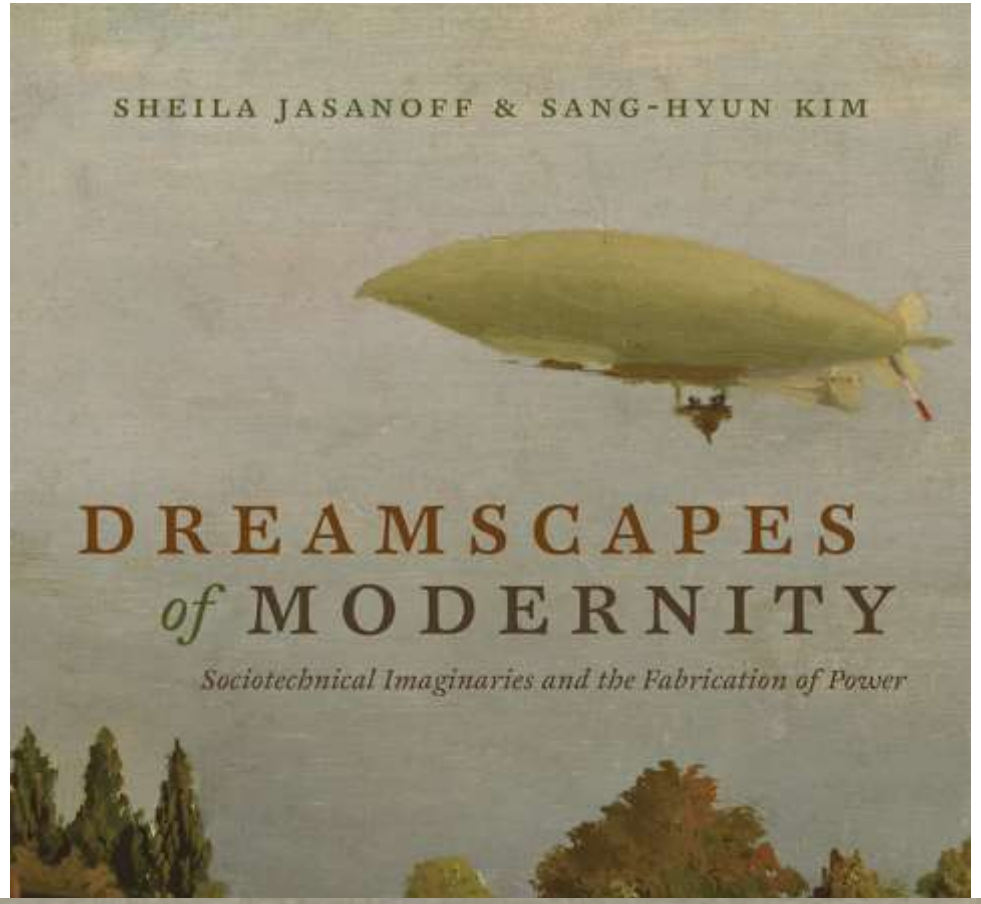
Weapons of math destruction: opaque, harm, scale

Cathy O'Neil

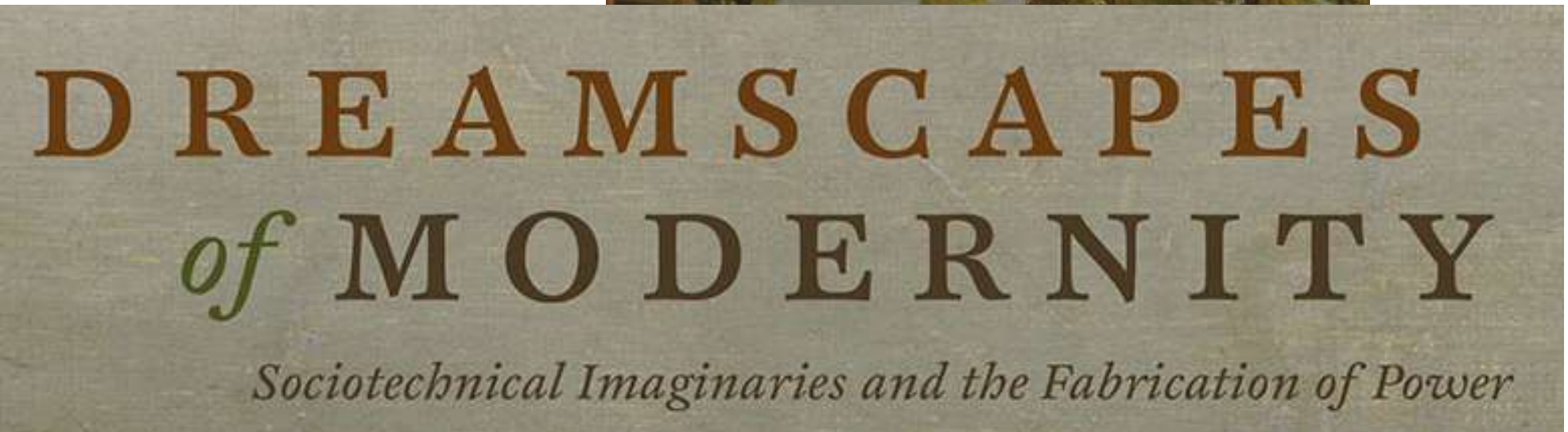


And yet …

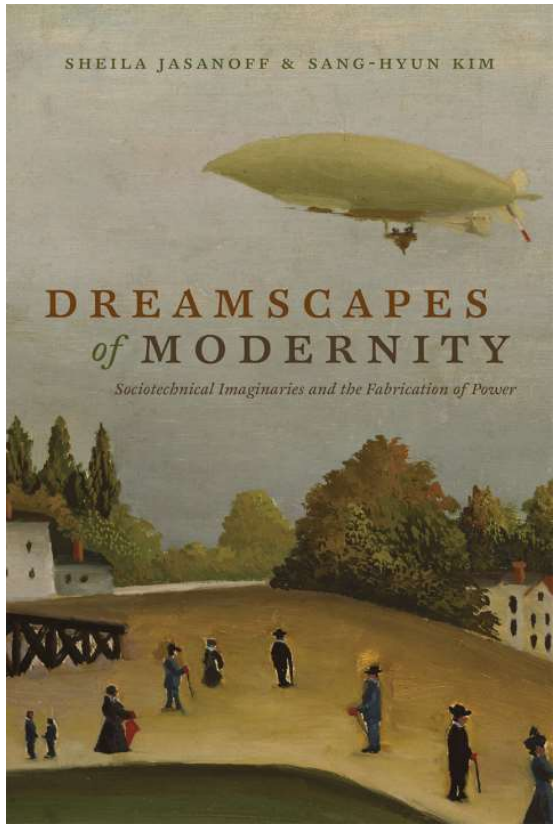
Sociotechnical Imaginaries



Sheila Jasanoff



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



Sheila Jasanoff

Which is the prevailing sociotechnical imaginary?

One where policy can be neatly designed given the right amount of computation?

‘Decisionism’ is mainstream

Cass Sunstein, winner of the 2018 Holberg Prize

“In a series of books (The Cost Benefit State, 2002, Risk and Reason, 2002, and The Laws of Fear, 2004), Sunstein shows the ways in which cost benefit analysis can discipline regulatory agencies”

https://www.holbergprisen.no/en/holberg-prize/prize-winners/cass-r-sunstein

Can technocracy be saved? An interview with Cass Sunstein.

Obama's regulation czar makes the case that "the issues that most divide us are fundamentally about facts rather than values."

By Dylan Matthews | @dylanmatt | dylan@vox.com | Oct 22, 2018, 9:00am EDT

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

“Often, immersion in the facts often makes value disagreements feel much less relevant”
(C. Sunstein)

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

The Sameness of Cass Sunstein

His books keep pushing the same technocratic fixes. But today's most pressing questions cannot be depoliticized.

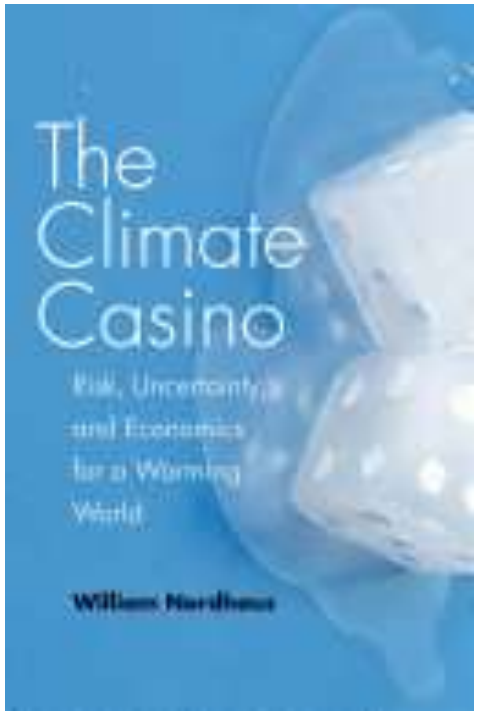
By **AARON TIMMS** | June 20, 2019

A critique of Sunstein's faith in 'nudge' and cost benefit analysis

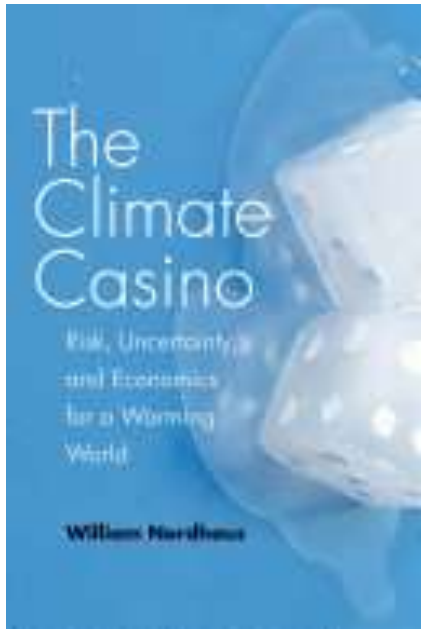
https://newrepublic.com/article/154236/sameness-cass-sunstein

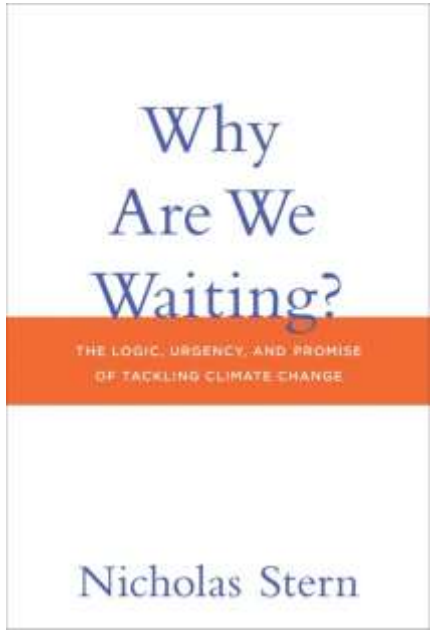
One of the winner of Nobel prize for economics 2018 is Willem Nordhaus, for his work on the economics of climate change.

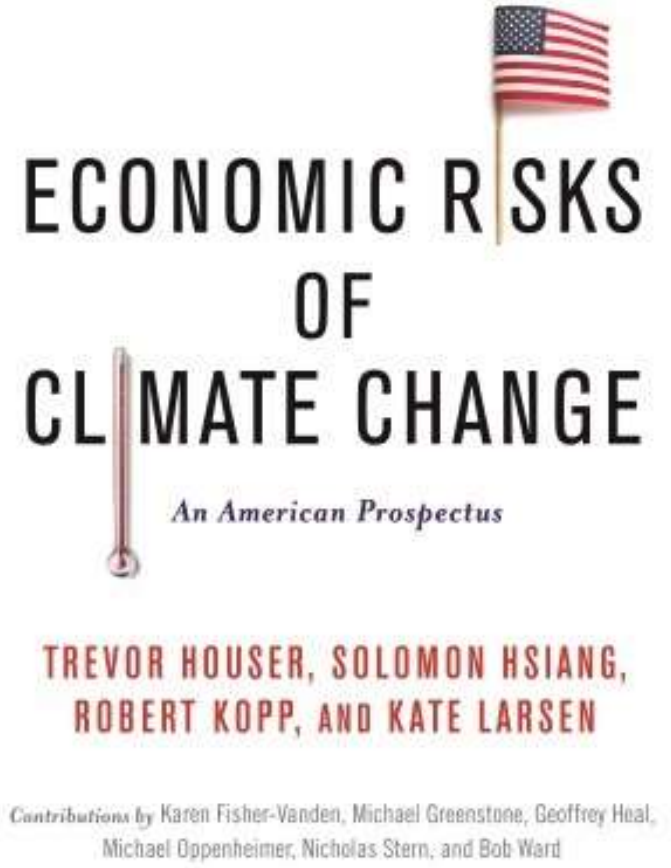
Cost benefit analysis to the year 2100?



Are these licit quantifications?







Saltelli, A., Stark, P.B., Becker, W., and Stano, P. , 2015, Climate Models as Economic Guides. Scientific Challenge or Quixotic Quest? Issues in Science and Technology (IST), Volume XXXI Issue 3, Spring 2015, https://issues.org/climate-models-as-economic-guides-scientific-challenge-or-quixotic-quest/

Statistical and mathematical modelling

nature COMMUNICATIONS

Comment | Open Access | Published: 27 August 2019

A short comment on statistical versus mathematical modelling

Andrea Saltelli

On the radar: October 2013

Futures
Volume 91, August 2017, Pages 5-11

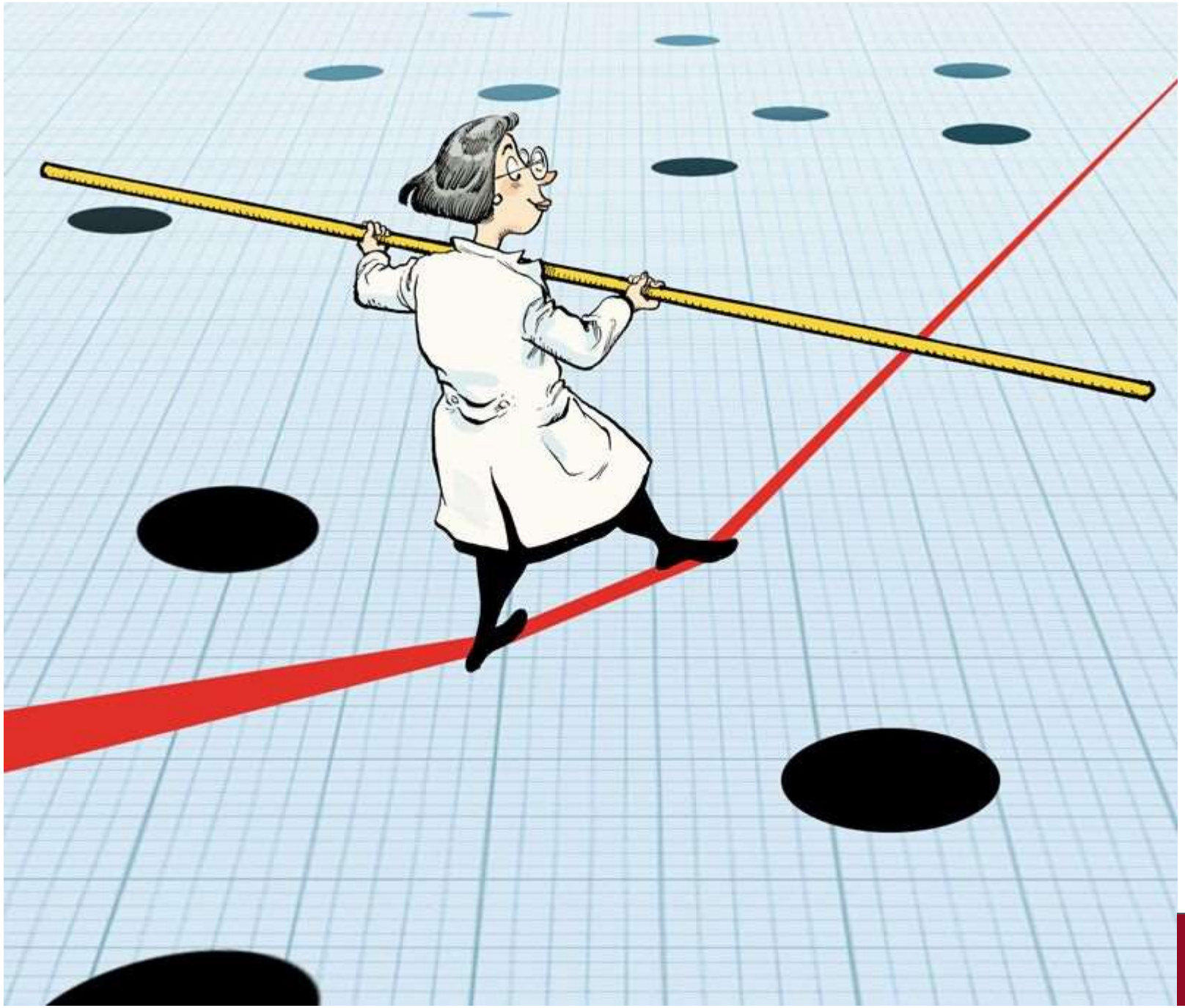
What is science's crisis really about?

Andrea Saltelli [a, b] ✉, Silvio Funtowicz [a]

Futures
Volume 104, December 2018, Pages 85-90

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

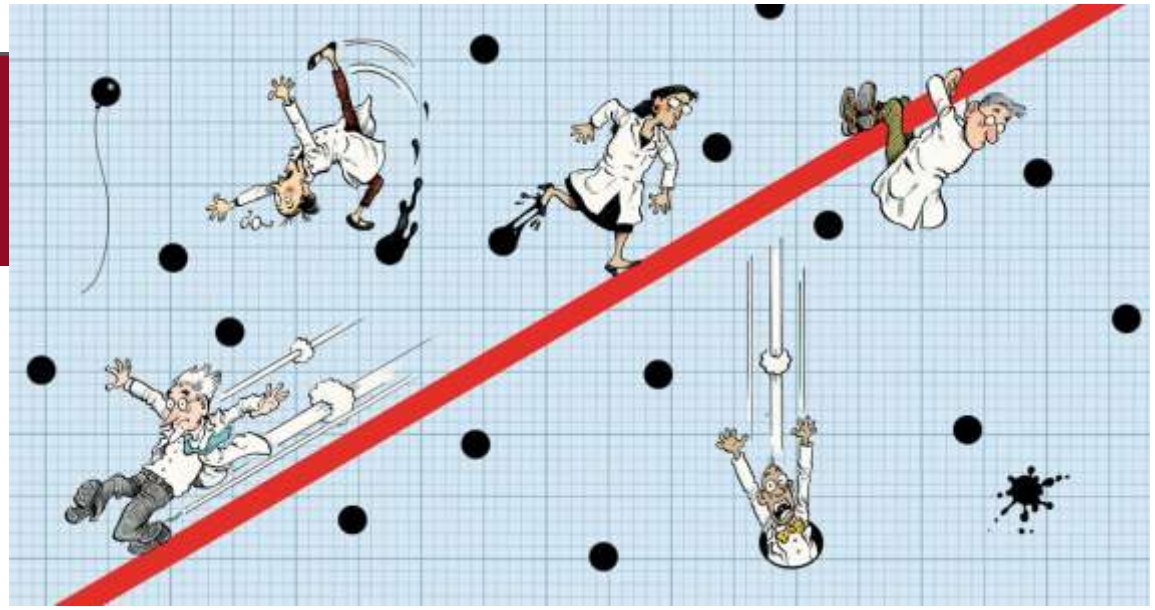
Andrea, Saltelli ✉



Crisis in statistics?

nature
International journal of science

nature
International journal of science

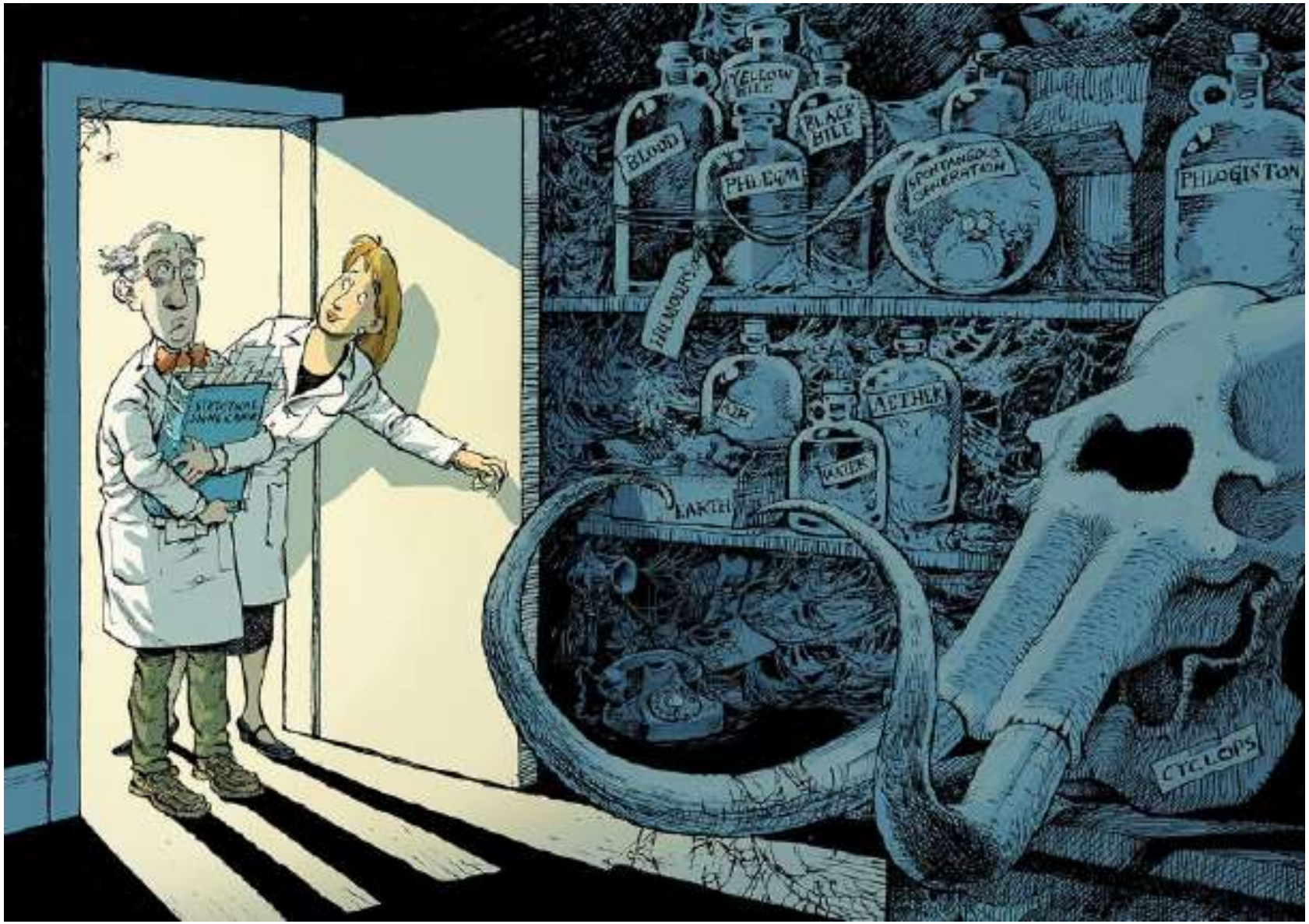


COMMENT · 28 NOVEMBER 2017

Five ways to fix statistics

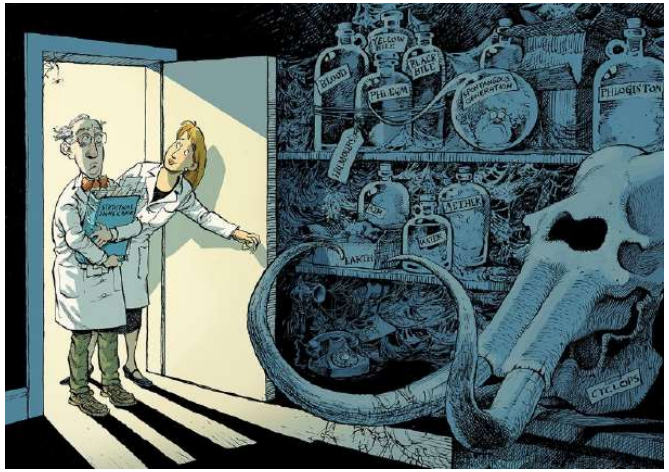
As debate rumbles on about how and how much poor statistics is to blame for poor reproducibility, Nature asked influential statisticians to recommend one change to improve science. The common theme? The problem is not our maths, but ourselves.

Jeff Leek ✉, Blakeley B. McShane, Andrew Gelman ✉, David Colquhoun ✉, Michèle B. Nuijten ✉ & Steven N. Goodman ✉



Throw away the concept of statistical significance?

nature
International journal of science



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

See the discussion on the blog of Andrew Gelman https://statmodeling.stat.columbia.edu/

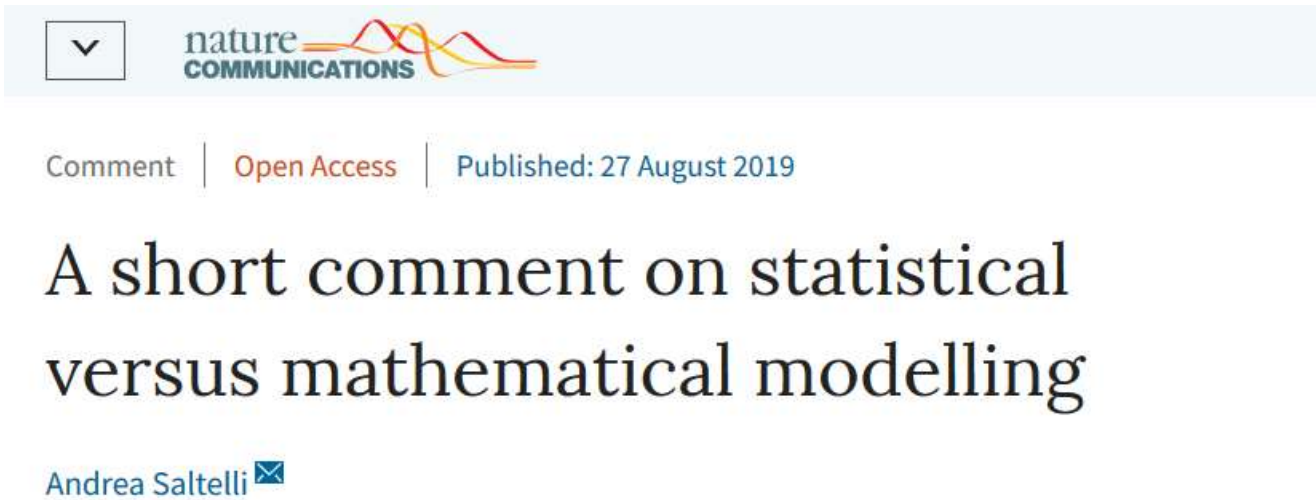
Statistical wars?

See the discussion on the blogs of Deborah Mayo https://errorstatistics.com/

and

Andrew Gelman https://statmodeling.stat.columbia.edu/

Is mathematical modelling affected?



nature COMMUNICATIONS

Comment | Open Access | Published: 27 August 2019

A short comment on statistical versus mathematical modelling

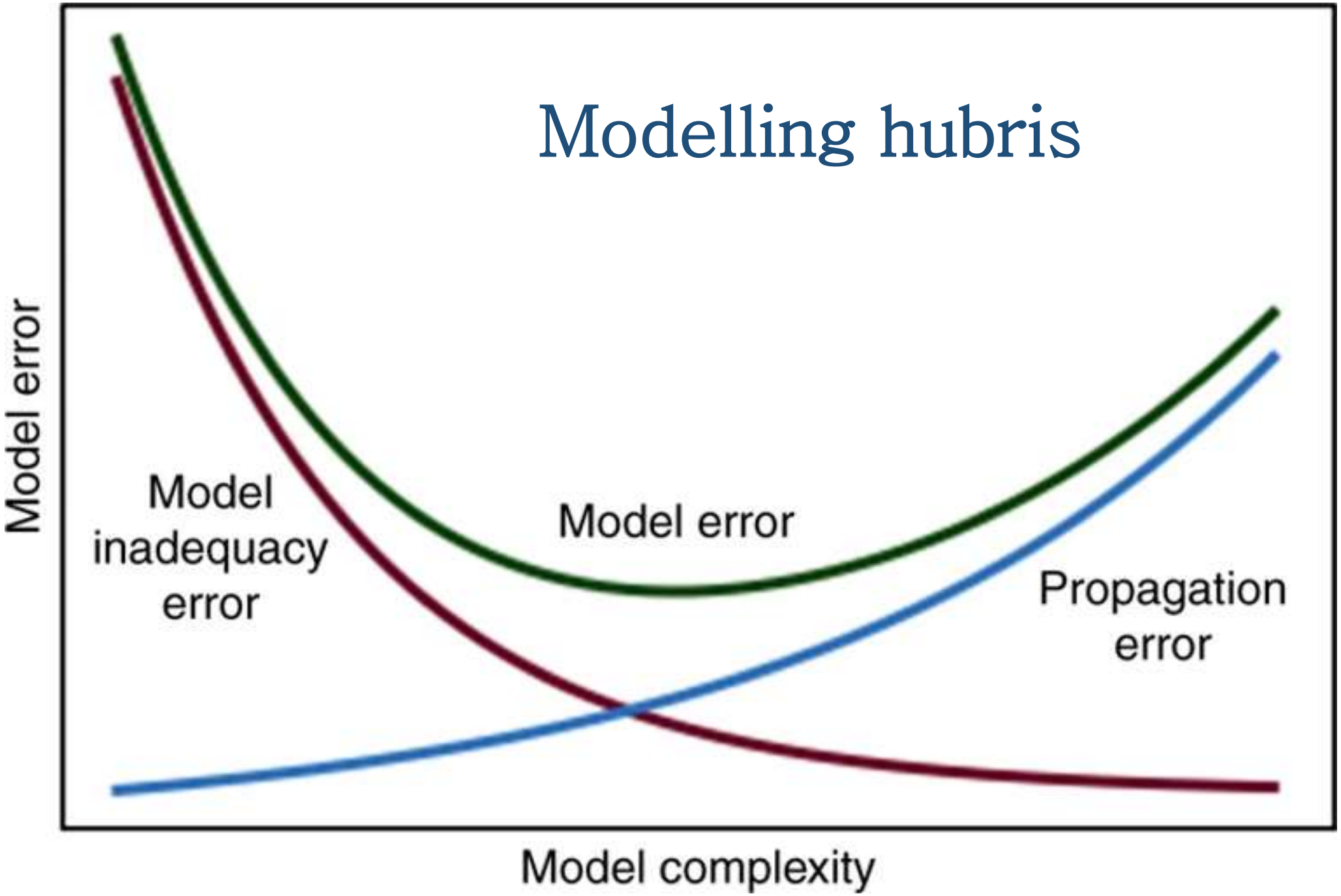
Andrea Saltelli

Unlike statistics, modelling is not a discipline …

… mathematical modelling cannot do this:

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

Modelling hubris



What recipes for an ethics of quantification?

Use tools such as NUSAP and sensitivity auditing to

- tame modelling hubris,
- to make quantifications interpretable, conveyable in plain English,
- and context/purpose specific
- models as tools not as masters

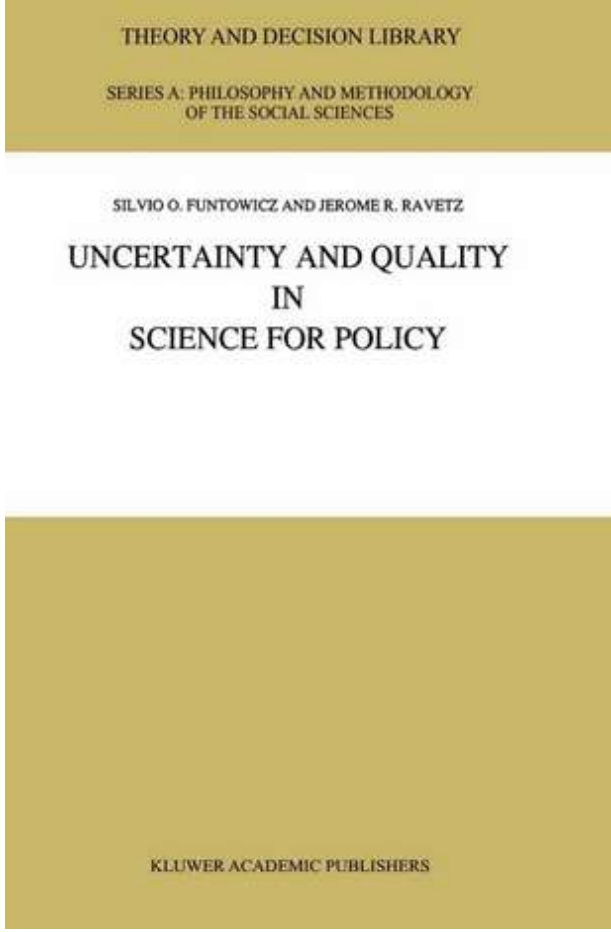
NUSAP

Numeral, Unit, Spread

+

Assessment (qualitative judgement on quantification)

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



Example Pedigree matrix parameter strength

Code	Proxy	Empirical	Theoretical basis	Method	Validation
4	Exact measure	Large sample direct mmts	Well established theory	Best available practice	Compared with indep. mmts of same variable
3	Good fit or measure	Small sample direct mmts	Accepted theory partial in nature	Reliable method commonly accepted	Compared with indep. mmts of closely related variable
2	Well correlated	Modeled/derived data	Partial theory limited consensus on reliability	Acceptable method limited consensus on reliability	Compared with mmts not independent
1	Weak correlation	Educated guesses / rule of thumb est	Preliminary theory	Preliminary methods unknown reliability	Weak / indirect validation
0	Not clearly related	Crude speculation	Crude speculation	No discernible rigour	No validation

Jeroen van der Sluijs

http://www.nusap.net/

Sensitivity Auditing

Int. J. Foresight and Innovation Policy, Vol. 9, Nos. 2/3/4, 2013 213

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

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

Ângela Guimarães Pereira

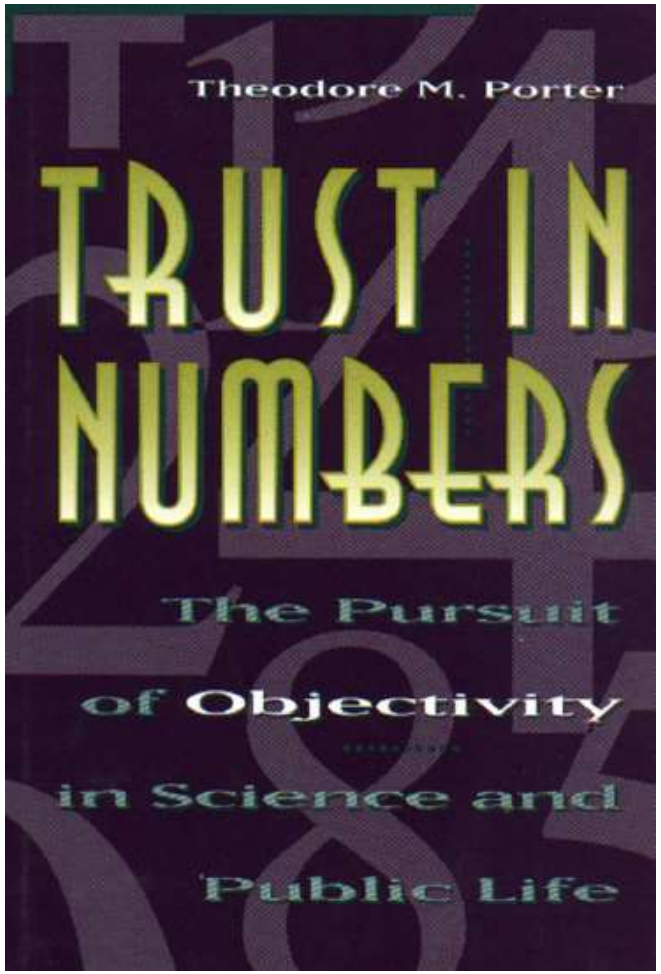
The rules of sensitivity auditing

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

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

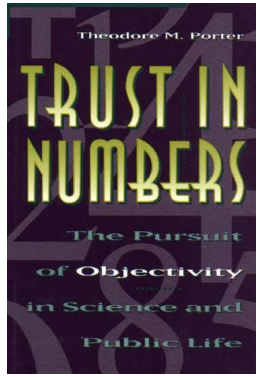
Numbers and trust

Theodor
M. Porter



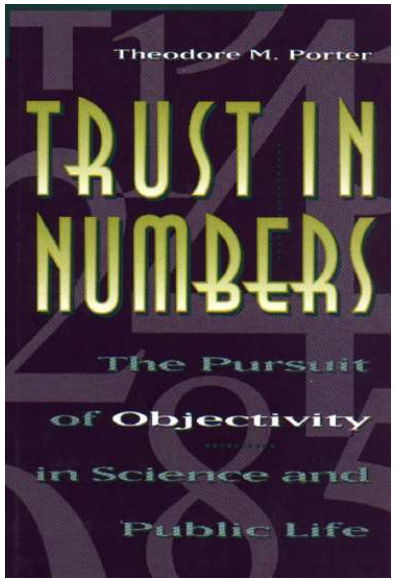
Theodore M. Porter, Trust in Numbers,
The Pursuit of Objectivity in Science and Public Life, Princeton 1995

p. 8: “The appeal of numbers is especially compelling to bureaucratic officials who lack the mandate of a popular election, or divine right.



Arbitrariness and bias are the most usual grounds upon which such officials are criticized.

A decision made by the numbers (or by explicit rules of some other sort) has at least the appearance of being fair and impersonal.”



p. 8: “Scientific objectivity thus provides an answer to a moral demand for impartiality and fairness.

Quantification is a way of making decisions without seeming to decide.

Objectivity lends authority to officials who have very little of their own.”

Trust, authority and styles of quantification: two different stories

ECOLE NATIONALE
DES PONTS ET CHAUSSEES

US Army Corps of Engineers®

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

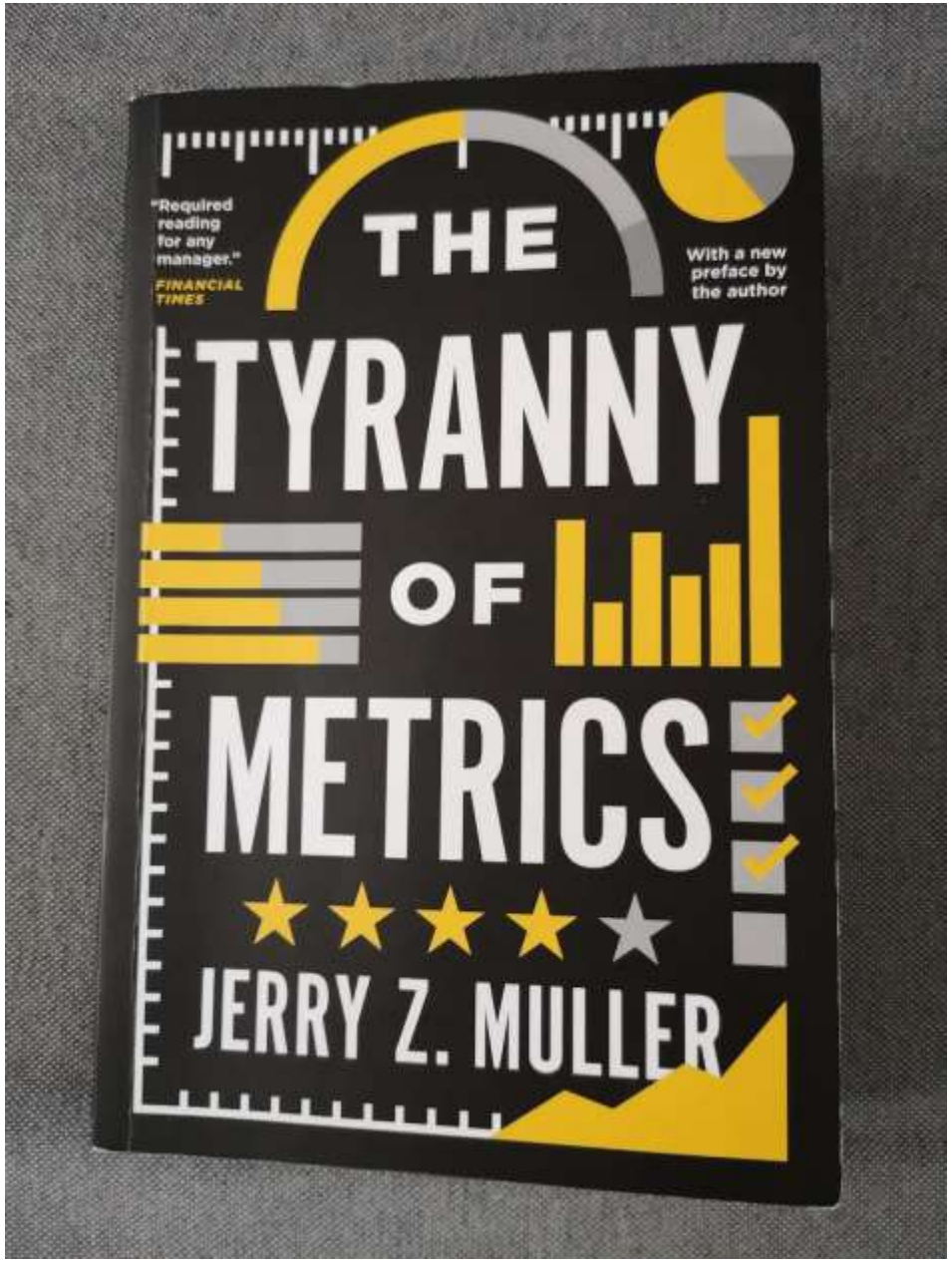
Charles Goodhart

p. 44 “Any … measures necessarily involve a loss of information … [and distorts behavior]” (Porter, 1995)

This is what we normally call Goodhart’s law, from Charles Goodhart. "When a measure becomes a target, it ceases to be a good measure."

Also known as Campbell's law (1976);
https://en.wikipedia.org/wiki/Goodhart%27s_law

The take of different authors



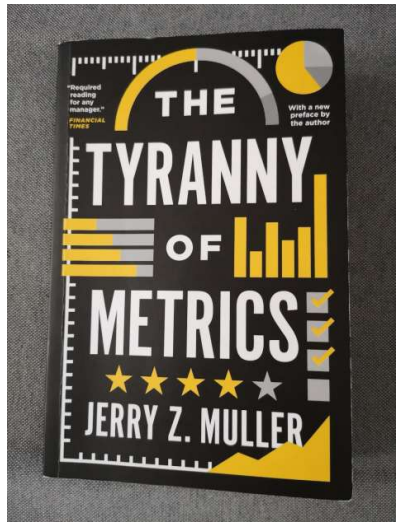
J. Z. Muller, The tyranny of metrics. Princeton University Press , 2018.

Metric fixation, or the irresistible pressure to measure performance

Gaming of metrics (recall Goodhart law)

“The calculative is the enemy of the imaginative”

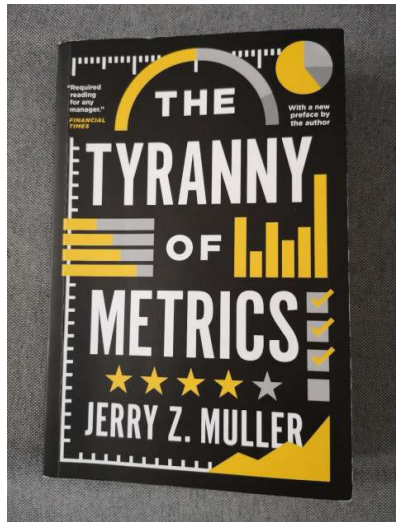
A wealth of case studies from education to war to medicine to foreign aid..



Critiques of metrics

From the left: metric fixation promotes deskilling

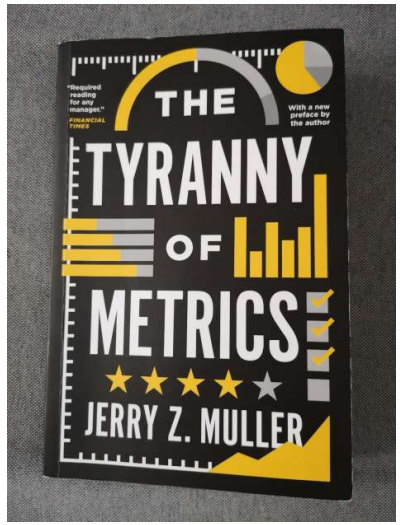
From the right (Friedrich Hayek): metric fixation reproduces features of the soviet system



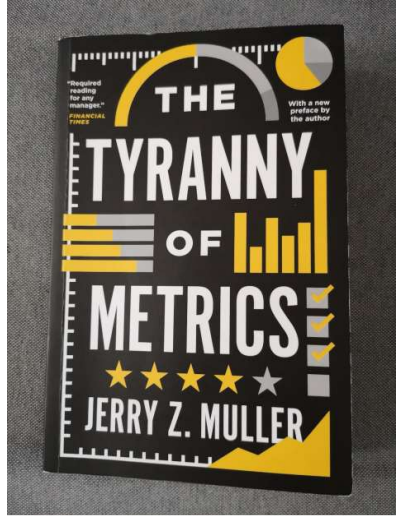
Critiques of metrics

An epistemological critique: metrics privilege abstract and formulaic knowledge against practical and tacit knowledge

(Greek concept of metis)



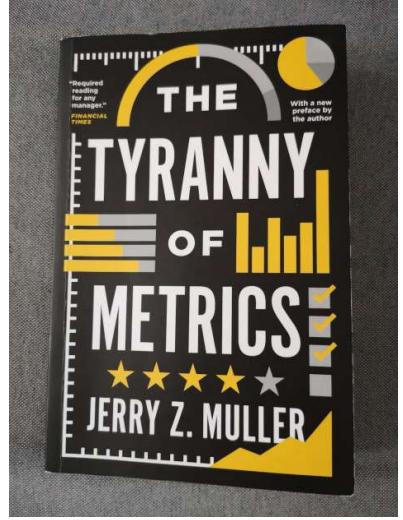
Unintended consequences: a litany



- Goal displacement
- Short termism
- Diminishing utility
- Rule cascade
- Discouraging risk taking
- Discouraging innovation
- Rewarding luck
- Discouraging cooperation and common purpose
- Degrading work
- Time waste
- Loss of productivity

A concluding remark

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

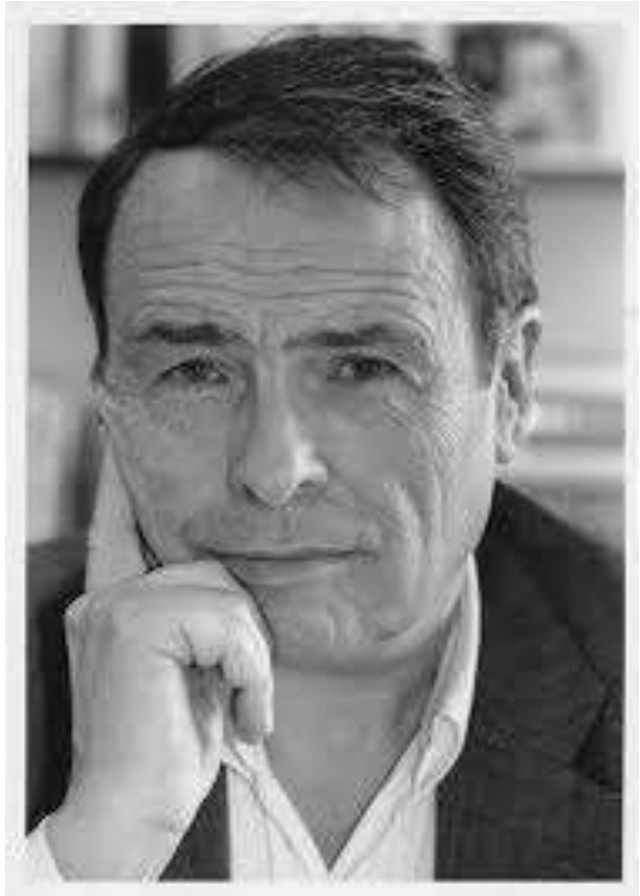


Do we need a movement of resistance?

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

How to be a "statactiviste"?

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



La sociologie, ça doit être rigolo

(Sociology must be fun)

How to be a "statactiviste"?

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

- Police statistics in NY

How to be a "statactiviste"?

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

- ‘Creative class’ or ‘precarious intellectuals’?

How to be a "statactiviste"?

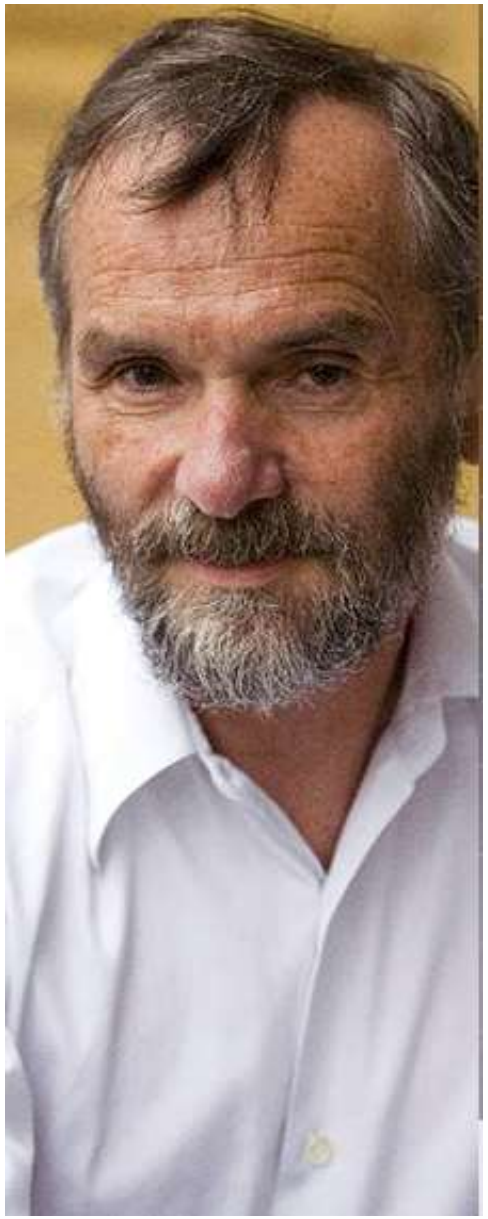
4. Measure something different.

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

Important:

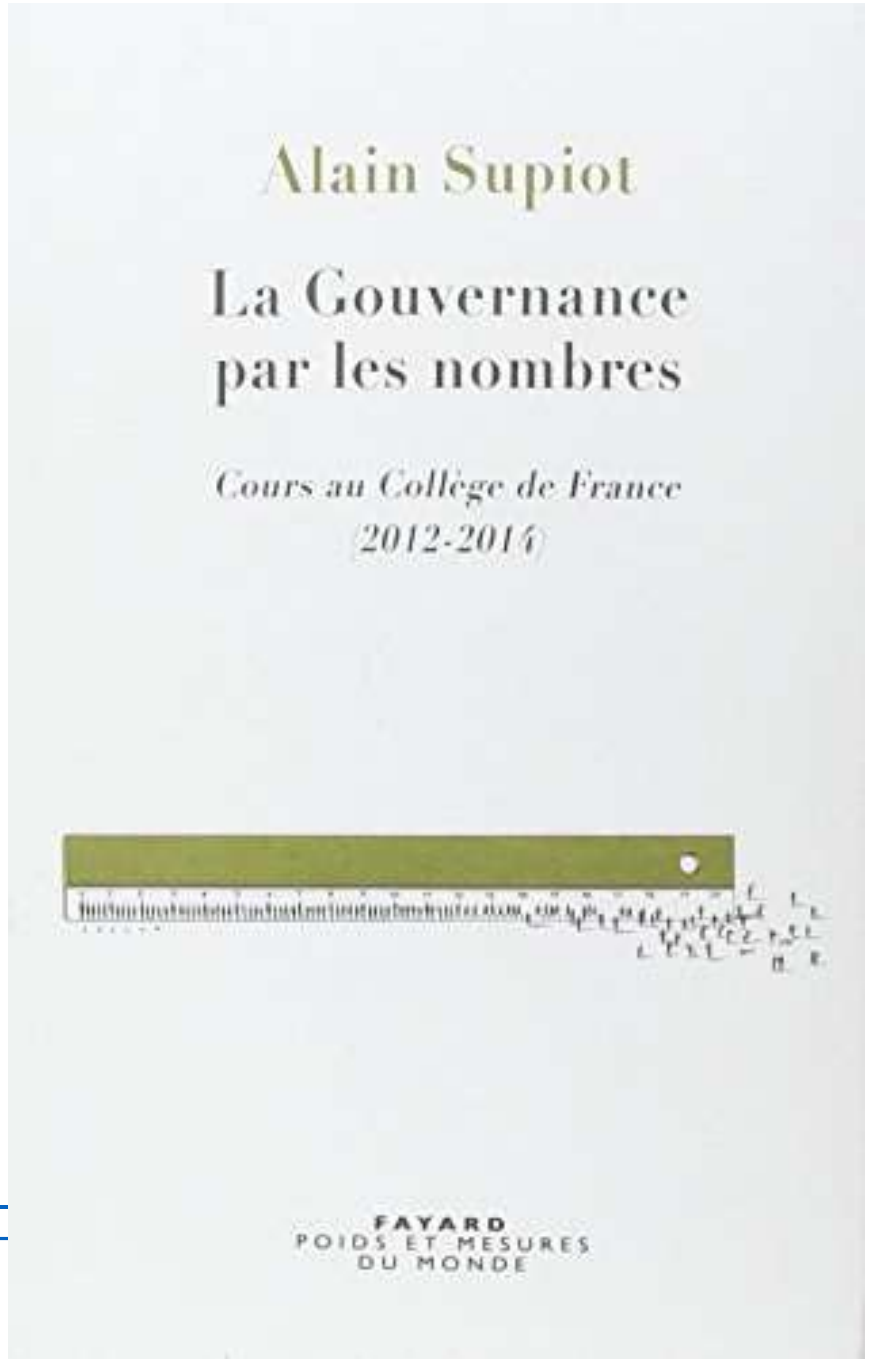
"Quantification should not be abandoned to the advantage of exalting qualities, singularities, and the incommensurable. Such an abandon would be a tactical error"

Alain Supiot

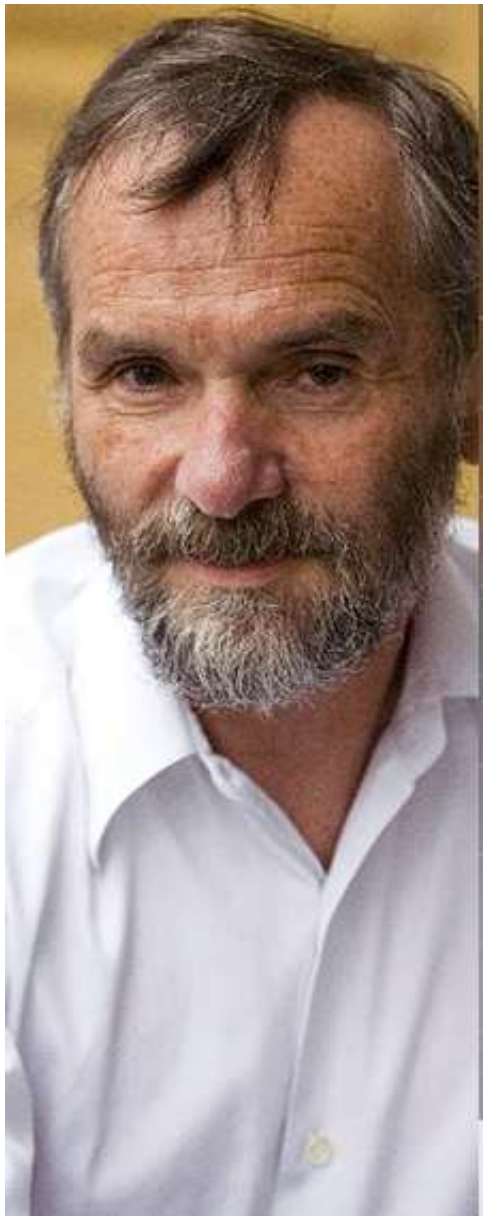


An indictment of the Total Market and the normative uses of economic quantification

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



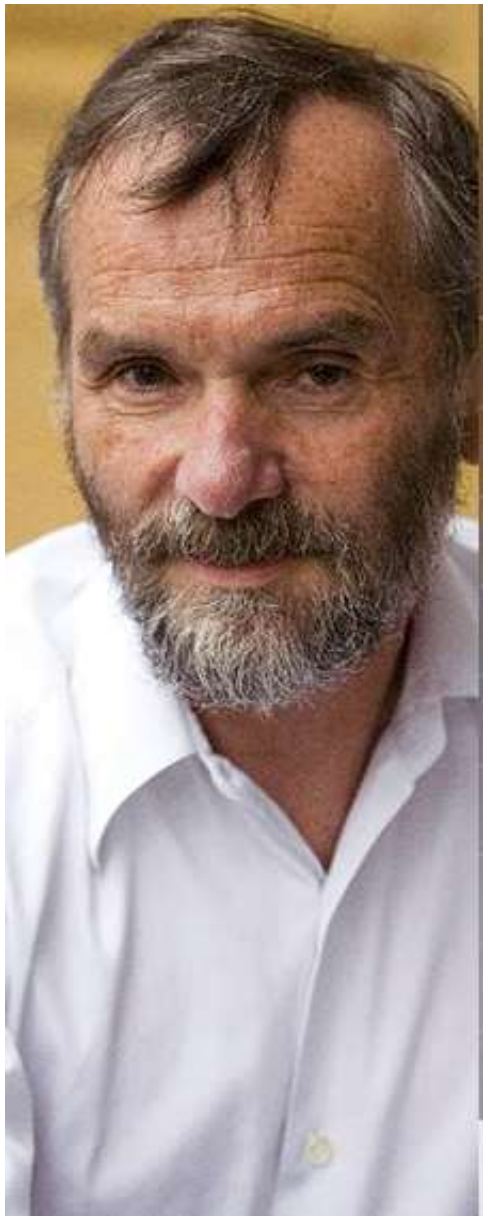
Alain Supiot



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

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

Poor quantifications: an example


EARTH
OVERSHOOT
DAY
ABOUT
BLOG
SOLUTIONS
STEPS TO #MOVETHEDATE
NEWSROOM
FOR KIDS & TEACHERS
SUBSCRIBE
EARTH OVERSHOOT DAY WAS JULY 29
On That Day, Humanity Exhausted The Biological Resources Our Planet Can Renew This Whole Year. Check Out Solutions Below So We Stop Increasing The Global Ecological Deficit.

At 8.00 am?

We use 1.75 planets
Or 17.5? 175? 1,750? …Infinity?

How many plastic bottles are we allowed to throw in the sea in a year?

Try replacing plastic bottles with extinction of a species, or collapse of a fishery, or a Fukushima,…

Move the date forward 5 days every years suggests Mathis Wackernagel

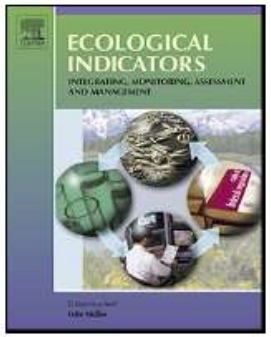
The Ecological Footprint suggests compressing sustainability to a single metric (acres of equivalent land). CO2 emissions from energy demand dominate the output.

Ecological Indicators 46 (2014) 610–621

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind



Footprints to nowhere

Mario Giampietro[a,c], Andrea Saltelli[b,*]

[a] Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain
[b] Institute for the Protection and Security of the Citizen (IPSC), The European Commission, Joint Research Centre, TP 361, 21027 Ispra, VA, Italy
[c] Catalan Institution for Research and Advanced Studies (ICREA), Passeig Lluís Companys, 23, 08010 Barcelona, Spain

Giampietro, M., and Saltelli, A., 2014, Footprints to nowhere, Ecological Indicators, 46, 610–621.

Goldfinger, S., Wackernagel, M., Galli, A., Lazarus, E., Lin, D., 2014, Footprint facts and fallacies: A response to Giampietro and Saltelli (2014) “Footprints to Nowhere”, 46, 622–632.

Giampietro, M., and Saltelli, A., 2014, Footworking in Circles, Ecological Indicators, 46 (2014) 260–263.

Alessandro Galli , Mario Giampietro , Steve Goldfinger, Elias Lazarus, David Lin, Andrea Saltelli , Matthis Wackernagel , Felix Müller, 2016, Questioning the ecological footprint , Ecological Indicators, 69, 224–232.

All the story...

Practicum on CUDOS

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.

… after the practicum on Merton's CUDOS

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

The End

@andreasaltelli

What issues for an ethics of quantification?

-The issue of trust.
-A defence against abuse
-To prevent consequentialism in scientific quantification
-To moderate excesses of optimism about the merits of quantification
-For the non-neutrality of the techniques; for the non-separability of facts and values
-For the need to contextualize any quantification
-To deter quantification hubris

What recipes would be offered by an ethics of quantification?

-A license not-to-quantify
-Taming hubris: memento Figure 1.
-Make use of the existing disciplinary arrangements
-Make quantifications interpretable, conveyable in plain English and context specific; use existing pedigrees
-NUSAP
-Sensitivity auditing