

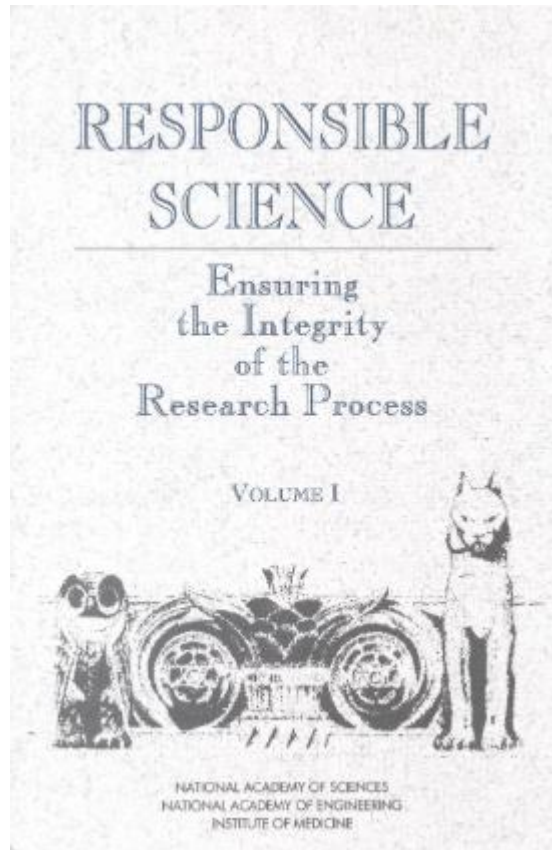
Calling for a National Model Benchmarking Facility

Benjamin L. Ruddell, et al.

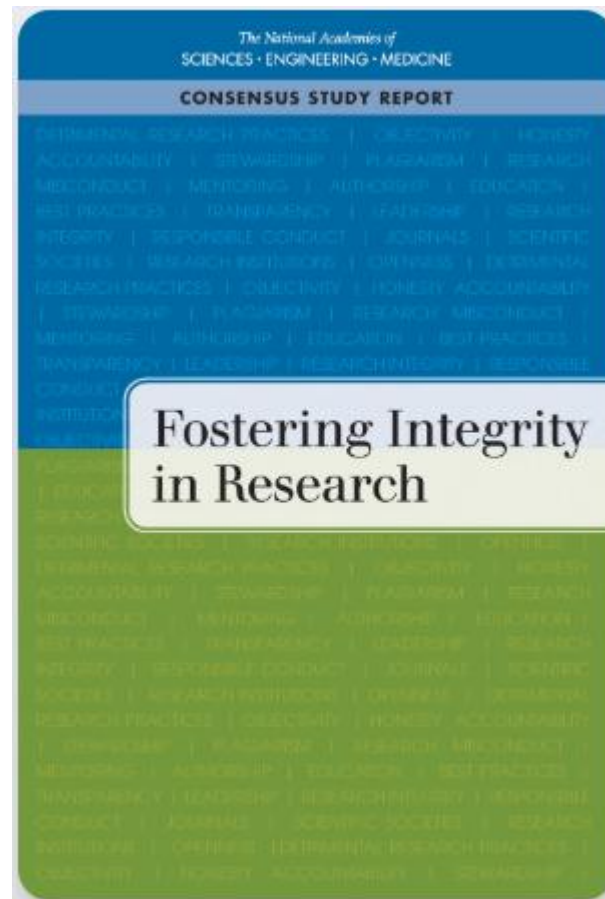
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Ruddell, B.L., Clark, M., Driscoll, J.M., Gochis, D., Gupta, H.,
Huntzinger, D., Kirchner, J.W., Larsen, L., Loescher, H.W., Luo, Y. and
Maxwell, R., 2023. Calling for a National Model Benchmarking Facility.

1992



2017



2019

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Half of social-science studies fail replication test in years-long project

Results from massive, 'eagerly awaited' initiative reinforce concerns about the credibility of science – but raise hope for solutions.

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EDITORIAL | 01 April 2026

More self-reflection in research can lead to better science

A package of papers looking at the social and behavioural sciences shows the value of researchers collaborating to further the cause of reproducible, replicable and robust findings.

2014

“Science's standards have always been high, and these measures add to steps we have already taken to increase transparency, such as requiring data accessibility. Nevertheless, journals can only do so much to assure readers of the validity of the studies they publish. The ultimate responsibility lies with authors to be completely open with their methods, all of their findings, and the possible pitfalls that could invalidate their conclusions.”

- McNutt, 2014

Given collapsing public trust in science, is “self reflection” sufficient transparency and accountability?


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Article | [Open access](#) | Published: 20 January 2025

Trust in scientists and their role in society across 68 countries

[Viktoria Cologna](#) , [Niels G. Mede](#), [Sebastian Berger](#), [John Besley](#), [Cameron Brick](#), [Marina Joubert](#), [Edward W. Maibach](#), [Sabina Mihelj](#), [Naomi Oreskes](#), [Mike S. Schäfer](#), [Sander van der Linden](#), [Nor Izzatina Abdul](#)



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Public losing trust in scientists, finds major UK poll

More people sceptical that science makes life better compared with pre-pandemic, and public also doubting contribution to economic growth

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Last updated January 20, 2026

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SCIENCE AND TECHNOLOGY

Major declines in the public’s confidence in science in the wake of the pandemic.

<https://doi.org/10.1038/s41593-025-02092-0>

Science must break its silence to rebuild public trust

Cory T. Miller, Michele A. Basso, Aaron P. Batista, Katalin M. Gothard, Karen J. Parker, Doris Y. Tsao, Ziv M. Williams & Michael L. Platt

 Check for updates

This Comment calls on scientists to acknowledge how insufficient communication and limited engagement beyond academia have deepened the divide between science and the public. Restoring trust requires a paradigm shift in which scientists accept that the responsibility to champion science lies with us. We propose a new model in which public communication and advocacy are considered as essential to our mission as rigor and reproducibility – critical not only for safeguarding science, but also for ensuring that its benefits reach all segments of

antibiotics such as penicillin to treat once-fatal infections, and pioneered organ transplants – from kidneys and hearts to faces and hands – that have saved and restored lives. More recently, scientists have mapped the entire human genome, laying the foundation for precision medicine to target cancer mutations and inherited diseases, while advances in brain–computer interfaces (BCI) have enabled paralyzed individuals to control robotic arms or type with only their thoughts. Thanks to these collective efforts, the global average life expectancy has nearly doubled since 1925. These real, measurable and often lifesaving impacts on people’s lives should be enough to earn public trust in science.

Excellence, however, often comes at a cost. It can foster an insular mindset in which we assume that the value of our work is undeniable. Great success can breed self-assurance that keeps us on an unwavering path, even when evidence indicates that a change is needed – convinced, sometimes blindly, that the solution to a scientific problem lies just ahead. Confident in our brilliance, we tend to dismiss

And, what about very complicated studies?
...such as computer models of geophysical systems?

“A solution to many of these challenges is to formally apply model benchmarking through an expertly administered and fully resourced model benchmarking process. Benchmarking is the broad set of methods that support systematic comparison of a model’s inputs, outputs, algorithms, numerical solutions, functional responses, architecture, statistical uncertainties, predictions, and projections against both theoretical and applied model quality standards such as error, robustness, and parsimony.”

- Ruddell et al., 2023

Calling for a National Model Benchmarking Facility

1. A fully funded “second stage” of peer review
2. Carried out by qualified third party experts
3. Institutionalize it as a group of competing publicly funded “reproducibility” or “benchmarking” facilities
4. This is a deep reproduction capability to address sophisticated disciplinary methods such as computer models of systems
5. Allocate 10% of the public science budget to reproduce the most consequential 1-2% of studies
6. Consider how to select studies for auditing, e.g. require benchmarking before larger “Phase 2” public funding?
7. Consider how to incent innovation and competition between institutes to advance efficiency and effectiveness

NMBF's and the Science Discovery Cycle

