

Executive Summary. Today's scientists are rewarded for QUANTITY at the expense of QUALITY, causing serious quality control problems in science. In a fresh attempt to solve this problem, we are boldly conducting the world's first *researcher transparency audits*, in combination with using unique rewards to NUDGE authors to increase their transparency. This uniquely addresses the needs of the established professor market *while* also catering to the needs of junior scientists in the emerging open science market. We are seeking a new round of funding so that we can (1) scale up and improve our apps and (2) operate a small auditing team to conduct ongoing transparency audits at a global scale. We're excited to move forward on our MISSION to scale up our disruptive transparency author apps, so we can achieve our VISION of a transformed research world brimming with high-quality scientific evidence.

The Problem: *Today's scientists are rewarded for QUANTITY at the expense of QUALITY, causing serious [quality control problems in science](#)*

In 2013, Peter Higgs, a Nobel-prize winning physicist, told *The Guardian* [no university would hire him in today's academia](#) because he would not be considered "productive" enough.

Higgs' shocking statement speaks to the most fundamental problem in today's universities globally: **Scientists are rewarded for QUANTITY at the [expense of QUALITY](#).**

Indeed, quality control problems abound in academia, e.g., most research fails to meet *minimum transparency*¹-- data are unavailable without valid reason (Figure 1; & see [broader replication crisis](#)).

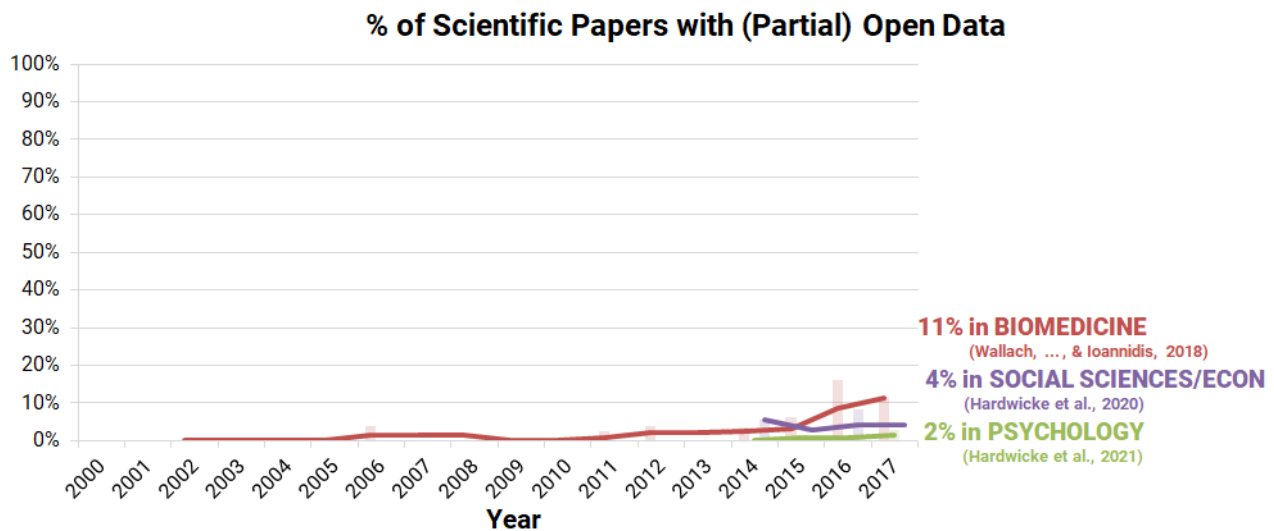


Figure 1. Percentage of empirical articles with (partial) public data in biomedicine (Wallach et al. 2018), social sciences/economics (Hardwicke et al. 2020), and psychology (Hardwicke et al. 2021) over time (biomedicine 3-year moving average for 2000-2017; social sciences/psychology 2-year moving average for 2014-2017).

This is devastating because *minimum transparency* (T) is the crucial ingredient that makes science work. It allows its quality control processes to operate, including peer-review, independent reanalyses, and replications. Minimum transparency also *directly* boosts quality in several ways.²

¹ Minimum transparency defined as the (public) availability of [sufficient study & data details to analytically and methodologically replicate a finding](#).

² Higher T increases quality given (1) it slows down research, (2) induces fear of easier error detection, & (3) errors *actually* easier to detect/correct.

Indeed, this is why minimum transparency is a *core ethical principle* that all (publicly-funded) scientists are [expected to uphold](#).

Academia’s quality control problem is harming society in at least 5 ways:

1. *Knowledge crisis*: Significant deceleration of cumulative scientific knowledge development.
2. *Wasted taxpayer money*: Of the [~\\$250B/year spent on biomedical research globally](#), [~85% is wasted](#) on [flawed](#) or [opaque](#) research, which is arguably worse than useless, given it misleads society, and squanders innovation opportunities, economic/societal benefits, etc.
3. [Science hijacking](#): Low standards allow drug companies, lobby groups, rogue governments, etc. to misrepresent science for financial/political gain, which corrupts the scientific record.
4. *Unjust legal decisions*: “Incorrect” court decisions made based on opaque or otherwise unverifiable scientific evidence, which is particularly problematic in criminal cases.
5. *Suffering medical patients*: Yearly, [millions of individuals](#) suffer/die from conditions whose treatments have stagnated due to [wasted](#) or [insufficiently transparent](#) biomedical research.

An unending number of solely reward-based initiatives have been used since the 1990s, with only negligible success in increasing transparency ([Figure 1](#)). It’s clear that carrots alone aren’t enough. *We need more than just carrots.*

Our Proposed Solution: *Use outside disruption to boost QUALITY in science³ by scaling up our transparency audits and author apps*

In a fresh attempt to solve academia’s quality control problem, we are boldly conducting the world’s first [researcher transparency audits](#), while simultaneously using unique “bribes” to NUDGE authors to increase their transparency.

We will first dangle unique carrots to authors – bragging rights, research impact boosting tools, unavailable anywhere else – as juicy rewards to entice them to increase their transparency level in an incremental and “[gamified](#)” manner (steps 1, 2, and 3 in [Figure 2](#)).

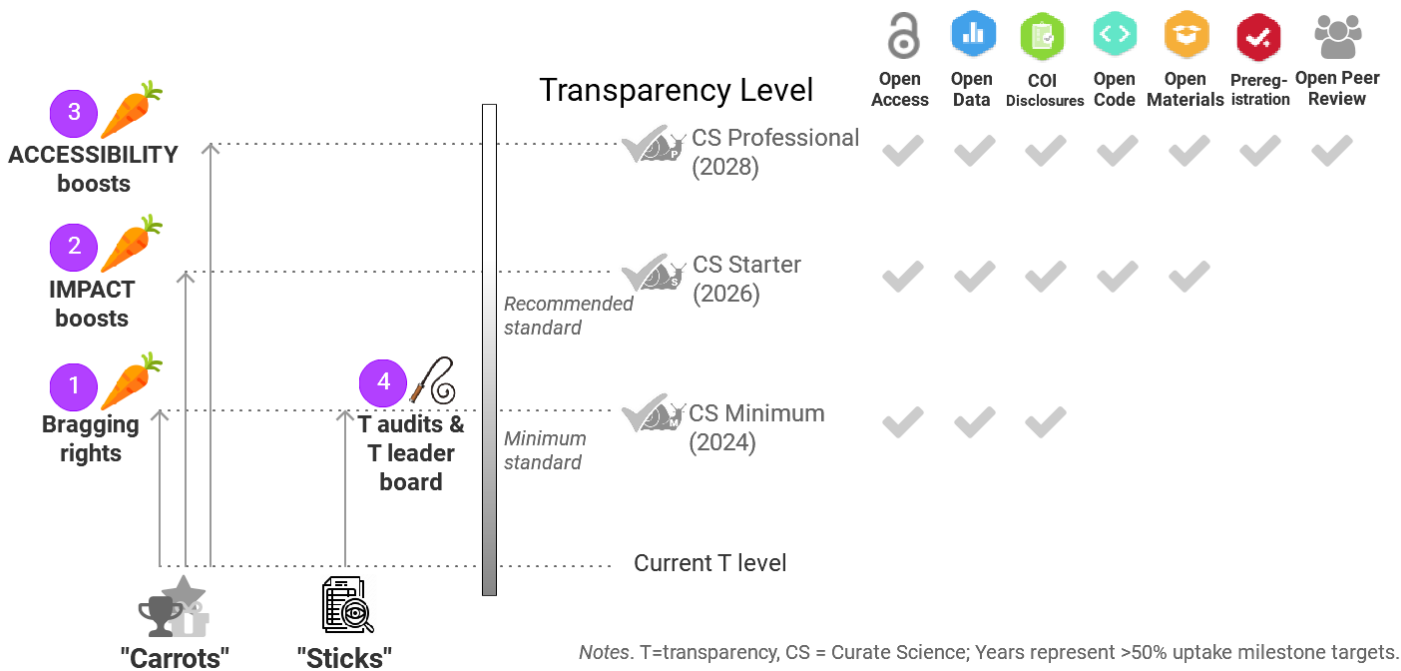


Figure 2. Personalized mix of “carrots” and “sticks” to be incrementally used to nudge researchers to increase their transparency level.

³ A problem especially in need of outside disruption given that [established players](#) are impeding progress due to not having any “[skin in the game](#)”.

If the offered rewards fail to motivate an author to meet the minimum T level⁴, then small sticks are used as nudges to increase transparency, in the form of warnings of social penalties and reputational costs via the public posting of audit results on [our T leaderboard](#) (step 4).

Rewards/Carrots⁵ 🥕 ([more details](#) about the rewards). As depicted in [Figure 2](#), researchers will be offered the following unique rewards, which they only get for increasing their transparency or achieving specific personalized transparency milestones:

1. First (step 1), for increasing their transparency, researchers are rewarded with *bragging rights* via the public T leaderboard and [impact boosts](#) proportional to the increase in T.
2. Second (step 2), for meeting progressively higher personalized T levels, authors get to “unlock” an *impact-boosting feature* of their choice ([out of 3 options](#); 2 levels).
3. Third (step 3), for meeting an even higher personalized T level, researchers get to unlock a *research accessibility boosting tool* of their choice ([also out of 3 options](#); 2 levels), which provides additional boosts to an author’s research impact.

Sticks/Penalties 🪄. Then, and only then, are small sticks used on opaque, laggard researchers ([Figure 2](#), step 4). Similar to how industrial companies face fines for polluting the environment, researchers who “pollute” the scientific literature with opaque, unverifiable findings face the following social punishments in a bid to hold them accountable:

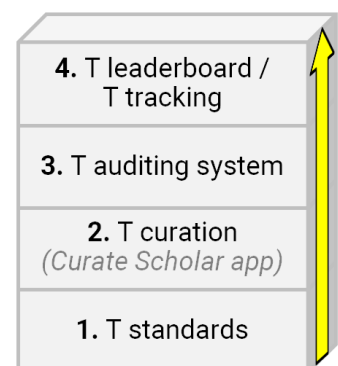
1. Warnings of social embarrassment for being at the bottom of a public T leaderboard for failing to meet a lenient, minimum transparency standard.
2. Possible tarnishing of one’s reputation -- in the eyes of the broader research community -- for violating core conceptual and ethical principles of science.

This *combined carrots-and-sticks approach* uniquely addresses the needs of professors in the established market *while* also catering to the needs of junior scientists in the growing open science market.

What We Have

We already have the following technological building blocks (in foundational order):

1. [T standards](#): Easy-to-use and flexible; feasibility tested ([audit results](#)).
2. [Curate Scholar product](#) (beta): Allows authors to easily curate their publications’ transparency, making them deliciously user-friendly to access (author page [eg1](#), [eg2](#)).
3. [T auditing system](#): Validated via 3 feasibility studies ([details & results](#)), showing the approach can be applied to papers across a wide variety of fields, article types ([16](#)), study types/methodologies ([463](#)), and researcher types/career stages.
4. [T leaderboard](#) (alpha): Public leaderboard of authors’ T track record.



Our Ask

To scale up our disruptive author apps and T audits globally, we are seeking a new round of funding for 3 years in the \$600K-\$1.2M range ([expense estimates details](#)) for a 2-3 person team composed

⁴ Min. T level requirements are informed by strategic ([as lenient as possible as per current ethical codes of conduct](#)) & [theoretical rationales](#).

⁵ Rewards are centered on boosting *research impact* given that impact is academia’s 2nd most important asset, after quantity, to secure/keep professorship positions and grants. Research impact is also a fundamental (social) psychological need, even for non-career-focused scientists.

of a founder/product developer (LeBel), a technical co-founder (whom we're finding via [YC's cofounder matching program](#)), and 1 full-stack developer.

This builds upon our foundational 2-year [European Commission Marie-Curie grant](#), among Europe's most [competitive and prestigious grants for early-career scientists](#) (see [our complete 2014-2020 funding history](#)).

What We'll Build

We will (1) scale up and improve our apps and (2) operate a small auditing team to conduct on-going transparency audits of the global population of scientists:

1. *Software*: Scale up the following apps as part of [our integrated software suite](#):
 - a. [Transparency auditing app](#): Includes dashboard and [automated T metadata scraper](#).
 - b. [Curate Scholar app](#): Additions and improvements to app to be used in rewards-only social campaigns to encourage *all authors* to boost their transparency.
2. *Auditing team*: Operate a small auditing team to conduct the following kinds of T audits⁶:
 - a. *Random audits*: Publicly-funded researchers, and
 - b. *Targeted audits*: Top 5% most cited authors; top 5% most productive authors; and authors of articles cited in public policy documents.

Business model: Operate as a nonprofit tech startup, as part of a [nonprofit-private partnership](#) with a commercial partner, generating revenue from:

- [Freemium products and plans](#): 1-3% of users/researchers within 5 years, e.g., N=2.5K-5K premium users, hence ~\$250K-\$500K revenue/year based on a [\\$100/yr premium plan](#).
- Transparency report contracts for professor and grantee publications for [unis](#) and [funders](#).

Our Team

[Etienne P. LeBel](#), PhD (*meta-scientist, psychologist; CV*), [Curate Science](#) (Canada) - Founder & lead
[Stefaniia Ivashchenko](#), PhD (*biophysicist*), [Open Science TV](#) founder (France) - Promotion/Marketing & community building

[Mark Ledwich](#) (*developer, data scientist*), [Transparency.tube](#) co-founder (Australia) - Technical advisor

We are leaders in scientific transparency with extensive domain expertise in meta-science. In fact, we have pioneered several foundational transparency [initiatives](#), [standards](#), and [technologies](#) that now make it possible to conduct T audits at scale. Our international team has a proven track record of leveraging its unusual combinations of traits to make progress on the big problems in science:

1. **Open-minded, but stubborn**: Firm in our *vision*, but flexible in our tactics to achieve our *mission* via hyper-experimentation: Becoming a "[prolific replicator](#)" conducting [adversarial replications](#); [PsychDisclosure.org](#); [public replication tracker](#); [T audits/public T leaderboard](#).
2. **Creative, but disciplined**: We combine [big vision meta-scientific thinking](#) with laser focus attention to details such as [UI/UX nuances](#). Creative solutions stem from insider knowledge – spanning almost 20 years – of the research culture in academia, e.g., how evidence is cherry-picked and "oversold" and from LeBel's social psychology background.⁷

⁶ Our target milestone is to audit N=~25K authors per year or 1% coverage by 2025 (leveraging [existing open-source T metadata text-mining tools](#)).

⁷ A social psychology background is particularly valuable when implementing researcher-tailored incentives that need to take into account how researchers' personalities interact with the situational factors (e.g., academia's "publish or perish" environment) that influence their decision to be more transparent. For e.g., "carrots" may be sufficient for high-integrity researchers whereas "sticks" may be needed for lower-integrity researchers.

3. ***Bold, but tactful:*** [Our solid core principles](#) empower us to boldly explore controversial, [uncharted territories](#) in the scholarly innovation space that other groups are not willing to touch ([media coverage of LeBel's audacious initiatives](#)). But [we do so tactfully](#).
4. ***Passionate, but principled:*** Driven to improve science to accelerate solving big societal problems like cancer, Alzheimer's, heart disease, anxiety disorders, and suicide, given these have afflicted our own loved ones. Our motto: [Fight for principles, fight for noble causes](#).⁸

Closing Statement

We are excited to globally deploy our transparency author apps for science, so we can achieve our vision of a transformed research world brimming with high-quality scientific evidence.

It is a bold vision, but with boldness brings progress - progress that spawns new eras of unparalleled scientific advances, applied innovations, and human flourishing.

We hope you will join us on this exciting adventure!

⁸ We've been tenaciously developing Curate Science for 5 years part-time and 3 years full-time. Founder LeBel has made [key contributions](#) to raising transparency and replication standards in academia for more than 10 years (even winning [an award from Berkeley for his leadership](#)).

Supporting Materials

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Details of Research REWARDS to Increase Transparency: BRIBES, BRIBES, BRIBES

Details regarding the several juicy, unique rewards that will be dangled to authors -- in a staggered, personalized, and gamified fashion -- to increase their transparency level.

Benefits are centered on boosting research IMPACT given that IMPACT is the most important asset in the current academic system, after QUANTITY, in securing/keeping jobs and grants. Research IMPACT is also a fundamental (social) psychological need, even for non-career-focused scientists.

Various benefits will be incrementally offered to incentivize researchers to gradually ↑ increase their T-level (see Figure 1):

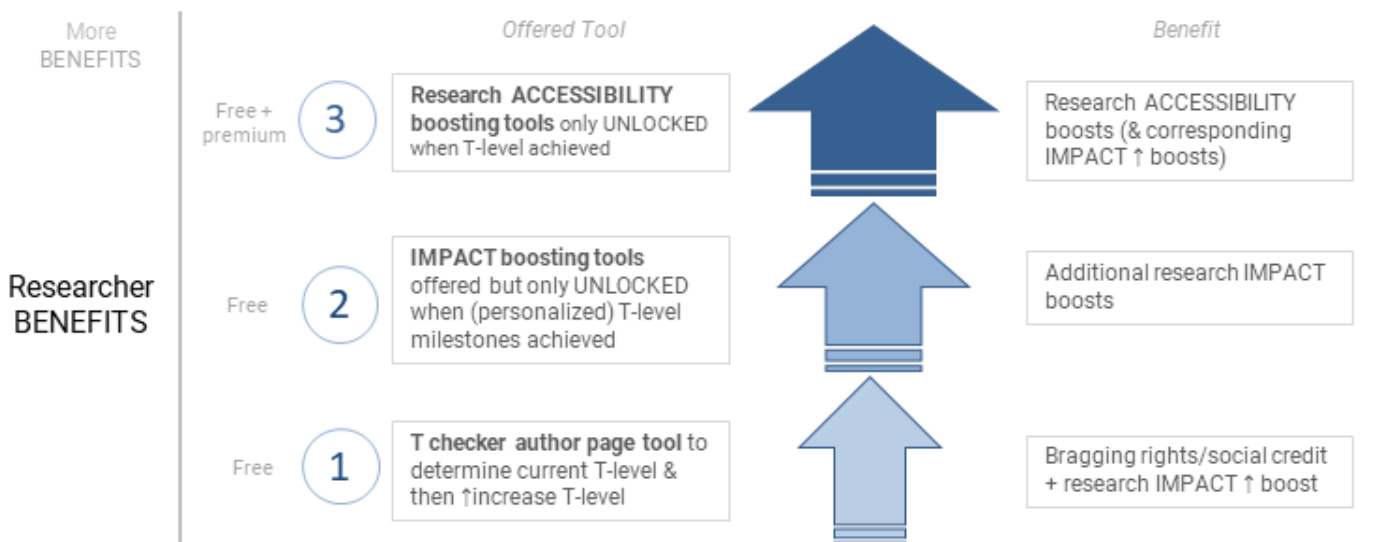


Figure 1. The “carrots”/benefits to be incrementally dangled to motivate researchers to progressively ↑ increase their T-level.

- Step 1. **T checker author page tool**: Determines current T-level and then allows researchers to ↑ increase their T-level, which rewards them with

- (1) *social credit/bragging rights* for achieved T-level via our [T leaderboard](#) and
- (2) a *research IMPACT* boost proportional to achieved T-level increase via the [open access](#) and [open data](#) citation advantages.
- Step 2. **IMPACT-boosting tools**: To further incentivize researchers to increase their T level, additional “carrots” will be dangled in the form of IMPACT boosting tools (unrelated to T), which only become “unlocked” when progressively *higher T-level milestones* are achieved (2-levels, tailored to a researcher’s current T-level). Tentative list⁹ of (free) tools to choose¹⁰ from:
 - Embeddable author page/publication lists (free; phase I; [early beta example](#))
 - Full-screen mode (free; phase I; [example](#); [early beta demo](#))
 - Transparency signalling [interactive labels at article-level & author-level](#) (free, phase I; [alpha prototype](#))
 - Integrated video abstracts (premium; phase II)
 - Nuanced and modern article/researcher impact metrics (premium; phase II)
- Step 3. **ACCESSIBILITY-boosting tools**: As additional incentives, we will offer the following *ACCESSIBILITY-boosting features* (which in turn further boosts one’s research impact) that are also only UNLOCKED when personalized T-level milestones are achieved:
 - Academic website builder (premium; phase I; [prototype](#))
 - Article beautification/interactive articles (premium; phase II)
 - Audio articles (premium; phase II)
 - Interactive CV (premium; phase II; [alpha example](#))

Personalized persuasive messages, tailored to a researcher’s current career stage, will be used to draw in and NUDGE users to add transparency information (at each conversion stage in the user interface), including leveraging powerful [network effects](#) and other social psychological forces:

<u>Researcher Career Stage</u>	<u>Persuasive Appeal Type</u>
Junior researcher	Social credit/bragging rights (T leaderboard) Social comparison (based on social comparison theory)
Mid-career researcher	Social modeling (based on social learning theory) Intergroup social comparison
Senior or elite researcher	Social normative appeal (based on social norms theory) Communal/collective appeal Plant a tree / donate to charity of choice

⁹ Actual tools offered, and phase of implementation, to be determined based on the ratio of estimated benefits (based on user surveys) versus costs of implementing the tools.

¹⁰ A choice of features to unlock is given to users for the following reasons: A general condition for behavior change is that the perceived BENEFITS of an action must be greater than its perceived COSTS. The perceived BENEFITS of our offered features and perceived COSTS of increasing transparency, however, will be different for different users/researchers. Such heterogeneity is why a wide set of beneficial features, for both the IMPACT and ACCESSIBILITY boosting tools, will be offered to ensure that such a condition is true for as many users/user segments as possible.

Details of Feasibility Studies to Validate General Transparency Audit System and Protocol

Three (3) feasibility studies (pilot/test audits) have been conducted (February 2021 - current), demonstrating the approach can be employed across a wide variety of fields/subfields, article types, study designs/methodologies, and across diverse types of researchers and career stages:

1. **Audit #1:** N=10 researchers predicted to have high (N=5 transparency leaders) vs. low (N=5 "legacy researchers") levels of transparency (construct validity, known groups method) ([audit results](#))
2. **Audit #2:** N=10 self-nominated researchers (3 of 10 completed) ([audit results](#))
3. **Audit #3:** Random audit of N=10 NIH-funded researchers (biomedicine focus; of 1.3M eligible; 10 of 10 completed) ([audit results](#))

Transparency and Accountability of our Transparency Audit System - Who Audits the Auditors?

Practicing what we preach, we strive to conduct our transparency audits as transparently as possible so that we are accountable to our stakeholders. We've intentionally "surfaced" article-level transparency information [within the leaderboard table itself](#) to make it easy for independent parties to verify the correctness of our transparency audits. Our audit results also go through various quality control processes PRIOR to public dissemination (e.g., double-verification internally; author verification checks). Moving forward, we will further increase the transparency of our audit process by improving our technical tools, e.g., publicly available audit metadata and formal database of auditor-auditee interactions. Finally, we are working on partnering with, or becoming, an "external independent organization" as recommended by [Shamoo \(2016\)](#).

Budget Expense Estimates Details (3-years, 2022-2024)

Expense estimates (in USD)	2022	2023	2024	Total
1 project lead/product developer @100% FTE	\$100K	\$100K	\$100K	\$300K
2 programmers @100% FTE	\$200K	\$200K	\$200K	\$600K
UI/UX product designer one-time contract	\$50K	-	-	\$50K
4 paid curators: PhD student @25% FTE	\$60K	\$60K	\$60K	\$180K
Web server costs	\$15K	\$30K	\$60K	\$105K
Total	\$425K	\$390K	\$420K	\$1.2M

Endorsements from Transparency Influencers

“Curate Science is making steady progress tackling the holy grail problem in academic science: Differentiating credible evidence from unreliable or otherwise non-verifiable research.”



[Chris Chambers](#), PhD, Professor of Cognitive Neuroscience, Cardiff University and author of [The Seven Deadly Sins of Psychology](#)

“Curate Science is tackling the important challenge of organizing the transparency and replication of published research so that researchers can efficiently evaluate the credibility of scientific claims. This is what the scientific record should look like in the 21st century.”



[Daniel Lakens](#), PhD, Associate Professor of Meta-Science, Eindhoven University and teacher of [Improving Your Statistical Inferences](#) MOOC

“Curate Science’s vision has always been at the cutting-edge. It offers delicious web products for forward-thinking researchers to make their research more transparent and accessible. It also takes on the next big challenge: Linking findings to illuminate reliable research as science self-corrects.”



[Bobbie Spellman](#), PhD, Professor of Psychology, University of Virginia, [active open science proponent](#), and [editor of special issue on transparency](#)