

## The Importance of Communicating Empirically Based Science for Society

Good science is based on [sound research](#).

- When the data have been collected and analyzed, the scientist must then interpret the results and determine if their hypothesis was supported or not.
- In many instances, the experiment fails to produce the anticipated result. This is not a failure of science, but it forces the scientist to revisit the experiments hypothesis, revising it based on what was learned in the failed experiment, or to reject the hypothesis and move on to different experiments.



The primary avenue for sharing scientific findings is through publication of the work in [peer-reviewed journals](#).

- Once the scientist has selected a journal to submit their work to, they must follow strict submission guidelines that include content and text formatting that complies with the journal's standards.
- Peer evaluators assess the quality of the work, including the methodology used, if the data are accurately presented, and if the interpretation of the research by the author is logical, supported by the data, and consistent with current understanding.
- The vast majority of research submitted to peer-reviewed journals is unacceptable for publication and the work is rejected. The rejection rate for many top journals can be as high as 90%.

Scientific research is often referred to as the [scientific process](#). That is because it is an ongoing and evolving process, with no starting or ending point.

- Each research study adds a piece to the puzzle but to see the final picture requires many puzzle pieces and hence, many experiments confirming the findings.
- The scientific process involves many false starts and leads, and incorrect conclusions may be made along the way until more evidence is collected and a pattern begins to emerge.
- As new information or evidence is found, scientists review how that fits the puzzle picture.

[Electronic publishing](#) has been the single greatest driver of enhanced quantity, speed and availability of publications to both scientists and the public.

- There are four main approaches to open access publishing: gold open access, green open access, hybrid models, and traditional closed models.
- Traditional publishing is funded by a combination of dollars, including library subscriptions and page charges.
- With the rise of open access publishing, publishers have scrambled to develop new business models to sustain high-quality journals, while they are losing subscription revenues. Often, this has led to a model in which authors pay an open access premium to offset costs associated with preparing articles for publication.

We live in a [precautionary era](#) in which technological breakthroughs poised to dominate the coming decades—from artificial intelligence and nanotechnology to the biotechnology revolution in medicine and agriculture—are often cast in a dark shadow.

- As with any new technology, scientists need to apply the technology to confirm its safe use, with regulatory scientists conducting risk assessments that confirm the resulting products are no riskier than existing products.
- The media influence public opinion and therefore political and regulatory decision-making.

Vendors use the Internet and social media to [shape broader public opinion](#) about GMOs, grabbing attention across several platforms often through compelling visuals

- The Non-GMO Project provides its logo to whoever pays its fees, regardless of whether there are GM varieties or not. Examples of deliberately mislead consumers through the application of the Non-GMO Project logo include tomatoes, grapes, and pasta, as there are no GM varieties of tomatoes, grapes, or wheat.

Instead of undertaking a [rational assessment](#) of a specific piece of information, people trust the information if it comes from someone they trust.

- Scientists, whether they work for academia, government or industry need to be better trained in how to communicate technical aspects of science, in a manner that aligns with how consumers want to receive information.

---

### Experts to Contact for More Information:

Stuart Smyth, [stuart.smyth@usask.ca](mailto:stuart.smyth@usask.ca); Jon Entine, [jonentine@geneticliteracyproject.org](mailto:jonentine@geneticliteracyproject.org); Ruth MacDonald, [ruthmacd@iastate.edu](mailto:ruthmacd@iastate.edu); Cami Ryan, [camille.ryan@bayer.com](mailto:camille.ryan@bayer.com); Meghan Wulster-Radcliffe, [meghanwr@asas.org](mailto:meghanwr@asas.org).

To view the complete text of this CAST Commentary, click [here](#) or visit the CAST website ([www.cast-science.org](http://www.cast-science.org)) and click on Publications. For more information about CAST, visit the website or contact CAST at 515-292-2125 ext 231.



To order copies *The Importance of Communicating Empirically Based Science for Society*, visit the CAST website ([www.cast-science.org](http://www.cast-science.org)), click on Publications, and select Issue Papers.

## CAST COMMUNICATES CREDIBLE SCIENCE

---

The Council for Agricultural Science and Technology (CAST) is a nonprofit organization with its membership composed of scientific and professional societies, companies, nonprofits, and individuals. Through its network of experts, CAST assembles, interprets, and communicates credible, balanced, science-based information to policymakers, the media, the private sector, and the public.

The primary work of CAST is the publication of papers highly regarded as a source of science-based information written and reviewed by volunteer scientists and subject experts from many disciplines. CAST is funded through membership dues, unrestricted financial gifts, and grants.

## Upcoming CAST Publications/Events

- ***Food Biofortification —Reaping the Benefits of Science to Overcome Hidden Hunger (October 2020)***
- ***Ground and Aerial Robots for Agricultural Production: Opportunities & Challenges (November 2020)***