

Correspondence

Tracking ecology is not old-fashioned

Long-term monitoring is not innovative and is never going to result in spin-off businesses, but it is still the best way of observing human impact on the environment. The use of trained personnel to take outdoor measurements is being called into question, however.

The UK Countryside Survey, for example, relies on experienced botanists to go out in all weathers to find out how habitats and species are changing. Their ability to recognize a particular species of grass among other vegetation, for instance, cannot be replaced by technology. In my view, expert volunteers (citizen scientists) who are willing to monitor particular ecological environments or species are no substitute, because their botanical expertise does not usually focus on the commonplace and the widespread.

Doing the same observations in the same way and at the same places no longer seems to light up potential funders. If they underrate the valuable expertise of fieldworkers and field botanists, we stand to lose one of the most highly regarded ecological monitoring programmes in Europe and the world.

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Code review poses extra challenges

As editors-in-chief of *ReScience*, a journal dedicated to computational replication (see <http://rescience.github.io>), we argue that the review of software codes used in research papers requires a departure from the conventional refereeing process (see *Nature* 555, 142; 2018).

In addition to scientific expertise, reviewers need experience in software development and programming languages to be able to run

the code and inspect it. They must test the source code and whether figures and/or tables from the submitted article can be reproduced using the software, input files, data sets and instructions supplied by the authors.

In our experience, technical problems that arise in installing and running scientific software are resolved most effectively if authors and reviewers can discuss the issues with one another. *ReScience* uses the GitHub platform for such open reviewing (see also N. P. Rougier *et al.* *PeerJ Comp. Sci.* 3, e142; 2017).

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Quality-assured data for enzyme activity

Transparent reporting of experimental methods to ensure the reproducibility of results (see *Nature* 555, 6; 2018) is particularly crucial in enzyme kinetics, given the wide variation in many assay parameters. It also allows unambiguous interpretation of the data.

The STRENDA (Standards for Reporting Enzymology Data) database is a repository for published enzymology data, lodged under its guidelines for transparent reporting of experimental methods (see go.nature.com/2qq9vm7). The STRENDA Commission is working with the biochemistry community and funding agencies to make submission to this database routine practice during publication. More than 50 journals currently recommend the guidelines to their authors.

The implementation of scientific data standards has typically been left to data curators (see, for example, U. Wittig *et al.* *Nucl. Acids Res.* 46, D656–D660; 2018). The STRENDA database now serves as a formal validation

tool for reliable reporting of data (see also N. Swainston *et al.* *FEBS J.* <https://doi.org/cm8d>; 2018).

We suggest that our model could be adapted for the benefit of authors, reviewers, data consumers, publishers and funders across experimental disciplines.

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A surge in Brazilian papers in top journals

As a rough assessment of Brazil's contribution to high-impact science from 1980 onwards, we analysed the number of papers published in *Nature* and *Science* from three of the country's leading universities. We found a dramatic increase in their publications in these prestigious journals over the period.

We combined publication counts for the University of São Paulo, the University of Campinas and the Federal University of Rio de Janeiro. To track the long-term trend in their performance, we sampled counts every decade from 1980 to 2010 and for 2017. During the 5 individual years we sampled from this span of 37 years, these institutions together published 0.08 papers, on average, in each edition of the two journals (details available from authors on request).

Although this is low compared with averages amounting to about 1.5, 0.6 and 0.5 papers per edition from Harvard University in Cambridge, Massachusetts, and the UK universities of Cambridge and Oxford, respectively, the total number of papers from the Brazilian universities increased by 2,200% from 1980 (1 article) to 2017 (23 articles). The rise has been steepest during the current decade (from just 7 papers in 2010), despite Brazil's economic

crisis that started in 2014.

This overall increase, in our view, reflects the intense research activity and resilience of the Brazilian institutions, which all have a strong history of international collaboration. Now more than ever, governmental commitment to science is crucial for our future research performance.

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Set goals for cancer research funding

Cancer Research UK — one of the country's largest voluntary-sector funding organizations — is seeking to improve the survival rates of people with cancer from around 50% today to 75% in 2034. We propose ways to focus cancer-research funding more effectively to help attain this goal.

We suggest that priority funding should go towards improving detection of early-stage, treatable tumours; developing innovative therapies for cancers that have high mortality rates even when they are detected early; and accelerating the translation of promising new drugs — which currently takes 17 years on average (Z. S. Morris *et al.* *J. R. Soc. Med.* 104, 510–520; 2011).

Strong leadership is crucial for implementing this three-pronged approach, and for optimal oversight of research funding. From our experience, training of team leaders needs to concentrate more on developing the skills for managing research teams and on acquiring the techniques for efficiently directing processes. Such training could be delivered by a leadership academy run by respected research leaders and business coaches.

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