Principal investigators (PIs), the linchpins of the scientific process and of integrity, are under ever-increasing pressures from many sources.

The cultures of departments and institutions may be influential. Last month's report draws attention to survey-based tools that can assess the health of an organization's research culture (such as that at go.nature.com/2p3fjed). But it would be more to the point to assess the health of research groups, which has much greater influence on trainees.

For example, how, if at all, are group members' data scrutinized by other members or the PI, perhaps by spot-checking? To what extent does a PI ensure that a graduate student or postdoc with a strong research claim is not deceiving themselves? In 2008, a study of case files concerning trainees found guilty of misconduct concluded that nearly three-quarters of the trainees' mentors had not directly reviewed source data (D. E. Wright *et al. Sci. Eng. Ethics* **14,** 323–336; 2008). What bandwidth does the PI have for such oversight?

Then there is a PI's approach to other essential aspects of research. For example, do group members get experience of peer review and grant applications? Is such training neglected, or are trainees so burdened with it that their own research is compromised?

And in relation to psychological well-being, to what extent do group members perceive themselves to be treated fairly, in good times or bad? At least three organizations — Future of Research, Rescuing Biomedical Research and the Global Young Academy — have sprung up in the past decade to advocate for early-career researchers, suggesting that trainees do not feel they are receiving just treatment. In 2013, an anonymous survey at one institution found that almost one-third of trainees felt pressure to back a mentor's research hypothesis even when data did not support it, and that nearly half knew of mentors who required trainees to have a high-impact publication before leaving the lab (A. Mobley *et al. PLoS ONE* **8,** e63221; 2013).

What of the broader needs of the PI? Does the institution provide support for ongoing data management or training in group organization and leadership? Probably not much — a 2014 survey of around 3,500 faculty members funded by the US National Institutes of Health (NIH) found that only around one-quarter had had opportunities to receive training in being a better mentor (S. L. Titus and J. M. Ballou *Sci. Eng. Ethics* **20,** 221–235; 2014).

"Institutions should help PIs assess their groups and allow independent checks."

Institutions should pursue such support and oversight, to help PIs assess their groups and to allow independent checks. And funders should insist on such support and appraisals. After all, what isn't measured tends to get ignored.

Sometimes, funders' efforts can undermine this process. To its great credit, the NIH has pursued measures requiring researchers to increase the reproducibility of their work. But it has not put enough money behind them, apparently believing that researchers should do the extra work anyway. Few other national funders have introduced any measures or financial support to enhance the technical and ethical integrity of research groups.

The National Academies report provides a helpful framework for such support to reduce what it refers to as "detrimental research practices". And assisting PIs will produce benefits that accrue over generations. But it will take resources to make the system rise to expectations of objectivity, openness and good leadership, and no one seems willing to bite the bullet and move the funds — even though that would underpin public faith in science. Support for PIs in sustaining healthy research groups is thus a crucial target for investment. ■

What pause?

The apparent slowdown in global warming has been shown up for what it was — overcooked.

Climate-science denial is quick to recognize opportunity. And its action follows a predictable, two-stage pattern. Step one: invent a false narrative claiming that the mainstream scientific community expects climate change to proceed as an uninterrupted, ineluctable process. Step two: pounce on any divergence from said narrative as evidence that said understanding of climate science is flawed.

The approach, while intellectually vacuous, can have the perverse outcome of leading to real progress — and to science that might not have been done otherwise. One such case is the claimed (and now definitely ended) global-warming 'hiatus', more properly called 'the most recent instance of normal climate variability'.

Some background: the El Niño weather event in 1997 and 1998 belched a great bolus of heat from the ocean into the atmosphere, a release that was entirely consistent with expectations — as was the heady spike in global mean surface temperature that followed.

From the top of the Himalayas, the rest of Earth is downhill. And, in a similar way, the 1998 peak in temperature offered an easily visualized time that climate sceptics could cherry-pick as a starting point for a 'hiatus', 'pause' or 'slowdown' in climate change. It's true (of course) that the next few years saw a reduced rate of warming, or maybe even a slight cooling. And it's also true that, soon after, some analyses showed that these observations were beginning to diverge from the suite of projections made by climate models.

A few responses emerged. First: yawn — "This is nothing more than the sort of normal variability one should expect in the climate system, and models should not be expected to predict any specific dip or peak." Second: hysteria — "Climate scientists have no idea what controls the climate system." Third: interesting — "Let's figure this out." Happily, most of the climate-science community adopted the third option. The result was a flood of publications on the topic, and the only half-joking suggestion that *Nature*'s publisher should launch a new journal called *Nature Hiatus*.

As discussed this week in an Analysis article (page 41) — and in an accompanying News & Views (page 37) — much controversy surrounding the hiatus could have been avoided if researchers had used more-careful definitions and terminology. But after a full scientific shake-out, what emerges? Once proper care is taken to compare like with like, no controversy remains. The models do not disagree with the observations; no fundamental revisions to our understanding of how the climate system works are needed.

So was it all a waste of time? Not at all. Even though much of the public discourse surrounding the hiatus was misguided, disingenuous and unfair, it did help to spur some major advances.

An explosion of ocean observations from the Argo float network, for example, solidified understanding that it is the heat content of the entire system, not just air temperature, that matters to measurements of global change. And, post-1998, global heat content kept going up. Whereas the atmosphere seemed to take it easy, the oceans continued to gorge on heat, driven by variations in wind systems. And the seemingly prosaic task of estimating global mean surface temperature from sparse and irregularly spaced observations was shown, in fact, to be as complicated as making great sourdough bread.

In the end, the hiatus controversy led to reinvigorated explorations of many mossy crevasses of climate science. This is not a bad thing, and might not have happened without the public (and political) firestorm. The next time something looks odd in climate science — as it surely will — researchers should once again denounce the inevitable and risible attacks for what they are, while welcoming the opportunity to question their own assumptions, sharpen data sets and revisit collective understanding of the underlying processes. ■