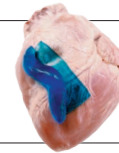


# THIS WEEK

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## Challenging science

*If the Trump administration has questions on global warming, it should direct them to the national academy rather than setting up a spurious 'red team–blue team' debate.*

After taking office as US president in 2001, George W. Bush enlisted the National Academy of Sciences to help identify the “greatest certainties and uncertainties” in climate science. The academy formed a committee of 11 leading scientists and issued a response in less than a month.

The 41-page document discussed the challenges of separating out natural swings in the climate system to understand — and project — the impact of rising greenhouse-gas emissions. It also underscored two simple messages: scientists have determined with confidence that greenhouse-gas emissions are warming the climate, and curbing those emissions will reduce risks in the future.

Sixteen years later, US Environmental Protection Agency (EPA) administrator Scott Pruitt is also questioning the science. But he is considering a more adversarial approach to finding answers, in which two scientific teams would go head-to-head in a debate of some sort.

This ‘red team–blue team’ exercise is based on the idea that scientific understanding can be bolstered by organized and focused scepticism. This is true, in principle, but it's not at all clear that this exercise will advance that goal.

Part of the problem is that nobody knows how Pruitt might organize the effort. A detailed written exchange? Or a televised debate? There's a chasm between the two. But there is more than enough room for scepticism about the administration's motives, as well. Pruitt has repeatedly questioned climate science, as have energy secretary Rick Perry and President Donald Trump himself. Moreover, Trump promised early in his election campaign to protect fossil-fuel interests — which stand to lose out if politicians take climate change seriously — and his administration has moved aggressively to repeal and delay environmental regulations put in place by his predecessor, Barack Obama.

Now it seems that top political appointees at the EPA have been consulting behind the scenes with the Heartland Institute, an organization based in Chicago, Illinois, that promotes the views of climate sceptics (see story on page 15). *Nature* has seen two lists of names that were apparently provided by Heartland to help the EPA assemble a sceptical red team. One is labelled “climate scientists”; the other, “climate economists”. Being on the list does not itself signify deference to Heartland's agenda — which is one reason that *Nature* elected not to publish the names — but suffice it to say that all of the well-known climate sceptics are there, as well as many scientists who are not active in the field.

Everybody has a right to question scientific results. Researchers do it themselves every day, and that's what shapes research programmes and hastens progress. But there's a difference between documenting evidence and sowing doubt to protect agendas. The fact is that climate scientists have produced a mountain of evidence over the past several decades, and numerous scientific organizations — including the Intergovernmental Panel on Climate Change, which represents most governments of the world — have assessed those findings on many occasions. Each time, the confidence in the underlying conclusions

has only increased; the onus is now on climate sceptics to find evidence that mainstream science is wrong.

Surely Pruitt knows this, which suggests that he may be more interested in appearances than in science. Here is the real danger — and probably the administration's true agenda. A red team–blue team

**“There's a difference between documenting evidence and sowing doubt.”**

exercise could create the false impression that there is a debate in the scientific community about the fundamentals, when in fact researchers are busy trying to work out an array of (very important) details and bolster confidence in their projections.

If Trump and his team have questions about the science, there is already a time-tested process for handling them. The Trump administration should follow Bush's lead, and submit its questions to the National Academies of Sciences, Engineering, and Medicine. ■

## Universal truth

*Probing antihydrogen could tell physicists more about the rules that hold the Universe together.*

The answer to life, the Universe and everything, according to Douglas Adams in *The Hitchhiker's Guide to the Galaxy*, is 42. He was out by a factor of two: the solution to the Universe is 21. Or to be more precise, 21 centimetres, which is the wavelength of radiation emitted when a hydrogen atom shifts from one specific energy state to another. That's why the plaque attached to NASA's 1972 Pioneer 10 spacecraft pictures a woman whose height is shown as the binary representation of 8. (Eight of those 21 centimetres making 1.68 metres.)

In the twentieth century, a *Who's Who* of physicists used hydrogen to predict and examine subatomic interactions. A paper this week describes a major advance in this effort — one that takes it into the mysterious realm of antimatter. It shows that antihydrogen, hydrogen's antimatter counterpart, also produces the telltale 21-cm hydrogen emission line (M. Ahmadi *et al. Nature* **548**, 66–69 (2017); see also page 20).

This latest experiment could answer some fundamental questions. One way to test for cracks in the standard model of physics — the rules that help to bind the Universe together — is to seek and find discrepancies in how matter and its antimatter counterparts behave. Decades of careful analysis of hydrogen atoms offer a benchmark that can now be tested against corresponding measurements of antihydrogen. Any divergence in the results could open a door to new physics: an answer to the Universe that somebody, somewhere, perhaps already knows. ■