

Let's march to stress the value of science for the public good, not to engage in partisan politics

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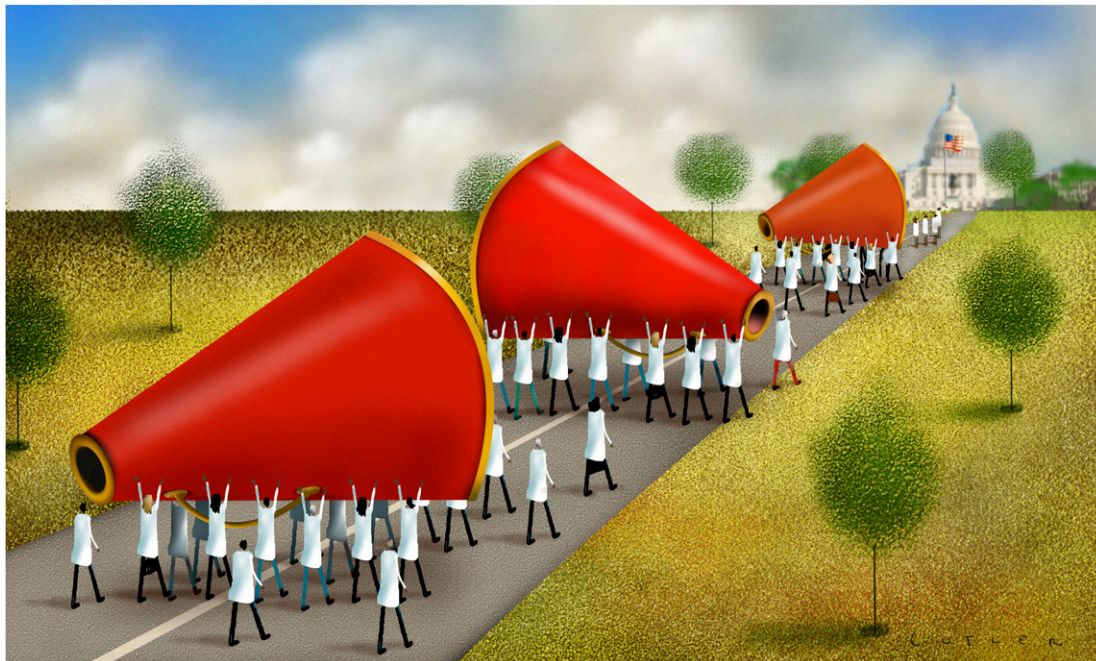
Much has been made of the aims of the upcoming March for Science, which is scheduled to take place on April 22 in Washington, DC. Some have argued it's a terrible idea (1). But the march could serve an important purpose—if organizers and participants succeed in sending the right message and reaching the right audiences, namely a public that's sometimes wary or suspicious of science and public officials who are trying to further specific interests.

If the March for Science were meant as a partisan enterprise or an objection to President Trump's policies in general, scientists would have reason to be reluctant to participate. In their statement of purpose, the organizers issue a "call to support and safeguard the scientific community" (<https://www.marchforscience.com>), a somewhat nebulous phrase that could be interpreted in a variety of ways. The statement goes on to lament

the "mischaracterization of science as a partisan issue, which has given policymakers permission to reject overwhelming evidence" (<https://www.marchforscience.com>). In other words, the event is meant to underscore that scientific findings should not be ignored by policy makers, not to favor one political party or another.

Scientists' findings deserve respect specifically because they emanate from procedures that ensure neutrality. Even if researchers would prefer a specific outcome, those adhering to the scientific method do not alter the results to fit their preferences. Their ethical commitments, rigorous training, and professional standards all suggest they have well-earned credibility in their chosen field.

Neither partisanship, political predilections, or even religious beliefs affect the procedures followed by well-trained, ethical scientists. They may be Republicans,



A march for science, done right, will underscore the critical importance of science literacy among the general public. Image courtesy of Dave Cutler (artist).

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Democrats, Independents, or have no affiliation with a political party, but the scientific method, properly applied, minimizes the intrusion of such inclinations into research. For many scientists, and many readers of journals like PNAS, this point may be so obvious that one might wonder why it bears restating. But much of the general public, surveys suggest, don't understand fundamental science concepts or they turn away from findings grounded in legitimate science research. It is this lack of science literacy that the march needs to address, in a manner that is neither condescending nor partisan.

Carefully Considered Caveats

Even if the speakers do avoid partisanship, it is reasonable to ask whether the march will undermine scientists' stance that they are as neutral in their research as humanly possible. It would be easy for the casual observer to conflate the election of President Trump and a Republican Congress with reasons for the march, given its timing. Despite the organizers' stated intent (<https://www.marchforscience.com>), might the march also be construed as an anti-Trump, anti-Republican occasion?

The partisan politics that have led to the march cannot be ignored. Many scientists are concerned about presidential appointments, such as the administrator of the

Research Center survey conducted in 2014 for the American Association for the Advancement of Science (AAAS), the public respects science, and broad public support exists for government funding of scientific research (2). Specifically, 79% of adults in the representative sample responded that "science has made life easier for most people and a majority is positive about science's impact on the quality of health care, food and the environment" (2).

The AAAS concurrently sponsored a survey of scientists that included many of the same questions as those posed to the broader, public survey. Pew revealed "stark fissures between scientists and citizens on a range of science, engineering and technology issues" (2). Scientists, for example, have a much higher regard than the public for what science has accomplished, with 92% of the scientists agreeing that United States scientific achievements are either the best in the world (45%) or above average (47%). However, the corresponding numbers for the public are 54% who consider United States scientific achievements either to be the best in the world (15%) or above average (39%) (2). Alarming, that positive assessment has declined by 11 points from a survey taken 5 years earlier. Scientists need to bolster public support and stop the decline. The march could help in this regard, or perhaps hurt if viewed as overtly political.

The Pew survey exposes other differences in perceptions between the public and scientists. Many people are skeptical about specific areas of science, where scientists are not, like the use of animals in research (with 47% of the public in favor, compared with 89% of the AAAS scientists), the desirability of building more nuclear power plants (45% public, 65% scientists), and the current scientific consensus that genetically modified organisms in crops are generally safe to eat (37% public, 88% scientists) (2).

It is worth noting that opinions on these issues are found on both the left and the right of the political spectrum, among Democrats and Republicans, although on different issues (3). That observation should help ease concerns about partisanship of the march.

Shifts in the scientific consensus—a byproduct of ongoing research—seem to contribute to the public's wariness: Is excessive salt a factor in heart health? Are hormone replacement therapy and mammograms worth the trouble? Why don't the experts make up their minds? The scientific community should acknowledge that people's hesitation to accept science findings often stems from not just a lack of knowledge about the research in question, but from confusion about the level of uncertainty in science.

The public is much more likely to support science if they understand its indispensability. Scientists and the scientific community also need to acknowledge and respect the values of different segments of the population. It appears, for example, that the antinuclear sentiment may arise not only from severe lack of knowledge—for example, the fact that nuclear reactors are the most efficient producers of noncarbon-based energy—but also from a much lower tolerance for risk of a large-scale disaster than nuclear scientists have (4); in other words, the values of scientists and citizens may sometimes clash.

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Environmental Protection Agency and the early indications of cuts to government funding for science research.

However, it's worth noting that if scientists only complain about cuts to science agency budgets, they will come across as just another special interest group. Instead, they would do well to couch the cuts in terms of lost opportunities to, among other things, improve the health of the American public, bolster national security, and provide additional safety from natural hazards. Science has always been a bipartisan issue; it would likely be counterproductive for the march to be perceived as opposing one party and favoring the other.

And there is an important reminder here for scientists who are understandably worried about funding declines: setting budgets is a long process with multiple steps. The President's proposal is likely to get altered significantly by Congress. If done right, a march communicating the importance of science to the nation and its citizens can make lawmakers' jobs easier.

For many, this concern is not limited to a single appointment or budget decision, but to the whole tone of the new administration. Will a march accelerate the politicization of science or will it increase the respect for the voice of scientists? Executed correctly, this rally can help inform those who do not understand how science works of its neutrality, and it can remind everyone of the importance of science to their health, welfare, and general quality of life.

Reaching Out

Indeed, the public at large is the most important audience for such a visible message. According to a Pew

Furthermore, scientists are not immune to corruption, something that the public instinctively knows and something that was ignominiously demonstrated in the case of researchers denying the negative health effects of sugar and tobacco (5, 6), the infamous 2005 stem cell research fraud in South Korea, or numerous other cases. Despite its careful procedures and its overwhelming benefit, scientific enterprise is, of course, far from pure. Awareness of these misgivings among members of the public should soften the tone of the speakers of the march if they are to be persuasive.

Attendees also need to understand that science exists in a political world. It depends on \$70 billion annually from federal funding (7). This support relies on positive public opinion that in turn translates into congressional appropriations for science. Such support implies an appreciation for the contributions that scientists make to the public good. Numerous scientific and academic societies, universities, and their associations lobby Congress and the executive branch for funding and support for this enterprise. Hundreds—perhaps thousands—of people work every day in the political sphere to make sure that the research enterprise can thrive. In other words, those worried about politicization should recognize that scientists are already deeply embedded in the political process and that political activity is productive for science and society.

Message and Messengers

Will public support evaporate if bench scientists and other objective researchers participate in a march for science? Does such activism in fact weaken their claim of neutrality? Such a result is highly unlikely if the message of the march stays nonpartisan and consistent: scientific research has transformed the quality of life of society, and the features of science—scientific method, replication, curiosity-driven research, honesty, open communication, and much more—are vital to its success.

Anecdotal observations from the 2012 Death of Evidence rally in Canada provide some reassurance for those who worry that the march will prove detrimental. The Canadian demonstration supporting science and its follow-up activities, including the creation of a new

advocacy organization for evidence-based policy, was successful, according to three participant-observers. “Our rally,” they opined in an editorial, “didn’t hurt the credibility of those who participated, and it didn’t lead to more polarization. Rather, our march started a movement that we believe led to concrete, positive changes for science in Canada” (8).

With sufficient participation, the March for Science could reinforce existing support for scientific activities, reassure beleaguered government scientists that their colleagues in other sectors are in their corner, educate those more distant from the scientific enterprise about the value of science (as imperfect as it is), and transform declining acceptance into more reliable support. An important message to the public is a simple one: “We need your support.”

Ignoring scientific findings and attacking science must not prove beneficial for the politicians who control its fate. Public awareness and action should translate into support for public officials who want to support science, and should inform other less-reliable allies of science that the public is paying attention to their actions.

Certainly, not everyone will be able or inclined to march, regardless of the positive net benefits of a well-attended, respectful rally. Those who stay home on April 22 can find other ways to participate in spirit by, for example, sponsoring public sessions on campus on science, its methods and its importance. Grantees from the NSF and NIH could explain how they are using taxpayers’ money and the larger significance of their work. Ethicists specializing in science could take on difficult discussions about where cloning, artificial intelligence, and other controversial developments might lead. Alternatively, researchers—working with their professional societies—could meet with or write to their members of Congress to explain their research, methods, and impact (see ref. 9 for a summary of other ideas).

Taking a strident political stance affords little long-term gain for scientists or the public. Let’s march for public outreach and understanding of science, ensuring that scientific activities can thrive, and that the public good, promoted by scientific investigation, endures.

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