



SEPTEMBER 28, 2022

Creating a Science-Engaged Public

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A DISCUSSION OF

The Next 75 Years of Science Policy

The federal government has the responsibility to serve all people through its programs, policies, and funding. This means it must lead the way in the creation and implementation of programs for engaging the public with science, which can ensure everyone has the tools to learn about, engage in, contribute to, and benefit from the results of scientific research and technological innovation. Doing so necessitates a shift in thinking from a need for the public

to *understand* science to a desire for the public to *engage* with science in beneficial ways. According to the American Association for the Advancement of Science,

Public engagement with science describes intentional, meaningful interactions that provide opportunities for mutual learning between scientists and members of the public. Mutual learning refers not just to the acquisition of knowledge, but also to increased familiarity with a breadth of perspectives, frames, and worldviews.

Strengthening the public's engagement with science is critical because nearly every challenge society faces—from climate change to pandemic preparedness and inclusive economic growth—requires significant taxpayer investment in scientific research and technological development. Members of the public need to understand how their dollars are being spent, have the chance to shape and provide input on the implications of these discoveries, and ensure that solutions benefit their communities. Indeed, the federal government's commitments on equity, public health, and the economy will not be possible without greater engagement with science and technology. True public engagement must build upon current investments in communication, education, and outreach to seek community involvement in shaping the research enterprise.

Without efforts to engage all people intentionally and equitably in science and technology, the research community will end up perpetuating the systems and structures that have marginalized groups and individuals for centuries. In a world where science and technology affect every aspect of people's lives and society, creating a science-engaged public is essential to ensuring that all can fully participate in that society. In short, both the process and results of science must be equitable, and meeting that goal requires more people to be engaged.

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One mechanism that ought to be central to this vision is a new national strategy for public engagement in science. National strategies are federal tools for facilitating targeted investments and outcomes across the US government. By coordinating the activity of federal agencies, in consultation with community groups and the private sector, these strategies have proven effective in directing federal resources, increasing practitioner capacity, and achieving public outcomes on topics as diverse as homelessness; science, technology, engineering, and mathematics (STEM) education; and federal data. They often include commitments to specific

actions across federal agencies and include mechanisms for further interagency coordination as well as measurement and accountability. A national strategy on science engagement would mimic other successful initiatives by increasing agency coordination to document current practices, building a shared language around science engagement, and scaling promising practices across the federal government.

In fact, the foundation for such a strategy has already begun to take shape in recent years. In 2020, the Day One Project laid out a bold plan of action that a new presidential administration could take for making public engagement with science a federal priority. A new national strategy should include three key components: increased federal investments in public engagement tied to research funding; strong incentives and structures for federally funded researchers to engage the public in their research (including through partnerships with public engagement practitioners and organizations as well as community groups); and coordination between the public and private sectors to ensure complementary efforts and collaborative investments in public engagement with science and technology.

INVESTING IN PUBLIC ENGAGEMENT

As with all national goals, strategic investment is paramount. To engage all Americans in science and technology and empower communities to solve problems, the federal government should work to ensure that federal agencies dedicate portions of their research development budgets to public engagement, while at the same time investing in capacity-building for federal agency staff, scientists, and community partners to scale effective models. In particular, the federal government should seek to expand collaboration between communities and federally funded researchers through proven approaches including community-embedded research, cocreated citizen science, and accessible scientific tools.

For example, the National Institutes of Health established the Community-Based Participatory Research (CBPR) program to support “collaborative interventions that involve scientific researchers and community members,” according to the program description. These approaches facilitate better outcomes for both medical research and patients and support overall community health. Strong arguments have been made to expand CBPR approaches across the healthcare field, including psychology research. Beyond medicine, the National Oceanographic and Atmospheric Administration (NOAA) has funded dozens of community-centered approaches to addressing environmental resilience. Through NOAA’s Environmental Literacy Program grants, the federal government has funded citizen science, youth education and leadership, community dialogues, and more in order to support education and engagement efforts that are grounded in science and advance community priorities.

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New investments will build on programs like these and many others that have developed new tools, authorities, and programs that allow federal programs to gather input on science and technology from the public, collaborate with communities to advance shared goals, and source solutions to science and technology problems from a wider range of innovators. Bringing these existing tools and authorities together with new approaches in a national strategy will promote more efficient investment of resources—and ultimately provide more effective outcomes for researchers and communities.

Scaling federal investment in public engagement could follow the example of, and build on, the work done in the last 20 years to increase investment in and capacity for open innovation approaches. While some open innovation approaches, such as weather forecasting, have been around for more than 100 years, in the early 2000s, agencies began increasing their use of these approaches, specifically incentive prizes and innovation challenges, to solve difficult technological and scientific problems. The first systematic analyses of the use of these mechanisms were undertaken by private foundations and research firms, as well as independent government agencies, in an effort to characterize the work underway and the opportunities to scale. Starting in 2012, the White House Office of Science and Technology Policy began issuing an annual report to Congress on federal use of prize authorities in order to track both the financial investment and the growing capacity for engaging in these efforts.

Currently, there is no equivalent reporting on how much money the federal government invests in public engagement with science or a broad understanding of the capabilities agencies draw on to engage the public. Therefore, a national strategy must start with understanding the current baseline in order to identify specific needs and opportunities for increasing this investment over time.

INCENTIVES FOR PUBLIC ENGAGEMENT

Beyond investment, however, appropriate incentives for public engagement must be integrated into multiple levels of federal science and technology policy. Again the groundwork is already in place. All research grants awarded by the National Science Foundation (NSF) are now evaluated on both their potential to transform their field (intellectual merit) and their ability to have significant societal impact (broader impacts). For more than 20 years, the NSF Broader Impacts (BI) criterion has provided an incentive for researchers to engage the public

in their research, and proposals submitted without BI sections can be returned without review. BI is viewed as an integral component of the proposal and figures prominently in reviews, providing a strong incentive for researchers to take public engagement seriously in their projects.

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A national strategy for public engagement with science should leverage ongoing efforts to strengthen the current NSF BI criterion and infrastructure such as the NSF-funded Center for Advancing Research Impact in Society, and expand existing public engagement programming and proposal requirements in other agencies. Programs to broaden participation of members of underrepresented groups and to prepare the next generation of scientists currently exist in most federal agencies, but requiring all research proposals to include public engagement plans will necessitate intentionality and substantial infrastructure and support.

PARTNERSHIPS FOR PUBLIC ENGAGEMENT

A final key component of the national strategy should be cultivation of public-private partnerships to develop complementary and collaborative investments in public engagement—including private companies, philanthropies, and community groups that are increasingly engaging the public in their scientific research and technological development.

The federal government should work closely with these groups in crafting this national strategy, using it as an opportunity to learn promising practices, highlight model approaches, and enlist collaborators for future efforts. This public-private collaboration must also include the practitioners who have experience in equity-centered, community-embedded research, as well as expertise in communications and engagement that develop the social, behavioral, and cultural fluencies required to build and sustain lasting relationships. A successful example of such a partnership is the Science Public Engagement Partnership (SciPEP), a collaboration between The Kavli Foundation and the Department of Energy's Office of Science. At its core, SciPEP works to ensure scientists are effective communicators and able to actively engage the public.

Currently, most community-centered public engagement in science and technology is being driven by nonprofit organizations, private foundations, and even for-profit companies

working in areas such as environmental science and medical clinical trial participation. The knowledge, experience, and lessons gained in these efforts should inform development of a national strategy. At the same time, the federal government can partner with these groups to leverage their capabilities, expertise, and deep community relationships to demonstrate the impact of public engagement approaches and more rapidly scale up public engagement efforts.

IMPLEMENTING A NATIONAL STRATEGY

A national strategy would go a long way to building robust mechanisms for public engagement into our science and technology policy for the next 75 years. In the shorter term, we suggest the following immediate action steps.

First, the Office of Management and Budget (OMB) and Office of Science and Technology Policy (OSTP) should clarify existing authorities that agencies can use to engage the public in science and technology. To more equitably increase the public's engagement with science and technology, federal agencies may need to take new approaches to making grants, entering into contracts and cooperative agreements, and engaging in other innovations. In OSTP's role as a coordinator across federal science agencies, it should undertake a concerted effort to understand the barriers that agencies are facing and should work with OMB to help agencies clarify how they can work within their current authorities to increase their support of public engagement with science.

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Second, OSTP and NSF should convene an interagency working group to explore applying lessons learned from the NSF BI criterion to public engagement capacity-building in other federal agencies that fund extramural researchers.

Third, the National Science and Technology Council should revitalize the Interagency Working Group on Open Science—established in 2013 to help make results of federally funded science more accessible to the public—and charge it with expanded responsibilities. A key assignment should be developing a formal national strategy for public engagement that includes commitments adopted by all participating federal agencies and is created in consultation with researchers, public engagement practitioners, and community members.

A national strategy for cultivating a science-engaged public will ensure that research discoveries are enhanced by the knowledge, expertise, and priorities of all people, including those from communities and groups currently underrepresented in the process and outcomes. Expanding who is engaged in the scientific process will ensure rigorous research and a transparent process, yielding results with the potential to be more readily used and valued by members of the public. Above all, it will further individual and community capacity and agency to use scientific methods and technological tools to explore, create, and innovate.

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Renoe, Susan D., and Christofer Nelson. "Creating a Science-Engaged Public." *Issues in Science and Technology* (September 28, 2022).

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