



LETTER TO THE PRESIDENT
Advancing Public Engagement with the Sciences

Executive Office of the President
President's Council of Advisors on
Science and Technology

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EXECUTIVE OFFICE OF THE PRESIDENT
PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY
WASHINGTON, D.C. 20502

President Joseph R. Biden, Jr.
The White House
Washington, D.C.

Dear Mr. President,

From the need to address climate change and improve public health to the impact of revolutionary advances in biotechnology and artificial intelligence, emerging science and technology has the potential to profoundly affect the lives of all Americans. While these innovations offer the promise of improved health, resilience, and sustainability, the American public also has concerns about societal impacts and ethical implications of scientific discoveries and technological innovations. In the context of such rapid scientific and technological change, the country has rarely faced a greater need for effective engagement among research and development (R&D) agencies, experts, and communities. As a nation, we must strive to develop public policies that are informed by scientific understandings and community values. Achieving this goal will require both access to accurate and trusted scientific information and the ability to create dialogue and participatory engagement with the American people.

While the pace of science and technology in our country has amplified the need for greater dialogue with the public during the policymaking process, the issues are far from new, and instructive examples of successful engagement efforts exist. One instance was the decision for the City of Cambridge to host the first recombinant DNA laboratories (see sidebar). Largely as a result of public participation in policy development, the city is today an internationally recognized leader, with both biotechnology and pharmaceutical enterprises attracted to a vibrant scientific and economic environment. It is impossible to disconnect this early and vigorous debate between scientists and

Public Engagement that Made a Difference

In 1976, Harvard University proposed to use Federal funds to build one of the nation's first laboratories for conducting recombinant DNA research. As reported at the time by the New York Times, this proposal was met by wide-ranging views from the scientific community as well as broad concern from the local residents:

"A number of other scientists at the university are warning of the potential dangers of the experiments...The Mayor of Cambridge says he fears the professors may produce a "monster." But the scientists who want to carry out the experiment with government money, while conceding that they do not know what might happen, say they will be very very careful."

Opinions were voiced and data were shared during a public hearing at the Cambridge City Council. Significant participation of the local citizenry at the hearing extended the discussion of this new technology beyond the usual purview of professionals, press, officials, and self-professed pundits.

What took place was an unusually public debate about the risks and merits of this new technology, ultimately leading to the approval of this new research in coordination with city oversight and guidelines. As a result, Cambridge became one of the first municipalities with clear regulatory guidelines to academia and industry about the responsible production and performance of research within its borders. Within ten years, the city had become a national hub for this new research, at the forefront of bioscience.

citizens from the economic success of biomedical research in Massachusetts.¹ Clarity of regulation, constructed by engaged and informed individuals and communities, provided a predictable and fertile ground for competitive economic growth.

More recently, to address critical matters arising from climate change, the USDA Northern Forests Climate Hub and Northern Institute of Applied Climate Science launched the [Climate Change Response Framework](#), a collaboration between scientists, policymakers, and community members to develop and implement strategies and policies for local adaptation, forest carbon management, and public health. This is just one of many current examples of Federal agencies—running the gamut from the FDA to the DOT, from the USDA to NASA—actively engaging public participation in their process of science-informed policy development and decision-making (see Appendix B).

Americans generally have confidence that scientists will act in the public’s best interests, and this high level of trust has remained high for the last half-century, relative to broader societal trends.^{2,3,4} However, as our society contends with a changing media and information landscape, legacies of social inequities, and an overall decline of trust in institutions, Americans increasingly want their values and priorities to be integral to policy development and the decisions that affect their lives.⁵ Of particular concern are the low levels of institutional trust among certain groups: marginalized racial and ethnic communities, people with less education and lower income, and younger people. Effective scientific communication exists on a spectrum, which gradually moves away from a top-down, one-way interaction towards a *two-way* interaction with diverse cross-sections of the public that enables Americans to communicate their values, concerns, priorities, and interests to adjudicate and legitimize policy choices and priorities. We must, as a country, create an ecosystem in which scientists collaborate with the public, from the identification of initial questions, to the review and analysis of new findings, to their dissemination and translation into policies.⁶

An inclusive dialogue among scientists, policymakers, and the public so that all can be part of ongoing, productive discussions and community-building will lead to more effective policies regarding our health, our environment, our national security, and our general well-being.^{7,8}

Several Federal agencies have come to this realization and are working to build new and more effective ways of communicating and engaging with the public on matters of science. PCAST recommends the following two actions from the White House which could support these initiatives and catalyze a more systematic approach to public engagement, leading to renewed public trust in policies which address matters of science and technology.

¹ This engagement persists to this date via the Museum of Science in Boston, which continues to receive significant Federal funding to host public forums and dialogues. <https://www.mos.org/pes/guide>

² Spencer, A. & Funk, C. (2022 March 25). “[When Americans think about science, what do they have in mind?](#)” Pew Research Center.

³ American Academy of Arts & Sciences (2018). [Perceptions of Science in America](#). Cambridge, MA.

⁴ Kennedy, B., Tyson, A., & Funk, C. (2022 February 15). “[Americans’ Trust in Scientists, Other Groups Declines](#).” Pew Research Center.

⁵ Hilgartner, S., et al. (2021). “[Was ‘science’ on the ballot?](#)” *Science* 371, 893-894. <https://doi.org/10.1126/science.abf8762>

⁶ Aguilar-Gaxiola, S., et al. (2022). “[Assessing Meaningful Community Engagement: A Conceptual Model to Advance Health Equity through Transformed Systems for Health](#),” *NAM Perspectives*, 22(2). <https://doi.org/10.31478/202202c>

⁷ O’Mara-Eves, et al. (2015). “[The effectiveness of community engagement in public health interventions for disadvantaged groups: a meta-analysis](#),” *BMC Public Health* 15(1). <https://doi.org/10.1186/s12889-015-1352-y>

⁸ Fishkin, James S. (2018). [Democracy When the People Are Thinking: Revitalizing Our Politics Through Public Deliberation](#). Oxford University Press.

RECOMMENDATION 1: *Issue a clarion call to Federal agencies to make science and technology communication and public engagement a core component of their mission and strategy. An essential pillar of this effort is ensuring that experts in participatory public engagement are included in agency senior-level policy development and decision-making processes.*

RECOMMENDATION 2: *Establish a new office to support Federal agencies in their continuing efforts to develop and build participatory public engagement and effective science and technology communications. This office should consist of individuals with a range of expertise who can partner with or be deployed to agencies, including assistance in the use of social science-informed techniques for participatory engagement⁹ and cutting-edge digital technologies. The U.S. Digital Service within the Office of Management and Budget and the 18F office within the General Services Administration may be useful models for this proposed office.*

These recommendations are aligned with priorities that have been established by your Administration for the Federal government, including the Presidential Memorandum on [Restoring Trust in Government through Scientific Integrity and Evidence-based Policymaking](#), and Executive Orders (EOs) highlighting engagement with underserved communities and equity, such as [Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government](#) (EO 14091) and [Revitalizing Our Nation's Commitment to Environmental Justice for All](#) (EO 14096). The strong and specific actions on **Public Engagement with the Sciences** proposed here would complement these Administration efforts. Such action would send a clear message about the fundamental importance of enhanced collaborative dialogue between communities and the scientific enterprises of our government, and set the nation on a firmer ground of shared deliberation.

In part because of the historic leadership of the United States in innovation—in medicine, energy, digital technology, space exploration, and many other areas—we are recognized as a country of almost unlimited possibilities. These advances can not only be inspiring but also empowering for all Americans, offering tools for identifying problems and inventing solutions—but only if our communities understand that they own these tools as key participants in the decision-making process. With these recommendations, we have the opportunity to help build the thriving society that results when science and technology are in everyone's toolbox.

Sincerely,
The President's Council of Advisors on Science and Technology

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⁹ Examples of participatory techniques include [deliberative polling](#) and [citizen juries](#), which depend on stratified random sampling to assemble representative (not self-selected) cohorts drawn from the public, and expert-informed deliberation.

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Appendix A. External Experts Consulted

PCAST sought input from a diverse group of additional experts and stakeholders. PCAST expresses its gratitude to those listed here who shared their expertise. Their willingness to engage with PCAST on specific points does not imply endorsement of the views expressed herein. Responsibility for the opinions, findings, and recommendations in this letter and for any errors of fact or interpretation rests solely with PCAST.

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Appendix B. Engaging the Public for the Good of Science and Society

Example 1: Public Engagement through Patient Partnerships

The U.S. Food and Drug Administration (FDA) participates in a number of efforts to engage patients in the [development of science-driven clinical research solutions and responses](#). Founded in 2007, the [Clinical Trials Transformation Initiative \(CTTI\)](#) brings together public stakeholders to make clinical trials more accessible, integrated, and patient-centered. Stakeholders include academic and clinical researchers, members of industry, and patient advocacy groups, along with representatives from agencies and other regulatory bodies, chosen to provide educated input on public health and the quality of clinical trials. After a 2017 public forum in which patient stakeholders asked for the creation of an outside organization to field patient engagement input, the FDA and CTTI started the [Patient Engagement Collaborative \(PEC\)](#). The PEC invites participation from patients, caregivers, and representatives with disease experience in the form of regulatory discussion and medical product development. A committee (patients, STTI staff, and FDA) selects members from a pool of applicants.

Example 2: Department of Transportation’s Guide to Public Involvement in Transportation Decision-Making

The Federal Transit Authority and Federal Highway Administration, divisions of the Department of Transportation (DOT), are legally required to engage the public at regular intervals when carrying out [statewide transportation planning processes](#). Planning agencies must evaluate the [effectiveness of engagement strategies](#) and work to improve public involvement processes to eliminate participation barriers.

MEANINGFUL COMMUNITY ENGAGEMENT IS NOT
SIMPLY PUBLIC EDUCATION, IT IS AN OPPORTUNITY
FOR THE COMMUNITY TO INFLUENCE WHAT WILL
HAPPEN IN THEIR COMMUNITY.

*Promising Practices for Meaningful Public
Involvement in Transportation Decision-Making*

In October 2022 the DOT released [Promising Practices for Meaningful Public Involvement in Transportation Decision-Making](#). This guide was developed to assist transportation professionals in incorporating meaningful public involvement into each stage of the transportation decision-making process. Information in this guide is being incorporated into regional and local efforts, with citations in draft planning documents such as the [Draft Public Participation Procedures](#) published for comment by the Mid-Region Metropolitan Planning Organization in Albuquerque, New Mexico.

Example 3: Participatory Exploration of NASA’s Asteroid Initiative

In 2015, NASA worked with the Expert and Citizen Assessment of Science and Technology Network to conduct a citizen-focused, participatory technology assessment (pTA) of NASA’s Asteroid Initiative. The goals of the exercise were to increase public understanding and engagement in the initiative, as well as to inform the agency’s planning of future missions. Viewed as an alternative to formal requests for information, pTAs are based on an engagement model, seeking to improve the

outcomes of science and technology decision-making through dialogue with informed individuals. To bring participants up to speed, short thematic background papers were provided prior to the workshop and informational videos were shown at the start of each session.

The program focused on drawing out the public's thoughts and values in these areas. Feedback from the pTA workshop was included in the decision-making process for the Asteroid Redirect Mission, and these deliberations also influenced the creation of NASA's Office of Planetary Defense.¹⁰

Example 4: Community Participation in Development of Wildfire Response Plans

[Smoke Sense](#) is a project that aims to reduce the public health burden of wildland fire smoke. Piloted in 2017, the project involves people using a mobile app that shares information on air quality, smoke, and health, and collects individual reports of smoke exposure and health symptoms.

In 2022 the EPA and the U.S. Forest Service engaged in a pilot study that integrated citizen science and community-based participatory research to offer local communities assistance with planning for smoke events from fires. As part of the project, researchers and communities collaborated to develop local wildland fire response plans with each county partner following recommendations in [Wildfire Smoke: A Guide for Public Health Officials](#). Information needed for fire response plans was provided by a diverse team of subject matter experts, as well as experts in public health and science communication. A plan has been approved by county officials and is being implemented with widespread acceptance, according to the health department officials.

Example 5: Developing Local Adaptations to Climate Change

In 2020, the Northern Institute of Applied Climate Science (NIACS) and the United States Department of Agriculture (USDA) Northern Forests Climate Hub launched a [collaborative forest management and climate change assessment approach](#). The [Climate Change Response Framework](#) is a partnership between stakeholders from Federal agencies, state and local governments, Native American tribal organizations, academia, and industry which aims to apply collaborative efforts to address and assess climate change response.



Primarily led by the NIACS with support from the USDA Forest Service and the U.S. Global Change Research Program, the Climate Change Response Framework operates around a framework process of collaborative science communication to shape responses at a local level. With a broad set of stakeholders from across the forest sector, the Framework addresses the local impacts of climate change by communicating science research to on-the-ground land and natural resource managers. Collaborative stakeholder engagement is then used to develop local strategies and policies for climate change response, adaptation, forest carbon management, and public health. Stakeholder feedback informed a series of adaptation strategy documents for a range of environments, such as agricultural land, forests, inland glacial lake fisheries, and tribal areas.

¹⁰ L.R. Kaplan, et. al. (2021). "[Designing participatory technology assessments: A reflexive method for advancing the public role in science policy decision-making](#)." *Technological Forecasting and Social Change*, 171, 120974. <https://doi.org/10.1016/j.techfore.2021.120974>

About the President's Council of Advisors on Science and Technology

The President's Council of Advisors on Science and Technology (PCAST) is a federal advisory committee appointed by the President to augment the science and technology advice available to him from inside the White House and from the federal agencies. PCAST is comprised of 28 of the Nation's thought leaders, selected for their distinguished service and accomplishments in academia, government, and the private sector. PCAST advises the President on matters involving science, technology, and innovation policy, as well as on matters involving scientific and technological information that is needed to inform policy affecting the economy, worker empowerment, education, energy, the environment, public health, national and homeland security, racial equity, and other topics.

For more information about PCAST see www.whitehouse.gov/pcast.

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