NATIONAL ACADEMIES *Sciences Engineering Medicine*

Accelerating the American Scientific Enterprise

A response to the Office of Science and Technology Policy

Request for Information OSTP–TECH–2025–0100

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To: Officials of the Office of Science and Technology Policy

As the presidents of the National Academy of Sciences, National Academy of Engineering, and National Academy of Medicine, we welcome OSTP's effort to re-examine how the nation organizes, funds, and accelerates scientific and technological progress. Across our work advising administrations of both parties; convening expertise and practice from science, engineering, and medicine; and synthesizing evidence to inform policy, we see a moment of structural change that calls for new approaches to discovery, translation, and talent development that can power economic growth and improve American lives.

In today's research ecosystem shaped by universities, national laboratories, industry, government, private philanthropy, and investors, the ability to convene thought leaders and practitioners is essential. Each year, the National Academies bring together thousands of experts from across sectors, disciplines, and industries to address issues of national importance, including how best to strengthen the U.S. research and innovation enterprise and translate new knowledge into societal and commercial benefit.

The questions that OSTP raises are of vital importance to the future of the United States. In recent years, the National Academies have addressed similar questions through dozens of studies, workshops, horizon scanning activities, engagements with state and local governments, and rapid consultations, and that work has spurred action in several areas. Many of the insights, conclusions, and recommendations from that work remain highly relevant, though they may have been only partially implemented, providing OSTP with a range of options for enhancing the system. Combined, our activities have the benefit of socializing and building public support around actions essential to creating economic and societal benefits.

At the same time, the National Academies continue to assess emerging scientific, engineering, medical, and technological frontiers through studies, roundtables, and workshops on such topics as AI, biotechnology, next-generation nuclear power, quantum computing, and space exploration. In these and other fields, cross-sector and interdisciplinary insight is critical to achieving OSTP objectives.

In the attached submission, we provide an overview of National Academies' activities relevant to the questions posed in the RFI. We also present several specific findings, conclusions, and recommendations from recent work. We hope the material is useful to OSTP as it considers options for strengthening the American scientific enterprise, and we stand ready to support this effort through continued engagement, convening, and evidence-based analysis.

Dr. Marcia McNutt, President
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RESPONSE TO OSTP REQUEST FOR INFORMATION

The National Academies of Sciences, Engineering, and Medicine (the National Academies) are pleased to provide the following response to the White House Office of Science and Technology Policy (OSTP) request for information (RFI) on accelerating the American scientific enterprise (90 FR 54412).

The nation's scientific and technological strength has always depended on the interplay of foundational discovery, world-class engineering, and advances in medicine. These innovations are powered by an American society with deep natural and human resources, with diverse financial networks, and a willingness to take risks for long-term benefit. Basic research conducted at colleges, universities, and national laboratories remains indispensable. However, coupling this research with engineering design, development, clinical and public health insights, and systems integration enables practical technologies, economic competitiveness, improved health and well-being, and enhanced national security. As global competition intensifies, particularly with China, the United States must strengthen this full continuum from discovery to deployment.

The system of federal funding of research must be reimagined to keep pace with today's world. The new system needs to capitalize on advances in cutting-edge technologies such as AI; our scientific, engineering, and medical talent pool; and the competitive edge of America's multisectoral economy to ensure that we are maximizing economic growth, national security, and health. This will require a broadening of the research enterprise to more directly include talent and institutions from states across the country and those in the private sector with the know-how to transfer breakthroughs into commercial products and further innovation as quickly and safely as possible.

In response to the questions posed in the RFI, we have provided an overview of National Academies' work most relevant to advancing U.S. innovation to the benefit of all Americans. As much of our work addresses several of the questions in the RFI, we have organized this response around several overarching themes, while calling out the specific questions the theme includes. Some specific examples of useful conclusions or insights, mostly from recent work, are provided, and the specific resources identified in the endnotes.

Creating New Pathways to Innovation

The National Academies have assessed several strategies aimed at spurring innovation, including those related to strengthening public–private collaboration and tapping the private sector (Question 1); improving the translation of research discoveries to practical applications (Question 2); forming and scaling up regional innovation ecosystems (Question 3); and strengthening the role of small- and medium-sized businesses (Question 4).

Private industry and philanthropy increasingly influence the direction of U.S. innovation through vehicles such as public–private partnerships (PPPs). While such partnerships have been successful in the energy and infrastructure sectors for decades, the National Academies have explored and strongly recommended their potential in several other sectors. For example, a 2025 report[1] on the use of AI in the life sciences recommended that the Biomedical Advanced Research and Development Authority, the Department of Energy, and the Department of Defense establish a PPP that could help mitigate biosecurity risks. A 2024 workshop[2] explored optimizing PPPs for clinical cancer research. One noteworthy activity related to PPPs is the National Academies' Government-University-Industry-Philanthropy Research Roundtable (GUIPRR, formerly GUIRR). For more than four decades, GUIPRR has worked to improve the U.S. research enterprise by successfully resolving the cross-sectoral issues that prevent the enterprise from reaching its full potential.[3] This mission is achieved by convening senior-most representatives from government, universities, philanthropies, and industry to frame the critical issues, followed—when appropriate—by the execution of activities designed to address specific cross-sectoral impediments to achieving a healthy, vibrant research ecosystem.

Regarding the translation of research to practical applications, the National Academies created several forums* over the past decade focused on the translational space in health and medicine. Key cross-cutting issues from those forums include the need for data sharing and management, clear regulatory pathways, and workforce development. A 2024 report[4] on talent recruitment found that access to capital for technology transfer and commercialization is a key component of many international talent recruitment programs.

To encourage regional innovation ecosystems, there are lessons to be learned and built on from our Gulf Research Program, which explores the interconnections among industry and research in the five states comprising the Gulf region. A 2025 report[5] of a decadal survey of ocean sciences concluded that marine stations can help communities integrate local, Indigenous, and traditional perspectives in research and education.

Small- and medium-sized businesses have been a further focus of the Gulf Research Program, the Transportation Research Board, and other activities of the National Academies. This sector of the economy is frequently where innovation can flounder due to a lack of resources and access, compromising their ability to provide insights gleaned from real life application. Much of this work—such as our engagement with the Ohio Department of Transportation's Small Business Enterprise Program, our advice for farmers on the dietary requirements of livestock, and our efforts on the small business technology transfer programs at NASA—is by definition focused on specific problems, but frequently holds the promise for broader application and impact.

* Those forums include the Forum on Neuroscience and Nervous System Disorders; Forum on Drug Discovery, Development, and Translation; Forum on Genomics and Precision Health; Forum on Regenerative Medicine; and Forum on Traumatic Brain Injury.

Reshaping Research Funding Practices

The recognition of rapid change in the global research landscape calls for a re-examination of common practices that guide U.S. federally funded research today, including making evidence-based changes to federal grantmaking to maximize scientific productivity and return on investment (Question 5); instituting reforms that would enable the pursuit of more high-risk, high-reward research (Question 6); and developing novel institutional models that complement traditional university structures and enable projects that require vast resources, interdisciplinary coordination, or extended timelines (Question 7).

Regarding the pursuit of high-risk, high-reward research, the National Academies have examined how out-of-the-box research and engineering can translate basic science into technological and medical breakthroughs. A 2025 workshop[6] looked at strategies to incentivize urgency, speed, and scale to support U.S. innovation and compete with China and other nations. The strategies discussed to benefit high-risk research included program structures that impose short timelines and clear decision points, redirection of funding when early metrics are not met, and clear, harmonized federal guidance that addresses the burdens of security measures, expands access to sensitive research areas, and supports broader engagement in high-impact work.

Regarding novel models, Rising Above the Gathering Storm (2007) recommended the creation of the Advanced Research Projects Agency—Energy (ARPA-E) based on successful Defense Advanced Research Projects Agency projects. This new agency was envisioned as a means of tackling the nation's energy challenges in a way that could translate basic research into technological breakthroughs while also addressing economic, environmental, and security issues. A 2017 report[7] assessed ARPA-E, recommending that the agency be sure to maintain a high-risk culture.

Fundamental to any improvement in research funding practices will be to engage actors at all levels of the innovation value chain, with an appreciation of the role that America's robust and creative financial sectors can play across the funding cycle. Any revised system needs to capitalize on advances in cutting-edge technologies; our scientific, engineering, and medical talent pool; and the competitive edge of America's multisectoral economy to ensure that the nation is maximizing economic growth, national security, and health. Thousands of our Academy members and volunteers work in the private sector or have launched entrepreneurial ventures to commercialize scientific, engineering, and medical innovations. This kind of creativity will be essential to support OSTP objectives.

Leveraging New Technology for Research

As new approaches to federal support of science are developed, it is vital that new technologies with profound implications for society and the conduct of science be pursued swiftly and responsibly. The National Academies have a long history of mobilizing the scientific, engineering, and medical communities and other stakeholders to consider the implications of new discoveries such as AI and tools such as human genome editing, thus setting standards for the world.

Regarding the questions of leveraging and preparing for advances in AI systems that might transform scientific research (Question 8), a December 2025 report[8] examined how to advance foundation models, which are large-scale AI neural networks that train on trillions of data points. These models could bring a paradigm shift to scientific discovery when fused with traditional computational methods. The National Academy of Sciences was a leader in convening AI experts, legal scholars, technology company executives, and ethicists to issue guidance for the responsible use of AI in science and proactively manage emerging risk.[9] To maintain U.S. leadership in the development of new AI capabilities, researchers in all settings need access to necessary computing power.

The cornerstone of a 2025 report[10] assessing the use of biotechnology for defense innovation is a strategic vision for connecting scientists and technologists to build on, leverage, and tailor advances at the intersection of AI and machine learning, automated experimentation, and biotechnology to drive innovation in defense-related biotechnologies. The report named this vision the BioCATALYST (Biotechnology Coupled with Artificial Intelligence and Transformative Automation for Laboratory Yielding Strategic Technologies) network. The report also recommends establishing and maintaining curated AI-ready datasets and creating a process for transitioning basic and applied research to advanced development by U.S. government and/or private-sector partners.

Removing Policy Barriers to Research

Excessive, uncoordinated, and duplicative policies and regulations surrounding research are hampering progress and jeopardizing American scientific competitiveness. The National Academies have a large body of work related to this challenge that identifies federal policies and regulations that create barriers to research (Question 9) and seeks to balance scientific openness with the need to protect national security (Question 13).

A 2025 report[11] that identifies strategies for simplifying research regulations and policies proposed 53 options for policy or regulatory reform or process improvements from system-wide changes to specific regulatory areas. The report's recommendations focus on protecting research assets, coordinating federal leadership, harmonizing research security requirements, providing just-in-time training, and using a tiered-risk approach to evaluate actual risk while minimizing unnecessary burden.

Over the past 5 years, the National Science, Technology, and Security Roundtable (NSTSR) brought together officials from universities, agencies, and law enforcement to ensure that the United States maintains the open, international collaboration that made it the best research enterprise in the world while also working to ensure that research security is not compromised. Participants at a 2024 NSTSR capstone workshop[12] discussed the need for a flexible, risk-based approach to research security, more clarity from federal agencies on what presents a security concern, and the need to work with international partners, allies, and like-minded countries to address concerns.

Strengthening the Talent Pool

The RFI also asks how to ensure that scientific talent is developed across the country (Question 10). A 2024 report[13] concluded that the United States is missing opportunities to develop STEM talent at all points along the education and career pipeline, from K–12 through advanced degrees. The report recommends the creation of a whole-of-government talent strategy, including national talent recruitment and retention approaches for international researchers. A 2022 report[14] called for the National Science Foundation to fund and coordinate an effort to define elements of the U.S. innovation system that are key to developing, attracting, and retaining top talent. A 2025 report[15] called for recognition that many students in rural areas lack opportunities in STEM education and would benefit from coordinated attention to K–12 STEM education and workforce development.

Recent work has also addressed the need to foster closer collaboration among scientists, engineers, and skilled technical workers, recognizing the importance of connecting theoretical and practical expertise (Question 11). The 2025 decadal survey[16] of ocean sciences called for supporting workforce development by investing in vocational and academic pathways, such as offering scholarships and apprenticeships, and by establishing fellowships that could potentially serve underserved student or professional populations.

Most recently, a December 2025 report[17] addressed our nation's critical shortage of computing doctorates, a talent resource essential to driving advances in AI, bolstering cybersecurity, and training the next generation of computing innovators. This decline in advanced degrees in computing will undercut technology innovation across all sectors and put U.S. global competitiveness at risk.

Conclusion

The National Academies submit this material to inform OSTP's work to strengthen the American scientific enterprise. We stand ready to support this effort through continued engagement, convening, and evidence-based analysis.

ENDNOTES

1 *The Age of AI in the Life Sciences: Benefits and Biosecurity Considerations* (2025)

2 *Optimizing Public–Private Partnerships for Clinical Cancer Research: Proceedings of a Workshop* (2024)

3 *GUIRR at 40: Reimagining the Triple Helix of Innovation, Investments, and Partnerships: Proceedings of a Workshop—in Brief* (2024)

4 *International Talent Programs in the Changing Global Environment* (2024)

5 *Forecasting the Ocean: The 2025–2035 Decade of Ocean Science* (2025)

6 *Incentivizing Urgency, Speed, and Scale to Support Future U.S. Innovation: Proceedings of a Workshop—in Brief* (2025)

7 *An Assessment of ARPA-E* (2017)

8 *Foundation Models for Scientific Discovery and Innovation: Opportunities Across the Department of Energy and the Scientific Enterprise* (2025)

9 "*Protecting scientific integrity in an age of generative AI*" (2024)

10 *Strategic Report on Research and Development in Biotechnology for Defense Innovation* (2025)

11 *Simplifying Research Regulations and Policies: Optimizing American Science* (2025)

12 *National Science, Technology, and Security Roundtable Capstone: Proceedings of a Workshop* (2025)

13 *International Talent Programs in the Changing Global Environment* (2024)

14 *Protecting U.S. Technological Advantage* (2022)

15 *K–12 STEM Education and Workforce Development in Rural Areas* (2025)

16 *Forecasting the Ocean: The 2025–2035 Decade of Ocean Science* (2025)

17 *Pathways to Doctoral Degrees in Computing* (2025)