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Response to 90 FR 54412: Accelerating the American Scientific Enterprise
Office of Science and Technology Policy

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Georgetown University's Center for Security and Emerging Technology (CSET) offers the following comments to the Office of Science and Technology Policy (OSTP) in response to the **Request for Information on Accelerating the American Scientific Enterprise**. These recommendations are drawn from CSET's wide body of research, based on CSET's mission to provide decisionmakers with data-driven analysis on the security implications of emerging technologies.

As the RFI rightly recognizes, the strength of the American scientific enterprise is tightly linked to U.S. national security, economic competitiveness, and the country's ability to generate innovative solutions to pressing challenges. To achieve this goal, the private sector, researchers, and academic institutions must be positioned within the most robust innovation ecosystem possible. This environment has historically been advanced through a complementary model: federal investment in basic research and university systems, shared infrastructure, policy coordination, and prioritization creates the conditions under which private actors can effectively develop, scale, and commercialize new technologies.

Our response addresses three critical areas in which sustained federal support builds and maintains a foundation that allows for private innovation:

- Generating the cumulative scientific knowledge that leads to commercializable technologies;
- Investing in the infrastructure that supports innovation hubs; and
- Providing the basis for effective public–private partnerships.

Together, prioritizing United States Government (USG) support and investment for each of these functions can ensure that private-sector innovation is more productive, scalable, and aligned with national interests and policy goals.

Building the knowledge base for transformative breakthroughs (ii., vi., xii.,)

Scientific breakthroughs are built upon a foundation of basic research. Before an innovator can develop a hypothesis to engineer a system, they first need to understand how the underlying science and technology works. For example, a cancer researcher must first understand how a healthy cell functions, before identifying how a cancerous cell develops or designing a therapy to correct it. Building this understanding requires sustained contributions from researchers across many highly specialized subfields, each

uncovering small pieces of knowledge that may appear incremental or disconnected at the time of discovery. The breakthrough moments that enable new technologies depend on a deep, shared knowledge base built over time, often through research that is undertaken before a downstream application has been envisioned.

The federal government has long played a central role in supporting this type of basic research since it addresses a well-known gap in private-sector incentives, with universities and academic institutions serving as the backbone of shared knowledge production. While downstream applications of scientific discoveries—like the new cancer therapy described above—may be commercially viable, the underlying knowledge that enables them often is not. Basic research produces broad ripple effects, is shared between multiple application areas, and typically requires long time horizons, making it poorly suited to private investment models that prioritize near-term returns. Federal research funding, on the other hand, is uniquely positioned to stimulate research often conducted in academic settings that is not immediately profitable but has broader value to the innovation ecosystem.

We recommend the U.S. government take the following actions to seed innovative breakthroughs:

- **Sustain federal funding across the full spectrum of basic to applied research to support incremental knowledge production and follow-on commercialization.** Federal research funding plays an outsized role in shaping the innovation pipeline, setting research agendas, and creating pathways the private sector can later scale and commercialize. Support for basic research, particularly at universities and academic institutions, is necessary to maintain and expand this pipeline. As demonstrated by CSET's Map of Science and Patent Clusters data resources, NIH-funded projects have a major impact on the broader innovation landscape including in downstream patenting, particularly in pharmaceutical and biotechnology-related subfields, even influencing research that does not itself receive NIH support.[1] Reductions in U.S. federal funding risk undermining this knowledge base and ceding America's leadership position in high-consequence areas such as AI-enabled biotechnology.[2]

- **Invest in shared research infrastructure and coordination mechanisms that enable translation from public research to private-sector innovation.** Ambitious initiatives such as the Genesis Mission illustrate the potential of coordinated, large-scale efforts to unleash a new age of AI-accelerated innovation and discovery, but will require significant and sustained federal investment to achieve. The federal government is uniquely positioned to build and maintain the necessary infrastructure to encourage public and private sector researchers to compile, access, and scale innovations derived from basic research. Realizing this potential cannot rely on private-sector investment alone and will require continuous USG prioritization and resources for cross-agency coordination. Furthermore, through these mechanisms, the federal government can play a critical role in incentivizing the private sector to develop innovations that maintain and build on America's global strategic leadership.

- **Support interdisciplinary research programs, forums, and convenings to connect incremental science with transformative research agendas.** As breakthrough technologies

[1] Quinn, Katherine, Steph Batalis, and Rebecca Gelles. 2025. *The NIH's Impact on Research and Innovation*. Data Snapshot. Center for Security and Emerging Technology. https://cset.georgetown.edu/publication/the-nihs-impact-on-research-and-innovation/.
[2] Batalis, Steph. 2025. "Federal Funding Underpins American Research across 'hot' AI + Bio Research Clusters." *Emerging Technology Observatory*, February 21. https://eto.tech/blog/federal-funding-underpins-ai-bio/.

emerge at the intersection of disciplines, such as artificial intelligence and biotechnology, federal funders should expand support for interdisciplinary efforts. Teams that include scientists, engineers, and technologists can better translate basic research findings into applications, with evidence suggesting that such interdisciplinary research is also more highly cited and influential.[3] Interdisciplinary convenings offer an opportunity to assess the current state of knowledge across fields, identify critical gaps, and align incremental advances with broader scientific and national goals. They also reveal scientific and technical gaps that may differ from assumptions embedded in high-level program design.

Creating an environment for innovation (iii., x., xi.)

To create new regional innovation ecosystems, the U.S. government should update its existing winning formula for success. Silicon Valley thrived on the federal research funding at nearby national labs like Lawrence Livermore and universities like Stanford. The research attracted scientists and students, allowing silicon chip manufacturers to take advantage of the concentrated talent. In the present day, CSET's PATHWISE tool has identified similar co-locations of cybersecurity and AI jobs and the universities that produce graduates in those fields.[4] Forming new regional innovation ecosystems located near universities and national labs can supply additional much-needed talent for our nation's scientific priorities and downstream private sector innovators. Discoveries made today through federally-funded academic studies or at national laboratories could inspire tomorrow's life-saving medicines from pharmaceutical companies.[5] Leveraging talent beyond Silicon Valley can advance scientific discovery and technological progress from the United States' broad talent pool. With sustained federal funding, all Americans will gain the opportunity to participate directly in underlying research, create new innovations, or materially benefit from its findings.

Robust regional innovation ecosystems ultimately support the circulation of workers and ideas between the labs that conduct basic research and the companies that commercialize it. More research jobs within a region increases the spread of tacit knowledge to support private sector progress, as workers share what they know through formal and informal collaboration. CSET has demonstrated such knowledge sharing by tracking researcher locations in publications through its Map of Science tool.[6] Researchers also carry their knowledge with them to new jobs or startups they found, perpetuating the economic benefits. However, forming regional innovation ecosystems can become a collective action problem if no stakeholder steps up to organize different groups. The federal government plays an essential coordinating role among industry stakeholders who otherwise need to compete for limited sources of talent and funding. State and local policymakers can also encourage partnerships with public colleges and universities that enroll students seeking degrees in in-demand fields, especially through providing funding to get programs started.

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[3] Toney, Autumn, and Melissa Flagg. 2021. *Research Impact, Research Output, and the Role of International Collaboration*. Center for Security and Emerging Technology. https://cset.georgetown.edu/publication/research-impact-research-output-and-the-role-of-international-collaboration/ ; Larivière, Vincent, Stefanie Haustein, and Katy Börner. 2015. "Long-Distance Interdisciplinarity Leads to Higher Scientific Impact." *PLoS ONE* 10 (3): e0122565. https://doi.org/10.1371/journal.pone.0122565.

[4] "Track Emerging Technology Talent: Introducing PATHWISE – Emerging Technology Observatory." *Emerging Technology Observatory*, October 30, 2025. https://eto.tech/blog/introducing-pathwise/.

[5] Corrigan, Jack, and Vikram Venkatram. "Trump Should Not Abandon March-In Rights." The National Interest, April 28, 2025. https://nationalinterest.org/blog/techland/trump-should-not-abandon-march-in-rights.

[6] Emerging Technology Observatory. "Documentation: Map of Science." December 15, 2025. https://eto.tech/tool-docs/mos/.

We offer the following recommendations:

- **Provide sustained funding and coordination to support regional innovation ecosystems.** Regional innovation ecosystems need the federal government to provide funding and coordination for industry and academic stakeholders, and to overcome private sector collective action problems. Sustained federal funding for basic research, alongside robust university programs that attract the brightest new talent, can connect all parts of the regional innovation ecosystem to develop tangible, real-world products.

- **Use federal research funding to attract and retain talent in regions across the country.** Federal research funding attracts top talent to universities and national labs that local businesses can hire to commercialize research. Local labor markets also benefit from having many employers and workers that can take advantage of talent to commercialize new ideas and start new businesses.

- **Strengthen workforce pipelines that support research, development, and commercialization.** Funding programs at universities and colleges, community and technical colleges would train workers for research and development roles. Initiatives like biomanufacturing apprenticeships have proven successful at expanding workforce pipelines, but require significant support to create.[7] Supporting K-12 education would also ensure that students have the basic skills needed to get more specialized training for jobs in in-demand fields.

- **Encourage the circulation of ideas and workers across institutions and firms.** Innovation ecosystems encourage the spread of ideas through formal collaboration between stakeholders and informal conversations. Workers carry their acquired knowledge with them to start new roles or companies.

Reinforcing robust public-private partnership (i., iv., vii., xi., xiii.)

Public-private partnerships are crucial in accelerating American scientific progress for several reasons. First, these collaborations bridge the "valley of death" between basic research and commercialization. Second, the partnerships encourage experimentation, especially with high-risk, high reward efforts. Third, public-private partnerships underscore the comparative advantages of the federal government, private sector, academia, and nonprofit organizations, which no single actor comprehensively holds. Translating research into real-world impact requires the combined efforts of all relevant stakeholders, especially in fast-moving technology areas.

Public-private partnerships are needed for breakthroughs in science and technology. Small- and medium-sized businesses are key drivers of innovation, especially due to their agility, responsiveness to emerging needs, and efficiency. CSET research into government contracting data in key emerging technology areas underscores how government contracts offer support for equitable industry access

[7] Koslosky, Luke, Steph Batalis, and Ronnie Kinoshita. 2025. *Biotech Manufacturing Apprenticeships:A Case Study in Workforce Innovation*. Center for Security and Emerging Technology. https://cset.georgetown.edu/publication/biotech-manufacturing-apprenticeships/.

through small-business set-asides and joint ventures.[8] The contract data sample from this research highlights how federal agencies have leveraged automated generation, low-code systems, and no-code systems, noting that automated generation has the longest history in government procurement. Government contracts and partnership mechanisms can incentivize a large range of firms to contribute to national innovation priorities. In addition, these partnerships can uncover critical gaps, opportunity areas, and share ways to reach breakthroughs in innovation to both government and private sector stakeholders. This joint learning can provide clearer insights into areas that may require new policies to eliminate obstacles for innovators and opportunities for the private sector to develop applications that benefit the economy and advance national interests.

To enable stronger public-private collaboration, the U.S. government should sustain federal investment in key research areas, develop incentives for companies to participate in government contracts, and continuously engage with stakeholders along the technology development pipeline. For example, recent public-private collaboration in the space domain has shown how such partnerships can benefit national security. CSET research into private sector space capabilities noted sustained public-private collaboration, robust policy frameworks, and strategic investments are needed to ensure the United States remains the leader in space technology.[9] Beyond space, partnership between the U.S. government and the private sector will be critical for advancing innovation in other emerging technologies, including artificial intelligence, cyber, robotics, quantum, and biotechnology.

We recommend the U.S. government partake in the following actions to reinforce public-private partnerships:

- **Ensure sustained federal investment in basic research and R&D across critical emerging technologies.** Emerging technologies, such as artificial intelligence, biotechnology, cybersecurity, and space technologies, often require significant funding, time, and research to bring to maturity. Basic research and R&D requires consistent federal investment to ensure long-term economic growth, national security, and societal well-being, and to compensate for gaps in private sector incentives. The federal government should secure its leadership role in foundational technologies, support a skilled workforce, and sustain public investment on basic research, which underpins the entire innovation ecosystem.

- **Reduce excessive regulatory burdens for commercial vendors while maintaining safeguards for safety, competition, and national security.** While prioritizing safety, the U.S. federal government should consider ways to reduce regulatory burdens. Excessive regulatory burdens slow down innovation, limit private sector participation, and impact the federal government's access to premier science and technology at the cutting edge. To reduce burdens, the federal government may consider removing duplicative efforts (e.g., registration submissions of commercial vendors), shortening timelines (e.g., review cycles for grant decisions and contract awards), and minimizing reporting (e.g., requiring several technical and financial reports). Regulatory reforms should instead focus on streamlining bureaucratic processes without

[8] Schoeberl, Christian. 2023. *Examining Key Tech Areas in Government Contracts Data.* Data Snapshot. Center for Security and Emerging Technology. https://cset.georgetown.edu/publication/examining-key-tech-areas-in-government-contracts-data/.

[9] Curlee, Kathleen. 2025. *Sustaining the U.S. Edge in Remote Sensing, Launch, and Advanced Technologies for National Security.* Center for Security and Emerging Technology. https://cset.georgetown.edu/publication/sustaining-the-u-s-edge-in-remote-sensing-launch-and-advanced-technologies-for-national-security/.

increasing risks to safety and security. Previous CSET research on the U.S. semiconductor industry highlighted examples of ways regulatory reforms and incentives could increase the United States' attractiveness for high-tech firms, particularly when physically locating them in the U.S. is a national security priority.[10]

- **Engage in continuous and robust dialogue with stakeholders across sectors.** By convening the federal government, academia, the private sector, and nonprofit organizations, breakthroughs in science and technology, policy, and security are best achieved. CSET research into public-private cooperation on technology deployed to aid Ukraine in its war against Russia highlights the need for robust and continuous dialogue between the U.S. government and commercial technology companies. Robust stakeholder engagement will be especially crucial amid competition with peer and near-peer adversaries.[11] It is in these forums that gaps and opportunities on emerging technologies can be discussed in the goal of successful adoption. Moreover, robust dialogue with stakeholders can offer creative solutions to complex challenges, adoption barriers, and new opportune areas for collaboration.

[10] Daniels, Owen J. and Will Hunt. 2022. *Sustaining and Growing the U.S. Semiconductor Advantage: A Primer.* Center for Security and Emerging Technology. https://cset.georgetown.edu/wp-content/uploads/CSET-Sustaining-Growing-US-Semiconductor-Advantage-A-Primer.pdf.

[11] Fox, Christine H. and Emelia Probasco. 2023. *Volunteer Force: U.S. Tech Companies and their Contributions in Ukraine.* Center for Security and Emerging Technology. https://cset.georgetown.edu/publication/volunteer-force/.