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COMMENTS OF ITIF

to the

Office of Science and Technology Policy

Washington, D.C.

In the Matter of: Request for Information for Accelerating the American Scientific Enterprise	)	Docket No. OSTP-TECH-2025-0100

December 18, 2025

INTRODUCTION AND SUMMARY

The Information Technology and Innovation Foundation (ITIF) is pleased to submit the following comments in response to the administration's Request for Information for Accelerating the American Scientific Enterprise. ITIF is an independent, nonprofit, nonpartisan research and educational institute focusing on the intersection of technological innovation and public policy.

The U.S. scientific enterprise has reached a fork in the road. While previous policy has encouraged principal investigators to pursue creativity and curiosity in conducting research, it is clear that this approach has not had the desired effect on advancing American competitiveness and strengthening America's position in maximizing national power. The science community must move beyond the linear *Science, the Endless* Frontier-model of scientific research, developed and encouraged by Vannevar Bush, and realign scientific exploration with national interests, especially in the face of the growing technological and economic threat posed by China.[1]

Undertaking this shift will mean prioritizing high-impact fields such as engineering, life sciences, and computer science over those with a less-direct impact on national competitiveness, and it means more closely aligning the research and academic community with private industry, prioritizing technology transfer and commercialization over basic, curiosity-driven research.

While we hope the administration will consider ITIF's comments and recommendations on these issues, we also would like to urge the administration to consider the bipartisan policy blueprint already developed during the first Trump administration in the National Institute of Standards and Technology's (NIST) "Return on Investment Initiative for Unleashing American Innovation" (the Green Paper). The Green Paper outlined a series of readily executable policy ideas to improve America's technology transfer ecosystem, increase the return on investment (ROI) from research dollars, streamline federal technology regulations, and increase the competitive orientation of the scientific enterprise. We believe that the Green Paper presents a set of readily accessible and easily implementable policy ideas to advance the American Scientific Enterprise. The administration should start by reviewing and implementing the strong work it's already done in this regard.

(i) What policy changes to Federal funding mechanisms, procurement processes, or partnership authorities would enable stronger public-private collaboration and allow America to tap into its vast private sector to better drive use-inspired basic and early-stage applied research?

First and foremost, the United States must recognize that it has already built the world's most effective system for technology commercialization, especially where it pertains to intellectual property (IP)/technologies derived from federally funded research and development (R&D) conducted at U.S. universities and research institutions. While positive reforms can still be made on the margins, the Trump administration must refrain from implementing poor IP/technology commercialization policies that unnecessarily make innovation more difficult, risky, and expensive.

In September 2025, in an *Axios* interview, Commerce Secretary Howard Lutnick called for the federal government to claim half the patent earnings from university inventions derived in part from federal R&D,

[1] Robert D. Atkinson, "US Science Policy At A Crossroads" (ITIF, June 23, 2025), https://itif.org/publications/2025/06/23/us-science-policy-at-a-crossroads/.

erroneously asserting that "the U.S. government is getting no return on the money it invests in federal research."[2] Yet the reality is the U.S. taxpayer—and the government—benefits greatly from this R&D funding. They benefit first from the extensive innovations produced from the academic tech transfer process, which alone has produced hundreds of life-saving drugs and vaccines, including treatments for breast, ovarian, prostate, and skin cancer, not to mention other breakthroughs in everything from Honeycrisp apples and neoprene to cloud and quantum computing. Second, university IP licensing revenues help fund key innovation-enabling infrastructure at U.S. universities, such as labs, incubators, or innovation accelerators that keep the innovation flywheel churning. Third, the government benefits from the taxes produced by the trillions in industrial output and millions of jobs created as a result of university tech transfer.[3] For instance, university research parks alone generated $33 billion in federal tax revenue in 2024.[4] **The administration should refrain from imposing a claim or a tax on IP licensing revenues earned by U.S. universities.**

Similarly, the administration should refrain from proposals to charge patent holders between 1 and 5 percent of a patent's overall value. As ITIF has written, taxing patents would disincentivize innovation and harm American competitiveness all while be extraordinarily difficult to implement.[5] (It's difficult enough for the private sector to accurately value IP, let alone a government agency doing so, and especially when debatable valuations would be tied up in litigation for years.) If the United States wishes to develop more and more useful IP—which is certainly should as a matter of technology and innovation policy—then increasing the cost of that IP through an annual tax should be a proposal summarily dispatched. Indeed, the United States should proceed in the exact option direction, such as how the United States offers lower patent filing fees for small businesses and how it has worked through patent backlogs which once took years to clear.[6]

Do not apply Bayh-Dole march in rights to control the price of resulting products. As late as 1978, the federal government had licensed less than 5 percent of the as many as 30,000 patents it owned.[7] Most of them languished on the shelves of government offices or labs. Congress transformed the situation by passing the bipartisan 1980 Patent and Trademark Law Amendments Act, better known as the "Bayh-Dole Act." The legislation both created a uniform patent policy among the many federal agencies funding research and allowed universities to retain ownership of the IP and inventions made as a result of federally funded

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[2] "Lutnick wants U.S. government getting cuts of university revenue," *Axios*, https://www.youtube.com/watch?v=M6090YFFrfo.

[3] Stephen Ezell, "Taxing University Royalties Would Deliver Few Benefits, but Great Harms," *The Innovation Files*, October 7, 2025, https://itif.org/publications/2025/10/07/taxing-university-royalties-would-deliver-few-benefits-but-great-harms/.

[4] Association of University of Research Parks (AURP), "AURP Releases 2025 Economic Impact Report: The Power of North American Research Parks," news release, September 11, 2025, https://aurp.org/aurp-releases-2025-economic-impact-report-the-power-of-north-american-research-parks/.

[5] Rodrigo Balbontin, "Taxing Patent Value Is a Patently Bad Idea," *The Innovation Files*, August 4, 2025, https://itif.org/publications/2025/08/04/tax-on-patent-value-is-a-patently-bad-idea/.

[6] Jo Dale Carothers, Ph.D., "USPTO Patent Fees Reduced for Small Businesses," *The IP Law Blog*, March 30, 2023, https://www.weintraub.com/2023/03/uspto-patent-fees-reduced-for-small-businesses/.

[7] B. Graham, "Patent Bill Seeks Shift to Bolster Innovation," The Washington Post, April 8, 1978; Ashley J. Stevens et al., "The Role of Public-Sector Research in the Discovery of Drugs and Vaccines" The New England Journal of Medicine Vol. 364, Issue 6 (February 2011): 1, https://www.nejm.org/doi/full/10.1056/NEJMsa1008268.

research.[8] The Bayh-Dole Act has transformed U.S. universities into engines of innovation, spawning robust academic technology transfer and commercialization capabilities and activities at hundreds of universities across the United States.[9]

In fact, the impact of academic technology transfer from U.S. universities has been so extensive that, from 1996 to 2020, it resulted in 554,000 inventions disclosed, 141,000 U.S. patents granted, and 18,000 start-ups formed.[10] Moreover, academic technology transfer has bolstered U.S. gross domestic product (GDP) by up to $1 trillion, contributed to $1.9 trillion in gross U.S. industrial output, and supported 6.5 million jobs over that time.[11]

When Congress passed the Bayh-Dole Act it included so-called "march-in right" provisions, which permit the government, in specified circumstances, to require patent holders to grant a "nonexclusive, partially exclusive, or exclusive license" to a "responsible applicant or applicants."[12] Yet some have called for the government to use Bayh-Dole march-in rights to control the price of resulting products, such as pharmaceutical drugs. This despite the fact that lower prices are not one of the rationales laid out in the Bayh-Dole Act. In fact, as senators Bayh and Dole have themselves noted, the Bayh-Dole Act's march-in rights were never intended to control or ensure "reasonable prices."[13]

The Trump administration should return to an initiative undertaken in its first iteration, when it had directed NIST to undertake a review of federal policies that could bolster the return of federal investments in R&D. The final 2018 report NIST produced, the "Return on Investment Initiative: Draft Green Paper," concluded, "The use of march-in is typically regarded as a last resort, and has never been exercised since the passage of the Bayh-Dole Act in 1980."[14] The report further noted, "NIH determined that that use of march-in to control drug prices was not within the scope and intent of the authority."[15] **The Trump administration should build upon the findings of the 2018 NIST Green Paper and affirmatively declare that price is not a legitimate basis for the exercise of Bayh-Dole march-in rights.**

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[8] Syracuse University Office of Technology Transfer, "The Bayh-Dole Act," https://techtransfer.syr.edu/about/bayh-dole/.

[9] Stephen Ezell, Meghan Ostertag, and Leah Kann, "The Bayh-Dole Act's Role in Stimulating University-Led Regional Economic Growth" (ITIF, June 2025), https://itif.org/publications/2025/06/16/bayh-dole-acts-role-in-stimulating-university-led-regional-economic-growth/.

[10] Association of University Technology Managers (AUTM), "Driving the Innovation Economy: Academic Technology Transfer in Numbers," (AUTM, 2023), https://autm.net/AUTM/media/Surveys-Tools/Documents/AUTM-Infographic-2021_1.pdf.

[11] Ibid.

12 John R. Thomas, "March-In Rights Under the Bayh-Dole Act" (Congressional Research Service, August 2016), 7, https://fas.org/sgp/crs/misc/R44597.pdf.

13 Birch Bayh, "Statement of Birch Bayh to the National Institutes of Health," May 25, 2014, http://www.essentialinventions.org/drug/nih05252004/birchbayh.pdf.

14 National Institute of Standards and Technology, "Return on Investment Initiative: Draft Green Paper" (NIST, December 2018), 30, https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1234.pdf.

15 Ibid., 30.

Do not give away American IP. The administration should also refrain from giving away private American IP to foreign or domestic entities. In the waning days of the Biden administration, the Nuclear Research Program at the Department of Energy misguidedly opened up U.S. clean energy technology to the world. The Nuclear Research Program actually mandated that any interventions supported by its funding be given away—even to foreign rivals.[16] The memo, which was not initially made public outside of the Department of Energy (DOE) National Laboratories, stated:

> The U.S. Department of Energy Office of Nuclear Energy (NE) is issuing this guidance regarding the commercialization of NE-funded technologies. With this guidance, NE is establishing a policy preference for the dedication to the public of such technology, *where it is made freely available to the public with few or no intellectual property restrictions, or the non-exclusive licensing of technology developed with NE funding*. (Emphasis added.)
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> Recognizing that the contractors who manage National Laboratories for DOE according to Management & Operating (M&O) contracts (DOE National Laboratory contractors) generally have rights under the Bayh-Dole Act, including the right to elect title to federally-funded inventions and license those inventions per the technology transfer mission clauses of M&O contracts this policy is intended to be a significant factor that the National Laboratory M&O contractors are expected to weigh when structuring and negotiating the licensing of NE-funded technologies, even when owned by the contractor. In the extraordinary circumstances in which a National Laboratory wants to exclusively license a NE funded technology, NE expects the National Laboratory M&O contractor to consult with NE leadership and the DOE Patent Counsel prior to entering into such an exclusive license. The purpose of this consultation is to verify that all parties agree that the exclusive license is the best vehicle for advancing DOE's mission and interests, including maximizing commercialization and broadly disseminating NE-funded technology.17

Giving away U.S. nuclear technology is a poor strategy when China has already begun to surpass the United States in the research into and deployment of fourth-generation nuclear reactor technologies and to at least be close to, if not at par, with the United States in nuclear fusion.[18] **The DOE should follow established technology licensing practices as codified in the Bayh-Dole Act.**

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[16] Joe Allen, "The Department of Energy's Technology Giveaway," *IP Watchdog*, February 19, 2025, https://ipwatchdog.com/2025/02/19/department-energys-technology-giveaway/id=186280/.

[17] Ibid.

[18] Stephen Ezell, "How Innovative Is China in Nuclear Power?" (ITIF, June 2024), https://itif.org/publications/2024/06/17/how-innovative-is-china-in-nuclear-power/; Sha Hua, "Atomic Power Is In Again—and China Has the Edge," *The Wall Street Journal*, December 7, 2023, https://www.wsj.com/world/china/atomic-power-is-in-againand-china-has-the-edge-5f8a8b84; Jennifer Hiller and Sha Hua, "China Outspends the U.S. on Fusion in the Race for Energy's Holy Grail," *The Wall Street Journal*, July 8, 2024, https://www.wsj.com/world/china/china-us-fusion-race-4452d3be.

(ii) How can the Federal government better support the translation of scientific discoveries from academia, national labs, and other research institutions into practical applications? Specifically, what changes to tech transfer policies, translational programs, or commercial incentives would accelerate the path from labs to market?

Empower the National Science Foundation's (NSF) TIP Directorate. One of the most effective ways in which the U.S. government can catalyze technology transfer and commercialization would be by empowering a program it has already established. The National Science Foundation (NSF) created the Directorate for Technology, Innovation, and Partnership (TIP) with the mission of accelerating key technology transfer to advance U.S. competitiveness. Congress authorized the directorate with $20 billion through the CHIPS and Science Act through 2027.[19] TIP makes industry buy-in a prerequisite for all projects receiving funding. Under Subtitle G of the CHIPS and Science Act, TIP grants must "develop mutually beneficial research and technology development partnerships and collaborations among entities such as institutions of higher education, nonprofit organizations, labor organizations, for-profit entities, government entities, and international entities," a guideline meant to guarantee an accelerated path to practical commercialization and use, and a stark contrast from much of NSF's other research.[20] Additionally, Subtitle G states that TIP grants are to be awarded only for research in several key technology focus areas, including AI, quantum computing, biopharmaceuticals, and semiconductors.[21]

However, in the years since the CHIPS Act was passed, Congress has only appropriated $410 million to the program.[22] Unsurprisingly, a program with an intended budget of $20 billion can't build U.S. competitiveness in critical technologies with just 10 percent of that budget. Yet, it has still made significant strides in accelerating technology translation. Rather than funding the ten technologies it originally chose, TIP has launched funding opportunities for three technologies viewed as having the greatest potential for growth in competitiveness with the smallest investment: AI use for protein and enzyme design, advancing cell-free systems in biochemical processes, and improving fifth-generation networks and creating next-generation wireless networks.

Given the success TIP has displayed in funding critical technology research and attracting private partners to research projects, Congress should extend the period over which the CHIPS Act authorizes TIP funding beyond 2027 to ensure that all $20 billion authorized is appropriated and appropriate $1 billion to the directorate for fiscal year 2026. Even with an additional $1 billion in appropriated funds from the CHIPS and Science Act, TIP would not be able to pursue funding opportunities across all 10 key technologies that Congress identified as critical to U.S. competitiveness. It would, at most, fund opportunities in a handful of

[19] Robert Atkinson and Meghan Ostertag, "Congress should Fully Fund NSF's TIP Directorate to Make America More Competitive Versus China" (ITIF, June 30, 2025), https://itif.org/publications/2025/06/30/congress-should-fully-fund-nsf-tip-directorate/.

[20] CHIPS and Science Act, H.R. 4346, 117th Cong. (2022), https://www.congress.gov/bill/117th-congress/house-bill/4346.

[21] Ibid.

[22] Atkinson and Ostertag, "Congress should Fully Fund NSF's TIP Directorate."

technologies. An additional $1 billion should be added each fiscal year until annual appropriations for TIP reach or exceed $4 billion per year.

TIP is also operating with a 45 percent smaller workforce as of January 2025 as a result of departures from attrition, deferred resignation programs, early retirement offers, and other cuts made in compliance with directives from the U.S. Department of Government Efficiency, compounded by the ongoing federal hiring freeze.[23] A smaller workforce, coupled with the hiring freeze, has made it impossible to expand TIP's network of programs into critical technology areas. Congress must make it a priority to fund TIP fully and lift the hiring freeze for TIP.

Increase the importance of commercialization activities at federal labs and research institutes. America's federal laboratories are insufficiently incentivized to invest time, energy, and resources in facilitating technology transfer, in large part because technology transfer is not even one of the eight main criteria in the Performance Evaluation and Management Plan (PEMP), a kind of annual report card for the federal labs.[24] Rather, PEMP treats successful transfers of technology to market as an afterthought. Elevating this important function to its own category would have significant impacts on the management of the labs and help to reverse the buildup of decades of skepticism and intransigence toward commercialization. Adding a ninth category to the PEMP for "Technology Impact" would create a mechanism to evaluate the economic impact of lab-developed technology, creating a stronger incentive for lab managers to focus on market implementation of valuable government IP assets and technical capabilities.[25]

Consider federal model IP agreements. Several states have implemented model intellectual property agreements, enabling faster, easier collaboration between universities and the private sector and streamlining the technology transfer process. Virginia, one of these states, announced its Lab-to-Launch initiative in August of this year, which will help university researchers and entrepreneurs in two key ways. First, the agreement standardizes the language in university IP agreements with start-ups, reducing the barriers and costs for entrepreneurs looking to commercialize their innovations. Start-ups that spin off from universities using these licenses are also eligible for awards of up to $50,000 toward their commercialization costs.[26]

Second, the bill creates an Entrepreneur-in-Residence program that connects university researchers with the private sector. This program will develop an online database of university IP, making it easier for private industry to find and engage with university researchers, reducing the cost and time required for

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[23] Ibid.

[24] Matthew Stepp, Sean Pool, Nick Loris, and Jack Spencer, "Turning the Page: Reimagining the Federal Labs in the 21st Century Innovation Economy" (ITIF, Center for American Progress, and The Heritage Foundation, 2013): 54, https://www2.itif.org/2013-turning-the-page.pdf.

[25] Stephen Ezell and Scott M. Andes, "Localizing the Economic Impact of Research and Development: Policy Proposals for the Trump Administration and Congress" (ITIF and Brookings, December 7, 2016), https://itif.org/publications/2016/12/07/localizing-economic-impact-research-and-development-policy-proposals-trump/.

[26] "Governor Glenn Youngkin Launches University Commercialization Initiative to Fast-Track Start-ups and Accelerate Innovation," press release, August 13, 2025, https://www.governor.virginia.gov/newsroom/news-releases/2025/august/name-1054942-en.html.

collaboration.[27] The federal agreement should examine these model IP licensing agreements and evaluate if they could be helpful toward improving IP licensing practices, such as for IP coming out of national laboratories.

Expand DOE's Lab-Embedded Entrepreneurship Program (LEEP). LEEP is designed to help early-stage innovative energy entrepreneurs take their product ideas to market with the collaboration of laboratory staff. LEEP programs have been developed at several national laboratories, including the Cyclotron Road program at Lawrence Berkeley National Laboratory in California. The LEEP program has enabled scientific entrepreneurs to develop critical energy-specific technologies that would have been cost-prohibitive without funding from national laboratories. One study found that LEEP achieved a 92 percent success rate, with nearly 4,000 jobs created, 182 new businesses started, and 212 fellows supported.[28]

Other government agencies should adopt the LEEP program, expanding this opportunity beyond simply clean energy technologies. The Department of War could undertake LEEP programs to support entrepreneurial scientists in defense and security technologies, or the National Institutes of Health (NIH) could develop a similar program for individuals with innovative ideas in life sciences or biotechnology.

Empower the NSF Engineering Research Centers (ERC) program. NSF's Engineering Research Center program (ERC) supports a network of 17 strategic university-industry partnerships that pursue high-risk, high-payoff research across almost the entire spectrum of technology fields—including advanced manufacturing, biotechnology, clean energy and sustainability, microelectronics, and information technology.[29] Since 1985, NSF has funded 83 ERCs that have led to more than 1,400 invention licenses, 920 patents, and 250 spinoff companies.[30] However, these partnerships do not require any industry funding match, reducing the likelihood that engineers trained in this program will be prepared with industry-specific skills or that research in these centers will be commercialized by private industry. Additionally, among the 17 ERCs currently funded by NSF, several are not focused on technologies used in globally traded industries, again reducing the applicability of the skills learned and the research conducted in these centers to the private sector.[31]

The administration should work to reform and expand this program. Given the goal of the ERC program to engage industry, it should be housed within the TIP directorate at NSF. Moving this program will also ensure that the ERC centers are aligned with the aforementioned 10 strategic key technology areas focused on by TIP.[32] Additionally, the framework for awarding funding under ERC should be adjusted. NSF should require that ERCs have at least half of their federal funding matched by industry. TIP should also ensure that existing

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[27] Ibid.

[28] U.S. Department of Energy, "Lab-Embedded Entrepreneurship Program," https://www.energy.gov/eere/ammto/lab-embedded-entrepreneurship-program.

[29] U.S. National Science Foundation, "Engineering Research Centers," https://www.nsf.gov/eng/engineering-research-centers.

[30] Ibid.

[31] Robert D. Atkinson, "China Is Rapidly Becoming a Leading Innovator in Advanced Industries, (ITIF, September 16, 2024), https://itif.org/publications/2024/09/16/china-is-rapidly-becoming-a-leading-innovator-in-advanced-industries/.

[32] Atkinson and Ostertag, "Congress should Fully Fund NSF's TIP Directorate."

and new ERCs more effectively coordinate with other similar federally funded programs. For example, NSF's ERC for Cell Manufacturing Technologies should coordinate with the National Institute for Innovation in Manufacturing and Biopharmaceuticals (NIIMBL), as both conduct research on cell manufacturing, but with a lower-level TRL focus for the ERC and a higher-level focus for NIIMBL. Beyond these reforms, the administration should work with Congress to ensure at least $150 million in annual funding for the NSF ERC program, supporting both existing and new manufacturing-focused ERCs.

Expand the Industry-University Cooperative Research Centers (IUCRC) program. The Industry University Cooperative Research Center (IUCRC) program forges partnerships between universities and industry, featuring industrially relevant fundamental research, industrial support of and collaboration in research and education, and direct transfer of university-developed ideas, research results, and technology to U.S. industry to improve its competitive posture in global markets.[33] NSF currently operates IUCRCs in 10 different critical technologies, including advanced manufacturing, biotechnology, and information, communication, and computing.[34] As with the ERC program, the United States could get more out of the IUCRC program to support both the American scientific enterprise and U.S. industrial competitiveness. The IUCRC program should also be moved under the TIP directorate in NSF to ensure that IUCRC focus areas align with those designated by Congress as critical to U.S. competitiveness. Additionally, the Trump administration should work with Congress to provide annual funding for the IUCRC program that supports at least 15 more centers in critical commercial-ready technologies.

(iii) What policies would encourage the formation and scaling of regional innovation ecosystems that connect local businesses, universities, educational institutions, and the local workforce—particularly in areas where the Federal government has existing research assets like national laboratories or federally-funded research centers?

Expand the collaborative R&D Tax Credit. Growing sectors of the economy increasingly rely on collaborative research (e.g. research performed between a business and a university, federal lab, or consortium). Businesses are increasingly turning to universities, federal labs, and other external sources for research, allowing for the creation of top-ranked innovative commercial products. In response, U.S. allies and competitors are increasingly offering additional tax incentives to spur collaborative R&D. For example, Hungary offers a full expensing of all R&D costs conducted under collaboration with a university or research institution up to 500 million forints.[35] Japan offers a flat tax credit for collaborating with a university or research institution of up to 30 percent.[36]

Yet, the R&D tax credit—the principal way the government entices the private sector to invest more in R&D—falls short of effectively incentivizing research collaborations. To make the United States more competitive, Congress should create a collaborative R&D tax credit, eligible for all sectors. The United States currently provides a 20 percent credit for collaborative R&D, but it only applies to energy research. The

[33] U.S. National Science Foundation, "Accelerating Impact Through Partnerships: Industry–University Cooperative Research Centers," https://iucrc.nsf.gov/.

[34] Ibid.

[35] "Hungary – R&D Tax Credit," INNOTAX, 2025, https://stip.oecd.org/innotax/incentives/HUN10.

[36] "Japan – General Type R&D Tax Credit," INNOTAX, 2025, https://stip.oecd.org/innotax/incentives/JPN1.

administration should work with Congress to eliminate the energy restriction. Further, companies should be able to claim the R&D tax credit on 100 percent of the investments they make in R&D at U.S. universities; currently they're only able to make a claim of up to 70 percent of their investment.

Reform Technology Hub Programs. In a 2019 report, "The Case for Growth Centers," ITIF examined where innovation jobs are found in the U.S. economy, defining these as jobs in industries that have a specified level of R&D intensity and that employ a certain share of STEM workers. ITIF found that fully one-third of U.S. innovation jobs are concentrated in just 14 U.S. counties, and one-half in 40 counties.[37] This insight was part of the inspiration behind Congressional creation of the Economic Development Administration's (EDA) Regional Tech Hubs program. EDA has designated 31 Tech Hubs and, in July 2024, released $504 million in Implementation awards for 12 of the 31 designated Tech Hubs.[38] The remaining 19 hubs should be fully funded.

Besides Congress not appropriating enough money, the program was poorly implemented. The Biden administration allowed NSF and the Department of Commerce (along with the Department of War and the Small Business Administration) to develop their own regional hub programs with no coordination, essentially spreading limited resources far too wide and thin. Moreover, many of the EDA awards are weak and likely to never become self-sufficient hubs once federal funding ends. **Accordingly, the Trump administration should redo the competition, but this time fund fewer centers, make NSF and EDA develop a joint program, require industry investment, and ensure that winners could be self-sufficient**.

(iv) How can federal policies strengthen the role played by small and medium-sized businesses as both drivers of innovation and as early adopters of emerging tech?

The Trump administration should work with Congress to get the Small Business Innovation Research (SBIR) and Small Business Technology Transfer Research (STTR) programs reauthorized. The programs (enacted in 1982 and 1992, respectively) have grown to become the federal government's most impactful programs and largest sources of early-stage capital for technology commercialization, allowing U.S.-owned and operated small businesses to engage in R&D activity that has a strong potential for commercialization.[39] SBIR sets aside 3.25 percent of R&D funding from 11 federal agencies (all those with R&D budgets greater than $100 million annually), providing about $2.5 billion annually to support small businesses engaging in R&D with commercialization potential.

SBIR accounts for only 3 percent of federal extramural research funding, yet numerous studies have documented the program's tremendous contributions to the U.S. innovation economy. Since the program's inception, it has distributed over $40 billion in funding, which has contributed to the generation of over

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[37] Robert D. Atkinson, Mark Muro, and Jacob Whiton, "The Case for Growth Centers: How to Spread Tech Innovation Across America" (ITIF and Brookings, December 2019), https://itif.org/publications/2019/12/09/case-growth-centers-how-spread-tech-innovation-across-america/.

[38] Economic Development Administration, "Regional Technology and Innovation Hubs (Tech Hubs)," https://www.eda.gov/funding/programs/regional-technology-and-innovation-hubs.

[39] Stephen Ezell, "Testimony Before the Senate Small Business and Entrepreneurship Committee on Reauthorizing SBA's Innovation Programs" (ITIF, May 2019), https://itif.org/publications/2019/05/15/testimony-senate-small-business-and-entrepreneurship-committee-reauthorizing/.

70,000 patents and 700 public companies.[40] On average, SBIR-supported companies receive 10 patents each day—a testament to the innovative prowess of the more than 450,000 engineers and scientists working in companies that have been SBIR-supported.[41] Companies launched in part with SBIR support feature a "who's who" of some of America's most successful innovators, including 23andMe, Amgen, Apple, Biogen, Jarvik Heart, LIFT Labs, Millennium Pharma, Qualcomm, Symantec, iRobot, and countless others.[42]

Congressional policymakers failed to reauthorize the program before its expiration on September 30, 2025, leaving the future of large-scale small business and startup success in jeopardy. Congress should reauthorize the programs in new legislation while addressing some obvious issues, such as so-called SBIR mills, or companies that have become dependent on SBIR awards as a primary business model. For instance, Congress could cap the number of proposals any single small business may submit in response to any single Phase I or Phase II solicitation to no more than three proposals across the firm or limit businesses to no more than 25 proposals per year across all SBIR and STTR solicitations.[43] Congress could also cap the total award amount that a firm may receive from SBIR grants to $75 million.

Expand the use of innovation vouchers. The administration should consider working with Congress to expand the availability of innovation vouchers for small- to medium-sized enterprises (SMEs). Innovation vouchers are grants that enable SMEs to purchase services from universities, research institutions, or federal labs to stimulate innovation. These services may include assistance with conducting R&D, technology feasibility assessments, overcoming specific product development hurdles, product prototyping, lab validation, or other activities that are difficult for smaller businesses to undertake. Many innovation voucher programs have been adopted at the state level in the United States, including in Connecticut, New York, and New Mexico, as well as internationally in many European nations and Canada. In the United States, vouchers range from $25,000 to $50,000, while in Europe they range from €10,000 to €25,000.[44]

Innovation vouchers foster greater levels of the industry-academic collaboration necessary for knowledge transfer, while introducing SMEs to continuous R&D and innovation practices. As firms become more comfortable conducting R&D, the time required for product commercialization is reduced, inducing greater economic benefits.[45]

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[40] U.S. Small Business Administration, "Birth & History of the SBIR Program," https://www.sbir.gov/birth-and-history-of-the-sbir-program.

[41] U.S. House of Representatives, 110th Congress, "H. Rept. 110-595 - SBIR/STTR REAUTHORIZATION ACT," April 18, 2008, 4, https://www.congress.gov/congressional-report/110th-congress/house-report/595/1?s=1&r=62.

[42] Ezell, "Testimony Before the Senate Small Business and Entrepreneurship Committee on Reauthorizing SBA's Innovation Programs."

[43] Ezell, Ostertag, and Kann, "The Bayh-Dole Act's Role in Stimulating University-Led Regional Economic Growth."

[44] David Hart and Stephen Ezell, "Small Business Voucher Program Helps Accelerate Energy Innovation," *Crain's Cleveland Business*, July 1, 2018, https://www.crainscleveland.com/article/20180701/news/166766/personal-view-small-business-voucher-program-helps-accelerate-energy.

[45] OECD, "Innovation Vouchers," STIP Compass, 2025, https://stip.oecd.org/stip/interactive-dashboards/policy-instruments/Innovation_vouchers.

For the past several years, the National Renewable Energy Laboratory (NREL), Sandia National Laboratories (SNL), and Pacific Northwest National Laboratory (PNNL) have provided technical assistance to the recipients of Department of Energy (DOE) -funded voucher programs, namely American-Made Challenges (AMC), the Incubator Program, and the Small Business Vouchers Program. **This effort should be fully built out into a national program across the clean energy focused federal labs to drive strong relationships between entrepreneurs and the national labs to accelerate the roll-out of new technologies in U.S. clean energy sectors such as electric vehicle (EV) batteries and solar cells.**[46]

Expand the availability of Manufacturing Reinvestment Account. In Connecticut, small manufacturers receive a manufacturing reinvestment account, similar to a 401(k), where they may invest up to $100,000 of profits annually over five years. These accounts are 100 percent tax-exempt and may only be used for R&D-related expenses. Implementing these accounts on the federal level would allow small manufacturers to more easily afford R&D activities, with minimal cost to the government.[47]

(v) What empirically grounded findings from metascience research and progress studies could inform the federal grantmaking process to maximize ROI? Please provide specific examples of evidence-based reforms that could improve funding allocation, peer review, or grant evaluation.

A growing body of metascience studies can inform two key points of the federal grantmaking system: *what* and *how* it funds.

1. What the federal government funds:

(a) Longer, flexible, investigator-focused grants increase breakthrough output

Empirical evidence:

Azoulay et al. (2011) compare Howard Hughes Medical Institute (HHMI) investigator awards—long-term, flexible grants that tolerate early failure—to NIH R01 awards, which are shorter, milestone-driven, and more risk averse. The study finds that HHMI investigators produce high-impact articles at significantly higher rates than comparable NIH-funded scientists.[48]

Potential reform:

Dedicate a defined share of NIH/NSF extramural budgets (e.g., 10-20 percent) to investigator-focused awards that offer longer terms, flexible budgets, and broader mission statements rather than narrow specific aims.

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[46] Pacific Northwest National Laboratory, "Vouchers to Enable Laboratory and Organizational Collaboration for Innovation and Technology Improvements (VELOCITI) Round 6 - CRADA 639 (Abstract)," https://www.pnnl.gov/publications/vouchers-enable-laboratory-and-organizational-collaboration-innovation-and-0.

[47] "16-155, Additions – Manufacturing Reinvestment Accounts," CCH AnswerConnect, https://answerconnect.cch.com/document/jct012213e3667b5a1000a2e7002264f3fce801/state/explanations/connecticut/additions-manufacturing-reinvestment-accounts.

[48] Pierre Azoulay, Joshua S. Graff Zivin, and Gustavo Manso, "Incentives and Creativity: Evidence from the Academic Life Sciences" (Berkeley, March 10, 2011), https://faculty.haas.berkeley.edu/manso/hhmi.pdf.

This operationalizes the principle of funding people, not just projects, which empirical evidence suggests yields more transformative science.

2. How the federal government decides what to fund: Improving peer review

(a) Funding more highly novel projects

Empirical evidence:

A metascience review of existing studies found that standard peer review is biased against highly novel or interdisciplinary proposals, which are routinely penalized by reviewers, as reviewers discount ideas that are too unfamiliar or interdisciplinary (See: Tartari and Kolympiris, 2021; Ayoubi et al., 2021; Boudreau et al., 2016; Lane et al., 2021).[49]

Potential reform:

Create dedicated high-novelty tracks at NIH/NSF with panels explicitly instructed to reward novelty and be more tolerant of failure, evaluation frameworks that expect a mix of failures and successes, and a committed budget share for high-risk, high-reward proposals.

(b) Partial randomization to increase fairness when reviewer scores converge

Empirical evidence:

Research shows that in the mid-range, where many proposals are essentially indistinguishable in quality, reviewers are faced with the difficult task of selecting among these, which increases the risk of arbitrary decisions not based on scientific criteria that opens the door to biases. Partial randomization (lotteries) in this zone of proposals, complementing peer review, could provide an unbiased measure of fairness without harming scientific quality.[50]

Potential reform:

Implement tiered review in large NIH/NSF programs:

- **Tier 1:** Clearly outstanding, top rated, proposals – fund normally.
- **Tier 2:** All proposals above a quality threshold but not clearly rankable – **enter into a lottery**.
- **Tier 3:** Clearly noncompetitive – do not fund.

Start with pilots (e.g., small programs) and rigorously evaluate outcomes relative to traditional peer-reviewed programs.

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[49] Valentina Tartari and Christos Kolympiris, "Peer review for science funding: a review," https://www.nber.org/sites/default/files/2022-05/Peerreviewforsciencefunding.pdf.

[50] Sandra Bendisciol, "The troubles with peer review for allocating research funding" *EMBO Reports* Vol. 20, Issue 12 (December 5, 2019), https://pmc.ncbi.nlm.nih.gov/articles/PMC6893288/.

(vi) What reforms will enable the American scientific enterprise to pursue more high-risk, high-reward research that could transform our scientific understanding and unlock new tech, while sustaining the incremental science essential for cumulative production of knowledge?

Create megafunds for high risk R&D. In 1960, private-sector R&D was split one-third to research and two-thirds to development. Today, only one-fifth of firm R&D goes to research. One reason companies are moving away from basic and applied research is because of the risk involved in financing. In drug development, for example, it often takes years or decades and hundreds of millions of dollars to produce a profitable product. Individual companies and even venture capitalists often lack the appetite for such long-term, high-risk, high-reward investments.

This risk could be mitigated through large portfolios that aggregate and manage risk. Mutual funds, pension funds, and 401(k) retirement accounts work this way, and MIT economist Andrew Lo has proposed extending this idea by establishing "megafunds" that utilize financial engineering techniques to fund R&D in long-term, high-risk, high-payoff areas such as drug discovery for cancer or orphan diseases.[51] However, to date, no such megafunds have been created by the market. The government incentives required for the creation of these funds could include one or more approaches from four broad categories: research and investment data streams; clear rules for private foundation program-related megafund investments; federal credit support; and tax incentives for funds investing in technologies with high societal impact (for example through the establishment of schedules and values of basis point step-ups and penalties).

To promote the creation of R&D megafunds, the Trump administration should establish an office within the Department of Commerce to develop and implement the needed incentives and oversight. The office would be tasked with establishing the rules for the funds and coordinating with federal agencies and the private sector to identify the technical areas of national interest where private-sector engagement is needed and the incentives required. The office should work with researchers, industry, and regulators to develop data-reporting and transparency standards that promote the translation of research to the market, provide a better understanding of the societal benefits of research, and an efficient data stream for regulation, and coordinate with federal funding agencies to enforce the provision and collection of such data.[52]

Continue to support the existing HRHR programs across government. Several government agencies have programs designed to fund HRHR research, which often have high costs but can yield high ROI. The NIH Common Fund includes an HRHR portfolio designed to invest solely in these more expensive investments, and the several ARPA offices in the DOE, Department of War, Department of Health and Human Services, and Department of Transportation have a similar purpose. The administration should refrain from cutting these programs as a short-term cost-saving measure and instead focus on the long-term returns they provide. The Trump administration should continue to empower these agencies to fund HRHR research.

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[51] Jose-Maria Fernandez, Roger Stein, and Andrew Lo, "Commercialization Biomedical Research Through Securitization Techniques," *Nature Biotechnology* 30 (2012), https://www.nature.com/articles/nbt.2374.

[52] Ezell and Andes, "Localizing the Economic Impact of Research and Development: Policy Proposals for the Trump Administration and Congress."

(vii) How can the federal government support novel institutional models for research that complement traditional university structures and enable projects that require vast resources, interdisciplinary coordination, or an extended timeline?

The Financial Accountability in Research Model (FAIR). Under the current federal research funding mechanism for research institutions, institutions are paid for their research costs under two different categories: direct research costs, which include the cost of project materials, researchers, and payments to research participants, and indirect research costs, including the costs of utilities, leases, operations, and other facility expenses supporting research activities. Indirect costs are paid to the institution at a negotiated reimbursement rate that has not been adjusted in recent years and therefore does not account for the increase in regulatory and administrative costs for researchers. Thus, researchers are often reimbursed far below the true value of indirect research costs, placing an extra financial burden on research institutions.[53]

The Financial Accountability in Research (FAIR) Model improves on the current system by requiring all research institutions to classify all costs for each project they undertake as research performance costs (formerly direct costs) and essential research performance support and general research operations (formerly indirect costs). These changes increase the transparency for the government by outlining exactly what services are being funded, and ensures that research institutions are funded for their complete research costs, rather than just a small fraction. **The administration should work with Congress to implement the FAIR Model for all agencies that award grant funding.**[54]

Focused Research Organizations (FROs). Traditional academic structures excel at investigator-driven discovery but struggle with projects that require large-scale coordination, extended timelines, or shared research infrastructure. Novel institutional models could fill this gap. The federal government can support Focused Research Organizations (FROs)—non-profit entities designed to tackle large, complex research challenges and produce public goods (tools, datasets, platforms) and fall outside the scope of a single academic lab, company, or informal consortium.[55]

Historical examples include the Large Hadron Collider and the Human Genome Project—efforts too large and too uncertain for individual labs or early-stage companies, not immediately lucrative enough for industry to undertake, yet essential for scientific progress.[56]

In biopharma, FROs could tackle pre-competitive challenges too big for one company. One current example, supported by Convergent Research, an incubator for FROs, aims to map the pharmome—identifying all unintended targets of approved small-molecule drugs.[57] The public benefits include better safety

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[53] Association of American Universities, "The Financial Accountability in Research (FAIR) Model," September 30, 2025, https://www.aau.edu/key-issues/financial-accountability-research-fair-model.

[54] Ibid.

[55] Alice Wu, "Focused Research Organizations: A New Model for Scientific Research," *Federation of American Scientists*, June 15, 2023, https://fas.org/publication/focused-research-organizations-a-new-model-for-scientific-research/.

[56] CERN, "The Large Hadron Collider,"2025, https://home.cern/science/accelerators/large-hadron-collider; NIH, "The Human Genome Project," last updated March 19, 2025, https://www.genome.gov/human-genome-project.

[57] Convergent Research, "A Mission Control For Frontier Technology," https://www.convergentresearch.org/; EvE Bio, "Mapping the Pharmome," 2025, https://evebio.org/.

pharmacology profiling, new drug repurposing opportunities, and better training data for AI drug development models.

NSF's initiative, Tech Labs, announced December 12, 2025 to launch and scale a new generation of transformative independent research organizations to advance breakthrough science is an important step in this direction.[58] Most federal science funding takes the form of small, project-based grants to individual scientists at universities, but a more diversified funding portfolio, with initiatives such as Tech Labs (with $10-50 million/year awards per team, 5+ year commitments, and measuring impact through advancement up the Tech Readiness Level scale rather than papers published) is key as research today is increasingly team-based, interdisciplinary, and infrastructure-intensive, needing institutional support, and cannot be done only through the traditional funding model of a series of grant projects.

(viii) How can the Federal government leverage and prepare for advances in AI systems that may transform scientific research—including automated hypothesis generation, experimental design, literature synthesis, and autonomous experimentation? What infrastructure investments, organizational models, and workforce development strategies are needed to realize these capabilities while maintaining scientific rigor and research integrity?

One of the most effective ways the federal government can prepare for AI-driven advances in scientific research is by ensuring that emerging automation capabilities are translated into widely usable research infrastructure. **A key priority should be supporting the adoption of self-driving labs (SDLs), which use AI and robotics to autonomously design, execute, and interpret experiments**. SDLs directly increase scientific productivity by replacing slow, manual trial-and-error workflows with automated experimental loops. This is especially important in materials science, where progress remains rate-limited by the need to fabricate and test large numbers of physical samples because material behavior cannot be reliably predicted in advance. By automating experimentation and continuously feeding results back into models, SDLs allow researchers to explore larger design spaces more quickly while generating standardized, reproducible data.

While promising SDL systems already exist, ensuring their broad adoption as routine research infrastructure will require sustained public support. Materials science, in particular, has seen slower diffusion than related fields such as chemistry, where automated synthesis and high-throughput experimentation are more established. This reflects the long timelines from discovery to deployment in materials, which reduce private incentives to invest in capital-intensive automation despite large long-term returns. Targeted public funding can ensure these capabilities scale.

Policymakers should ensure broad adoption by pursuing public funding models that de-risk early deployment and make self-driving labs accessible beyond a small number of well-resourced institutions. One approach is an ARPA-E–style Grand Challenge that competitively funds teams to build and demonstrate SDLs capable of delivering measurable advances in materials discovery. This would accelerate technical progress while establishing proof points for SDLs as durable national infrastructure. In parallel, policymakers should support Focused Research Organizations to develop modular, open-source hardware and software components that

[58] National Science Foundation, "NSF announces new initiative to launch and scale a new generation of transformative independent research organizations to advance breakthrough science," press release, December 12, 2025, https://www.nsf.gov/news/nsf-announces-new-initiative-launch-scale-new-generation.

lower costs, enable interoperability, and make SDLs easier to replicate and adapt across labs. Together, these models would move SDLs from isolated demonstrations into widely usable research infrastructure.

(ix) What specific federal statutes, regulations, or policies create unnecessary barriers to scientific research or the deployment of research outcomes? Please describe the barrier, its impact on scientific progress, and potential remedies that would preserve legitimate policy objectives while enabling innovation?

Develop a Phase Zero grant award program within major federal research agencies. When the SBIR and STTR programs were still active, they both supported innovation, but required high approval standards for early-stage companies. There was often insufficient funding available at universities (or from other sources) to advance nascent technologies to the point at which these companies were positioned to receive an SBIR or STTR grant. The problem was that researchers and universities lacked the resources to support the proof-of-concept work, market analysis, and mentoring needed to translate ideas and nascent technologies from the university laboratory into a commercial product.

A national "Phase Zero" proof-of-concept program would not only help more projects cross the "valley of death," but would also help enhance the infrastructure (e.g., expertise, personnel, support, small business, and venture capital engagement) and facilitate the cultural change necessary for universities, federal laboratories, and other non-profit research organizations to support commercialization activities.

America's competitors have recognized the need for such an instrument. For instance, the European Research Council (ERC) has announced a new proof-of-concept funding initiative to help bridge the gap between ERC-funded research and the earliest stage of marketable innovations.[59] These awards can be as high as $215,000 for individual researchers, in total, equivalent to about 1 percent of ERC's budget.[60] Here in the United States, the Wallace H. Coulter Foundation has established Translational Research (for individual researchers) and Translational Partnership (for institutions) Awards for proof-of-concept research in biomedical engineering.[61] The Translational Research Awards are made in amounts of approximately $100,000 per year, while the university grants have a duration of five years at over $500,000 per year.

Similarly, NIH's Research Evaluation and Commercialization Hub (REACH) program fosters the development of therapeutics, preventatives, diagnostics, devices, and tools that address diseases within NIH's mission in a manner consistent with business case development. The work supported by the REACH program may include technical validation, market research, clarification of IP position and strategy, and investigation of commercial or business opportunities.[62] Finally, a number of states, such as Kentucky and Louisiana, have developed Phase Zero grants to help firms apply for SBIR grants and support early proof-of-

[59] European Research Council, "Proof of Concept Grants," https://erc.europa.eu/proof-concept.

[60] Gretchen Vogel, "Europe Nudges Top Scientists to Market," *Science*, March 25, 2011, http://www.sciencemag.org/news/2011/03/europe-nudges-top-scientists-market.

[61] Wallace H. Coulter Foundation, "Translational Research" (Miami, Fla., 2016), www.whcf.org/partnership-award/overview.

[62] Department of Health and Human Services, "National Institute of Health Evaluation and Commercialization Hub (REACH) Awards" (2014), http://grants.nih.gov/grants/guide/rfa-files/RFAOD-14-005.html.

concept research. **One way for the federal government to implement such a proof-of-concept program would be through a grant program for states that agree to match the funds dollar-for-dollar.**

(x) How can Federal programs better identify and develop scientific talent across the country, particularly leveraging digital tools and distributed research models to engage researchers outside traditional academic centers?

If the United States is to significantly revitalize America's scientific enterprise, it needs to take further steps to ensure it has the workforce to support expanded U.S. scientific and technical output. That's especially the case as analysts expect the demand for tech talent to grow to 7.1 million tech jobs by 2034 in the United States, from an estimated six million in 2023.[63] Another report by the Semiconductor Industry Association (SIA) finds that, by the end of 2030, an estimated 3.85 million additional jobs requiring proficiency in technical fields will be created in the United States, but that, "Of those, 1.4 million jobs risk going unfilled unless we can expand the pipeline for such workers in fields such as skilled technicians, engineering, and computer science."[64] For the semiconductor industry, the report estimates that roughly 67,000—or 58 percent of projected new jobs (and 80 percent of projected new technical jobs)—risk going unfilled at current degree completion rates.[65] The administration should lead in several efforts to enhance U.S. workforce skilling, including:

Expand Advanced Technological Education (ATE) program funding. Skilled technicians are a key component of the traded sector workforce. One highly successful program designed to build technician skills is NSF's Advanced Technological Education program, which supports community colleges working in partnership with industry, economic development agencies, workforce investment boards, and secondary and other higher education institutions.[66] ATE projects and centers are educating technicians in a range of fields, including nanotechnologies and microtechnologies, rapid prototyping, biomanufacturing, logistics, and alternative fuel automobiles. Notwithstanding this, ATE funding is quite small, at approximately $74 million in FY 2025.[67] The Trump administration should work with Congress to double ATE funding to at least $150 million per year.

Expand the Manufacturing Engineering Education Program (MEEP). The engineering curricula at too many American universities is overly academic as opposed to industry focused. Indeed, university engineering programs have evolved in two troubling directions over the past several decades. First, the focus on "engineering as a science" has increasingly moved university engineering education away from a focus on real

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[63] Nate Paynter et al., "Navigating the tech talent shortage" (Deloitte, June 2024), https://www.deloitte.com/us/en/insights/topics/talent/overcoming-the-tech-talent-shortage-amid-transformation.html.

[64] Semiconductor Industry Association (SIA), "Chipping Away: Assessing and Addressing the Labor Market Gap Facing the U.S. Semiconductor Industry" (SIA, July 2023), 5, https://www.semiconductors.org/wp-content/uploads/2023/07/SIA_July2023_ChippingAway_website.pdf.

[65] Ibid.

[66] Stephen Ezell and Robert D. Atkinson, "Fifty Ways to Leave Your Competitiveness Woes Behind: A National Traded-Sector Competitiveness Strategy" (ITIF, September 2012), https://itif.org/publications/2012/09/20/fifty-ways-leave-your-competitiveness-woes-behind-national-traded-sector/.

[67] U.S. National Science Foundation, "NSF 24-584: Advanced Technological Education (ATE)," (accessed December 8, 2025), https://www.nsf.gov/funding/opportunities/ate-advanced-technological-education/nsf24-584/solicitation.

problem solving toward more abstract engineering science. Second, this focus on "engineering as a science" has left university engineering departments more concerned with producing pure knowledge than working with industry to help them solve real problems.

That's why ITIF has argued that the United States needs more "manufacturing universities," which would revamp their engineering programs and focus much more on manufacturing engineering and in particular work that is more relevant to industry. This would include more joint industry-university research projects, more student training that incorporates manufacturing experiences through co-ops or other programs, and a Ph.D. education program focused on turning out more engineering graduates who work in industry. These universities would view Ph.D.s as akin to high-level apprenticeships (as they often are in Germany), where industry experience is required as part of the degree. Likewise, criteria for faculty tenure would consider professors' work with and/or in industry as much as their number of scholarly publications. In addition, these universities' business schools would integrate closely with engineering and focus on manufacturing issues, including management of production.

One model for these manufacturing universities is the Olin College of Engineering in Massachusetts, which reimagined engineering education and curriculum to prepare students "to become exemplary engineering innovators who recognize needs, design solutions, and engage in creative enterprises for the good of the world."[68]

Congress implemented a form of these proposals when it passed the Manufacturing Engineering Education Program into law in December 2016 as part of the 2017 National Defense Authorization Act (NDAA), authorizing the Department of Defense to support industry-relevant, manufacturing-focused, engineering training at U.S. institutions of higher education, universities, industry, and not-for-profit institutions. With its $48 million in initial funding, MEEP made awards to 13 educational and industry partners to bring educational opportunities to Americans interested in learning manufacturing skills critical to sustaining the U.S. defense innovation base.[69] In 2023, MEEP issued additional three-year funding grants "that establish programs or enhance existing programs to better position the manufacturing workforce to produce military systems and components that assure technological superiority for DoD."[70]

MEEP can be a powerful initiative, but it is underfunded and has become too solely focused on engineering in the national defense context. Therefore, the Administration should work with Congress to broaden the MEEP remit to refocus it more on supporting industry-relevant, applied engineering programs at leading universities**. Congress should allocate $150 million annually to a revitalized MEEP program that would make grants to 20 engineering programs at leading U.S. universities to redirect them toward more hands-on, industrially relevant engineering activities.**

[68] Ezell and Atkinson, "Fifty Ways to Leave Your Competitiveness Woes Behind: A National Traded-Sector Competitiveness Strategy."

[69] U.S. Department of War STEM, "Our partners: Manufacturing Engineering Education Program Grantees," https://dodstem.us/about/partners/?tab=grantees.

[70] Ibid.

(xi) How can the fed government foster closer collaboration among scientists, engineers, and skilled technical workers, and better integrate training pathways, recognizing that breakthrough research often requires deep collaboration between theoretical and applied expertise?

Establish an Office of Innovation Review. Because federal agencies often propose regulations with little consideration given to their effect on innovation, Congress should task the Office of Management and Budget's Office of Information and Regulatory Affairs with creating an Office of Innovation Review (OIR) to review proposed regulations to determine their effect not just on costs in the short term but also on innovation over the long term. OIR would have the specific mission of being the "innovation champion" within agency rule-making processes.[71] It would have authority to push agencies to either affirmatively promote innovation or to achieve a particular regulatory objective in a manner least damaging to innovation. OIR would be authorized to propose new agency actions and to respond to existing ones and could incorporate a "competitiveness screen" in its review of federal regulations that affect globally traded industries.[72]

(xii) What policy mechanisms would ensure that the benefits of federally-funded research, including access to resulting tech, economic opportunities, and improved quality of life, reach all Americans?

Withdraw the NIH Intramural Research Program Access Planning Policy. On January 10, 2025, in one of the Biden administration's final actions, the National Institutes of Health (NIH) issued an Intramural Research Program (IRP) Access Planning Policy whose objective was to "expand equitable patient access to products that emerge from NIH-owned patents."[73] The directive required "organizations applying to NIH for certain commercial patent licenses to submit Access Plans to NIH outlining steps they intend to take to promote patient access to those licensed products."[74] Pricing was a central focus of the Access Planning Policy, the guidance noting that ways applicants could "promote equitable access and affordability in product deployment" could include by "Committing to keep prices in the U.S. equal to those in other developed countries" or by "Committing to price reductions once preset sales, revenue, or profit thresholds are reached."[75]

But bringing a drug to market represents a complex, risky, lengthy, and costly process that can take 14 or more years at costs measured in the billions of dollars. The notion that a small start-up licensing prospective IP in the form of a novel chemical compound from a university is in any kind of position to reliably price a potentially resulting product over a decade and hundreds of millions, if not billions, in further development and clinical trials costs is simply not realistic. (And the same goes for many products beyond drugs.) Requiring licensees to accurately predict years in advance how a product resulting from a licensed IP would be priced would stifle U.S. biopharmaceutical innovation. **Therefore, the Trump administration should direct**

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[71] Stuart Benjamin and Arti Rae, "Structuring U.S. Innovation Policy: Creating a White House Office of Innovation Policy" (ITIF, 2009), http:// www.itif.org/files/WhiteHouse_Innovation.pdf.

[72] Ezell and Andes, "Localizing the Economic Impact of Research and Development: Policy Proposals for the Trump Administration and Congress."

[73] National Institutes of Health (NIH), "NIH Intramural Research Program Access Planning Policy," Notice NOT-OD-25-062, (NIH, January 10, 2025), https://grants.nih.gov/grants/guide/notice-files/NOT-OD-25-062.html.

[74] Ibid.

[75] Ibid.

the NIH to withdraw its Intramural Research Program Access Planning Policy and also ensure that similar requirements aren't promulgated across other federal agencies.[76]

The advancement of transformative scientific breakthroughs requires more than robust R&D funding—it also depends on a comprehensive policy framework that supports both innovation and timely deployment.

Innovative U.S. companies have pioneered the breakthrough technology of multi-cancer early detection (MCED), developing diagnostic tests that can reliably screen for the presence of more than 50 types of cancer from a simple blood draw. MCED is poised to transform the world's cancer screening paradigm—which is vitally important when one in two women, and one in three men, are likely to develop cancer at some point in their lifetimes.[77] Unfortunately, the United States has lagged in crafting a policy environment supporting MCED adoption and encouraging innovation.

Current Medicare statutes create the most significant barrier to deployment of breakthrough medical technologies by requiring explicit congressional authorization for each new category of preventive screening, regardless of U.S. Food and Drug Administration (FDA) approval status. For MCED technologies this statutory gap prevents Medicare beneficiaries from accessing FDA-approved tests despite their transformative potential. The barrier's impact extends beyond patient access: it weakens incentives for continued private-sector investment in high-risk medical research and risks ceding American leadership in precision medicine to foreign competitors, namely China.[78]

The United States simply can't afford to squander its lead in MCED by allowing regulatory roadblocks to remain in the way of the industry's further development. The bipartisan Medicare Multi-Cancer Early Detection Screening Coverage Act (H.R. 842/S.339) offers a practical remedy by establishing an evidence-based pathway for coverage of FDA-approved breakthrough technologies while preserving CMS's authority to determine appropriate coverage parameters. These reforms are consistent with the approach taken by Congress with colonoscopy screening—which ultimately paved the way for tremendous progress America has achieved in the screening of colon cancers. Importantly they would maintain rigorous safety and efficacy standards while eliminating arbitrary delays that currently separate regulatory approval from patient access, thereby strengthening the entire innovation ecosystem from basic research through clinical deployment.

(xiii) How can the federal gov strengthen research security to protect sensitive technologies and dual-use research while minimizing compliance burdens on researchers?

Create tiered risk categorizations for technologies. In practice, the current system for research security often relies on broad, compliance-heavy requirements that are not consistently tiered to the actual sensitivity of the research or the threat environment. The federal government does not use a single, unified definition of "sensitive technology" or "dual-use"; instead, it operationalizes sensitivity through multiple, partially

[76] Stephen Ezell, "Comments to OMB Regarding Deregulation" (ITIF, May 12, 2025), https://itif.org/publications/2025/05/12/comments-to-omb-regarding-deregulation/.

[77] Stephen Ezell, "Seizing the Transformative Opportunity of Multi-cancer Early Detection" (ITIF, April 2021), https://itif.org/publications/2021/04/19/seizing-transformative-opportunity-multi-cancer-early-detection/.

[78] Stephen Ezell, "America Can't Afford to Lose the Early Cancer Detection Race to China," *Innovation Files*, December 9, 2024, https://itif.org/publications/2024/12/09/america-cant-afford-to-lose-the-early-cancer-detection-race-to-china/.

overlapping regimes. The current model defines these categories primarily through export-control lists (the Export Administration Regulation's Commerce Control List and the International Traffic in Arms's U.S. Munitions List) and a few domain-specific oversight regimes (e.g., the U.S. Government Policy for Oversight of Dual-use Research of Concern and Pathogens with Enhanced Pandemic Potential in the life sciences). However, these mechanisms are anchored mainly to known items, agents, or reasonably foreseeable misuse pathways, rather than systematically tiering basic research areas by how they might become dual-use over time; this can leave emerging risks underappreciated, and some disciplines may not view themselves as part of the research/security problem set.

The centralization of risks through tiered categorization is needed precisely because of the political economy in scientific communities and research organizations/universities. There is little incentive to self-assess that basic research, far away from practical dual-use applications, can build rival countries' capacities. Yet, this happens in practice. For example, basic research on how bacteria defend themselves from viruses helped enable CRISPR gene editing, which is now widely treated as biosecurity-relevant because it can lower barriers to modifying organisms, including potentially harmful ones; likewise, open computer-vision and machine-learning research has been incorporated into military intelligence/surveillance and targeting support.

Develop security assessment guidelines. Research scrutiny is heavily focused on projects that receive federal funding, but most R&D is driven by private investment. Although screening and organizational risk assessments for defense contractors generally work as intended, they tend to overlook private R&D in areas with capabilities that could be used for dual purposes but are currently business-oriented. For example, robotics for household use or software-heavy R&D.

A simple solution to this problem would be to introduce security assessment guidelines for companies applying for the widely used R&D tax incentive. In other words, to qualify for tax benefits for private R&D, applicants should meet a basic set of security standards, such as those established by the Federal Bureau of Investigation or the Department of Homeland Security.

Assemble the interagency research security working group. The interagency research security working group was established under the National Science and Technology Council and authorized by the National Defense Authorization Act of 2020 to enforce the continued implementation of NSPM-33, which instituted requirements for disclosure and research security infrastructure for research recipients. OSTP should regularly convene the interagency research security working group to ensure that NSPM-33 continues to be implemented across all government agencies and that security measures are coordinated and harmonized across government.

Another potentially effective research security model would borrow from cybersecurity concepts to shift away from today's largely binary, front-loaded approach to vetting researchers and **move toward a more robust endpoint security and zero-trust architecture model.** Currently, universities assess research security risk most heavily at the hiring stage, which requires high amounts of compliance and often results in a go/no-go decision that either blocks talent entirely or assumes low risks thereafter.

A zero-trust–inspired framework could instead allow broader participation while segmenting access based on risk and sensitivity, asking explicitly what data, tools, or research outputs a university is comfortable exposing if compromised. This means continuous checks throughout the research lifecycle, including in the laboratory,

collaborations, access, and offboarding, rather than concentrating compliance on individual disclosures. Such an approach would reduce friction for researchers and might increase overall compliance resources, but would better shift that responsibility to universities without choking off openness or talent.

CONCLUSION

The Information Technology and Innovation Foundation commends the Trump administration for working to reform and accelerate the American scientific enterprise. The success of this effort will be vital to enhancing the global competitiveness of U.S. science and technology over the coming decade.

Thank you for your consideration.

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