U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HEARING CHARTER

"*The United States, China and the Fight for Global Leadership: Building a U.S. National Science and Technology Strategy*"

Tuesday, February 28, 2023
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

Purpose

On Tuesday, February 28, 2023, the Science, Space, and Technology Committee will hold a hearing to examine the current state of the United States' science and technology enterprise and how it is impacting our global leadership, as well as threats to that leadership from the Chinese Communist Party (CCP). This hearing will examine the CCP's attempts to surpass U.S. scientific leadership and the economic and national security implications that it has for America. It will also serve as an opportunity to discuss and identify key objectives for a U.S. National Science and Technology Strategy and quadrennial review to ensure the United States' continued growth and competitiveness.

- **Dr. Kelvin Droegemeier**, Regents' Professor of Meteorology and Weathernews, Chair Emeritus Roger and Sherry Teigen Presidential Professor, University of Oklahoma and Former Director, White House Office of Science and Technology Policy
- **Ms. Deborah Wince-Smith**, President and CEO, Council on Competitiveness
- **Dr. Kim Budil**, Director, Lawrence Livermore National Laboratory
- **Mr. Klon Kitchen**, Senior Fellow, American Enterprise Institute

Overarching Questions

- What is the current state of U.S. leadership in science and technology (S&T), and what is the outlook for continued leadership, particularly in areas of S&T that will help drive economic competitiveness and national security in the coming decade? Why is it important for the U.S. to maintain leading capabilities in both fundamental research and technology development, and what are the consequences of loss of leadership, especially to China?
- What makes the U.S. S&T ecosystem of government, academia and industry unique in the world, and how can we continue to use that system to our competitive advantage?
- What are the benefits to having a National Science and Technology Strategy? What are the key characteristics of a National Science and Technology Strategy that will ensure it is adopted and utilized by the U.S. S&T ecosystem and leads to the public and private sectors working together to ensure America's S&T dominance?

NATIONAL S&T STRATEGY AND QUADRENNIAL REVIEW

First proposed in Chairman Lucas' "Securing Leadership in Science and Technology Act" (SALSTA) in 2019, the CHIPS and Science Act of 2022[1] directed the Office of Science and Technology Policy (OSTP) to develop a 4-year comprehensive national S&T strategy, primarily focused on economic security, and consistent with other relevant federal strategies such as the National Defense Strategy or National Security Strategy. Additionally, the legislation requires OSTP to conduct a quadrennial review of the science and technology enterprise. This quadrennial review will serve as a comprehensive examination of U.S. science capacity and make informed policy and investment recommendations in areas such as industrial innovation, STEM workforce, tech transfer, regional innovation, and U.S. research leadership.

These strategies will not only provide useful context for policymakers to shape national priorities, but also inform the strategic framework for making federal investment decisions – a tactic many countries already employ. A successful strategy will balance competing ideas from various stakeholders while also identifying ways to ensure buy-in from public and private entities. Both the quadrennial review and the S&T strategy will serve as a tool for furthering U.S. leadership in science and technology.

U.S. RESEARCH & INNOVATION LANDSCAPE

Background

Since the 18th century, the relationship in the United States between science, technology, research and development has been a close one, as Americans created a decentralized system for the advancement of scientific innovation by combining federal government backing of basic research with university and privately funded research. For decades, that system has helped America lead the world in science and technology innovation, driving economic growth, addressing national priorities, and improving the health and quality of life of Americans.

More than half of the economic GDP growth in the United States during the first half of the twentieth century has been due to scientific and technological advancements.[2] A primary driver of future economic growth and job creation will be innovation that is made possible through advances in science and engineering.[3] Scientific discovery has also allowed the U.S. to maintain strategic military advantages. The U.S. investment in research and innovation allowed the U.S. to become the strongest economy in the world.[4] The federal government supports scientific and technological advancement directly by funding and performing R&D and indirectly by creating and maintaining policies that encourage private sector efforts.

Research is generally categorized as either "basic" or "applied," with the former seeking to produce new knowledge without any specific application in mind, and the latter focusing on addressing a more specific problem or need. According to the American Academy of Arts and Sciences, basic research lies behind every new product brought to market, every new medical device or drug, every new defense and space technology, and many innovative business practices.[5]

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[1] P.L. 117-167
[2] R.M. Solow, Technical Change and the Aggregate Production Function. Review of Economics and Statistics, 39: 312-320, 1957.
[3] Vest, C.M., 2010, *Rising Above the Gathering Storm Revisited: Rapidly Approaching Category 5*, National Academy of Sciences at https://www.nap.edu/read/12999/chapter/2
[4] Tripp, Simon, 2013, *The Impact of Genomics on the U.S. Economy*, Batelle Memorial Institute, at https://www.unitedformedicalresearch.org/wp-content/uploads/2013/06/The-Impact-of-Genomics-on-the-US-Economy.pdf
[5] Restoring the Foundation: The Vital Role of Research in Preserving the American Dream. (n.d.). Retrieved from https://www.amacad.org/sites/default/files/publication/downloads/AmericanAcad_RestoringtheFoundation.pdf

U.S. R&D Expenditures

The most recent estimate of total U.S. research and development (R&D) spending was $720.9 billion in 2020, [6] an amount greater than any other country and more than a quarter of the global total. While the private sector funds and performs the majority of U.S. R&D, the Federal government has been the leading source of support for basic research, often funding R&D in areas that industry lacks strong incentives to fund as well as areas of critical importance to national security. In 2019, basic research activities comprised $102.9 billion (15%) of the total of U.S. R&D expenditures, followed by applied research at $132.0 billion (20%) and $432.0 billion (65%) for experimental development.[7]

The business sector has accounted for most of the growth in total U.S. R&D over the last decade. According to the National Center for Science and Engineering Statistics (NCSES) at the National Science Foundation (NSF), in 2010, businesses invested $248 billion in R&D, compared to $127 billion by the Federal government. In 2019, these numbers rose to $464 billion and $139 billion, respectively, which means the business sector now accounts for 73 percent of all U.S. R&D. The remainder of R&D funding comes from states, foundations, nonprofit organizations, and universities' institutional funds.

Global R&D Expenditures and U.S. Competitiveness

The global total of R&D expenditures continues to rise at a substantial pace. The NCSES's latest estimate puts the worldwide total at $2.4 trillion (current PPP dollars) in 2019.[8] In 2010, it was estimated at $1.416 trillion, and in 2000, the estimate was $722 billion. This nearly threefold expansion over nearly two decades reflects, in part, the escalating knowledge intensity of economic competition among the world's nations—as well their individual desires to harness advances in science and technology to improve their own economies and indicators of their societal well-being.[9] Asian countries, most notably China, have heavily contributed to the overall increase in worldwide R&D expenditures – a notable shift in the global concentration of R&D performance from the United States and Europe to East-Southeast Asia and South Asia.[10]

While the U.S. remains the largest R&D performer, its share of global R&D has declined substantially. From 1960 to 2020, the U.S. share of global R&D fell from 69 percent to 31percent.[11] This decline resulted from rapid growth in public and private R&D spending by other nations, even as U.S. R&D expenditures since 1960 have grown more than 37 times in current dollars. However, China has rapidly become the second largest R&D performer, accounting for 24.8 percent of global R&D in 2020, up from 4.9 percent in 2000.[12]

China poses an especially formidable and growing strategic challenge. The CCP has exhibited dramatic growth in its investment in R&D, 13% in 2019 alone and nearly tripling between 2000 and 2019.[13] The CCP is pursuing aggressive plans to dominate the next generation of technology. National policies—such

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[6] U.S. Congressional Research Service. *Global Research and Development Expenditures: Fact Sheet* (R44283; September 14, 2022), by John F. Sargent, Jr. Accessed February 21, 2023 at https://crsreports.congress.gov/product/pdf/R/R44283

[7] National Science Board, National Science Foundation. 2022. *Research and Development: U.S. Trends and International Comparisons. Science and Engineering Indicators 2022*. NSB-2022-5. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20225/.

[8] *Id.*

[9] National Science Board, National Science Foundation. 2020. *Science and Engineering Indicators 2020: The State of U.S. Science and Engineering*. NSB-2020-1. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20201/.

[10] National Science Board, *supra* note 6.

[11] U.S. Congressional Research Service, *supra* note 5.

[12] *Id.*

[13] Hourihan, M. & Zimmerman, A. (2022, January 19). Some Key Takeaways From NSF's "State of the Science" Report. Retrieved February 23, 2023. Available at https://www.aaas.org/news/some-key-takeaways-nsfs-new-state-science-report.

as the Made in China 2025 Plan and 1000 Talents program—are concerted efforts to cultivate indigenous technological innovation, backed by commitments for hundreds of billions of dollars in investment. However, the R&D priorities of the U.S. and the CCP are very different. In the United States, 17 percent of R&D expenditures goes towards funding basic research compared to only 6 percent in China. The CCP is much more focused on R&D development which accounts for 84 percent of their R&D portfolio compared with only 64 percent in the United States.[14] This focus on technology development has resulted in China surpassing the U.S. in 2011 to become the leader in knowledge- and technology- intensive manufacturing.[15]

Federally Funded Research and Development Centers (FFRDCs)

FFRDCs, which includes the Department of Energy National Laboratories, play an important role in our R&D enterprise, supporting large-scale, long-term R&D, including through the construction of major user facilities in key technology areas, including computing and biotechnology. The work conducted at the FFRDCs covers a wide spectrum of applications as well, from truly open basic research to highly classified national security projects. Some of the fastest supercomputers in the world are housed in the DOE National Laboratory Complex, providing insight into some of today's most pressing scientific questions. Advanced light sources at the labs are also providing discoveries that have broad industrial impacts in the fields of molecular science and advanced materials research. FFRDCs are privately operated R&D organizations that are exclusively or substantially funded by the federal government. In 2021, the federal government funded $24.5 billion (98.4%) of R&D expenditures across 43 FFRDCs.[16] Because they are distributed across the country, including states and regions that are generally not among the highest in research and innovation capacity, they also serve an important role in local economic development and in providing STEM education and research experiences to students who might otherwise not have such access.

University R&D Investment

The United States has long been home to many of the world's leading research institutions. In 2019, U.S. universities performed a total of $83.7 billion in R&D from all sources, including $39.5 billion in Federally funded R&D. The share of academic R&D funded by Federal agencies declined from 60 percent in 2010 to 50 percent in 2019.[17] Other sources of funding include institutional funds, industry, and foundations. University research advances foundational knowledge in science and technology. Universities are also the source of thousands of spin-off companies that contribute to regional economic development and job creation. Such spin-offs are primarily clustered in geographic proximity to the university.

Public-Private Partnerships

There are many partnerships between the government (including national labs), universities, and the private sector, and the Committee on Science, Space, and Technology often explores the nature of those partnership models - what works, what can be expanded, and what new models may be viable. Such partnerships require a sustained commitment by all parties and new ways of partnering as new challenges and opportunities arise. They also require new thinking as to who the partners must include. There is increasing focus on bringing to the table non-traditional partners, including local governments and community organizations, civil society organizations, labor organizations, and others who might be users of, or might be affected by, the research being carried out.

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[14] *Id.*
[15] *Id.*
[16] Gibbons MT; National Center for Science and Engineering Statistics (NCSES). 2022. *Federally Funded R&D Centers Report 6% Increase in R&D Spending in FY 2021*. NSF 22-334. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf22334/.
[17] National Science Board, *supra* note 6.

Beyond the overall investment figures, key policy issues and challenges present barriers to capitalizing on R&D expenditures. For instance, some observers have described a "valley of death" between basic research conducted at U.S. universities and the commercialization activities typically carried out by industry, since universities generally do not have the means of production necessary to take the results of initial research and generate marketable products. According to the American Academy of Arts and Sciences, the pace of American innovation–translation of discoveries and inventions from laboratory research to products must accelerate for the U.S. to remain competitive.[18] Closer cooperation among industry, government, and academia could increase technology transfer, stimulate innovation, lead to new products and processes, and expand markets.[19]

U.S. STEM Workforce

Since World War II, the United States has benefitted from the social, economic, health, and military advances made possible, in part, by a highly skilled STEM workforce. Today, a wide range of U.S. occupations in STEM and non-STEM fields either require or benefit from workers with STEM skills and knowledge. Science and technology skills will continue to be as important in the future as they were in the past, if not more so. As such, widespread STEM literacy, as well as specific STEM expertise, are critical human capital competencies for the 21st century. The United States is falling behind other nations in the production of total STEM degrees after having been the world leader in educational attainment for several decades after World War II.[20]

To remain competitive, the U.S. needs flexible STEM-capable workers at every education level. The need for U.S. workers with STEM skills is heightened in today's global economy and is projected to increase in the future. According to the Science and Engineering Indicators Report of 2022, the STEM workforce in the United States—made up of occupations like software developers, computer system analysts, chemists, mathematicians, economists, research scientists, STEM teachers and engineers—has grown rapidly and now constitutes 23% (about 36 million) of all U.S. jobs.[21] This includes 17 million workers that comprise the skilled technical workforce who use science and engineering expertise and technical knowledge but do not hold bachelor's degrees.[22]

The National Science Board, in its Vision 2030 report, has concluded that to maintain its global leadership in science and technology research and development, the United States must continue to cultivate a diverse workforce by expanding domestic talent and continuing to attract and retain global talent. The pressure on the U.S. talent pipeline is heightened by the rapid increase in the CCP's STEM workforce. According to the most recent estimates, the United States awarded nearly 1.1 million S&E first university degrees in 2019, broadly equivalent to a bachelor's degree. China produced 1.8 million S&E first university degrees[23], growing from 359,000 degrees in 2000.[24]

In addition, it has been well documented that the CCP is making a deliberate effort to recruit top foreign talent, particularly from U.S. universities, industry and the federal government. The Department of Energy warned that talent programs were offering scientists at U.S. national labs hundreds of thousands, and in

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[18] Moore, J., & Wilson, I. (2021, January 04). *Decades of basic research paved the way for today's Covid-19 vaccines*. Retrieved February 22, 2023, from https://www.statnews.com/2021/01/05/basic-research-paved-way-for-warp-speed-covid-19-vaccines/.

[19] Congressional Research Service, RL32076, *The Bayh-Dole Act: Selected Issues in Patent Policy and the Commercialization of Technology*, (Dec. 2012).

[20] Congressional Research Service. *Science, Technology, Engineering, and Mathematics (STEM) Education: An Overview.* CRS Report No. R45223, at https://crsreports.congress.gov/product/pdf/R/R45223/4.

[21] National Science Board, *supra* note 6.

[22] National Science Board, National Science Foundation. 2019. *The Skilled Technical Workforce: Crafting America's Science & Engineering Enterprise*. NSB-2019-23. Alexandria, VA. Available at https://www.nsf.gov/nsb/publications/2019/nsb201923.pdf.

[23] National Science Board, *supra* note 6.

[24] National Science Board, *supra* note 23.

some cases millions, of dollars to conduct research in China.[25] Federal investigators identified 23 U.S. academics and dozens of industry scientists with financial ties to China.[26] To address this threat, the House Science Committee worked to ensure the CHIPS and Science Act included a prohibition of federal employees participation in foreign talent programs and a prohibition for all federally funded research grantees from being a member or participating in a malign foreign talent program.

CHALLENGES TO U.S. INNOVATION

Competition with China and U.S. Response

The CCP has vowed to turn the nation into a self-reliant technology power.[27] China and the United States take different approaches to R&D. For instance, the CCP mandates the political and economic trajectory of the nation through the publication of Five Year Plans. In the 14th Five Year Plan, governing 2021 to 2025, President Xi encouraged basic research and discussed the need to fortify the national innovation system.[28] The CCP's Made in China 2025 plan[29] uses government subsidies, state owned enterprises, and intellectual property acquisition to transform China into one of the most powerful high-tech and manufacturing countries in the world.[30]

This top-down policy prescription differs from the United States, which employs mostly a decentralized bottom-up approach to innovation and R&D. While the American government certainly encourages the growth and development of the national innovation system, it by no means dictates precisely how this growth should occur; rather, the federal government largely allows academia and industry to drive this development, providing funding and regulation as necessary.[31] Through this approach, the U.S. has created a S&T ecosystem that fosters innovation, risk taking, and the discovery of new ideas.

But if the U.S. is to maintain its competitive edge in science and technology, the nation must coordinate across all public and private sectors to expand capacity, participation, and collaboration and allow for strategic investments in research and technology. This is a particularly urgent issue for the U.S. in emerging technology fields that will serve as the main sites for innovation and competitive advantage, and lead to unprecedented national security challenges in the 21st century.

CRITICAL TECHNOLOGIES

Artificial Intelligence (AI): AI includes technologies that allow computers and other machines to learn from experience and complete tasks that have traditionally required human intelligence or reasoning. AI could be one of the most disruptive technologies of the 21st century and is advancing rapidly. On February 11, 2019, President Trump issued an Executive Order to launch the American AI Initiative, which directs federal agencies to develop AI R&D budgets to support their core missions.[32] Federal agencies are also

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[25] Puko, T. & O'Keefe, K. *U.S. Targets Efforts by China, Others to Recruit Government Scientists*. 2019, June 10. Available at https://www.wsj.com/articles/energy-department-bans-personnel-from-foreign-talent-recruitment-programs-11560182546.
[26] Mervis, J. *Trial of Harvard chemist poses test for U.S. government's controversial China Initiative*. Science. (2021, December 2). Available at https://www.science.org/content/article/trial-harvard-chemist-poses-test-u-s-government-s-controversial-china-initiative.
27 Lietzow, R., Ye, Q., and Tan, S., *A New Era of Chinese Technology and Innovation* at https://china.ucsd.edu/opinion/post/a-new-era-of-chinese-technology-and-innovation.html.
28 McDonald, J., *China's leader vow to become self-reliant technology power* at https://apnews.com/article/technology-beijing-xi-jinping-china-economy-d046181a10641362176124866 0d47479
[29] *Made in China 2025' plan issued.* Retrieved March 31, 2021, from http://english.www.gov.cn/policies/latest_releases/2015/05/19/content_281475110703534.htm.
[30] McBride, J., & Chatzky, A. *Is 'made in CHINA 2025' a threat to global trade?* Retrieved March 31, 2021, from https://www.cfr.org/backgrounder/made-china-2025-threat-global-trade.
[31] *Id.*
[32] E.O. 13859 of Feb 11, 2019. Available at https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-

directed to increase access to their resources to drive AI research by identifying high-priority federal data and models, improving public access to and the quality of federal AI data, and allocating high-performance and cloud computing resources to AI-related applications and R&D. In December 2020, Congress enacted the National Artificial Intelligence Initiative Act.[33] This bipartisan legislation, which was led by the House Science Committee, accelerated and coordinated Federal investments and new public-private partnerships in research, standards, and education in trustworthy artificial intelligence.

Quantum Information Science (QIS): Through developments in QIS, computers can handle new workloads and solve much more difficult challenges than traditional computers. In 2018, this Committee developed, and the President signed into law, the *National Quantum Initiative Act*[34], which leverages the resources and expertise of U.S. government, industry, and academia to create a unified national quantum strategy that ensures the U.S. continues breakthroughs in QIS. President Trump also released the *National Strategic Overview for Quantum Information Science*[35] to guide Federal QIS actions, including the establishment of a Quantum Economic Development Consortium to build the QIS industrial ecosystem.

Since those initial actions, Congress has continued to take an active role in structuring critical R&D programs to account for the growing role of QIS. In 2020, Congress passed the National Defense Authorization Act for Fiscal Year 2020[36], which extended QIS R&D directives to the Department of Defense and established QIS research centers to accelerate U.S. capabilities. Multiple bills have been filed to prevent exports of quantum technologies to China, with a particular focus on QIS computing.[37] [38] [39]

The country that harnesses the power of quantum technology will have a significant security and economic advantage. The race to reach operational quantum technologies in communications, encryption, and computing will be one of the most important technological efforts of the coming decade for the U.S.

Advanced Manufacturing: Advanced manufacturing technologies fundamentally alter and transform manufacturing capabilities, methods and practices. These new manufacturing technologies drive U.S. competitiveness by enabling improved productivity, the development of superior products, and has led to the formation of entirely new industries. President Trump developed a *National Strategic Plan on Advanced Manufacturing*[40] that focuses on expanding manufacturing employment and ensuring a resilient supply chain and strong manufacturing and defense industrial base.

Fusion: The fusion energy industry is experiencing a period of global renaissance. With the recent December announcement[41] from Lawrence Livermore National Laboratory that the National Ignition Facility has achieved ignition for the first time, the continued construction progress at the International Thermonuclear Experimental Reactor (ITER), and the rapid growth of multiple U.S. based startup companies, the field has never been busier. The Department of Energy has been prioritizing ways that the National Laboratory Complex can advance U.S. leadership in fusion energy sciences and assist commercial fusion companies with the challenges they are facing. This has been done through increases in

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[33] P.L. 116-283.

[34] P.L. 115-368.

[35] National Science & Technology Council. *National Strategic Overview for Quantum Information Science*. September 2018. Available at https://www.quantum.gov/wp-content/uploads/2020/10/2018_NSTC_National_Strategic_Overview_QIS.pdf

[36] P.L. 116-92.

[37] H.R. 3532, 116th Cong. (1st Sess. 2019).

[38] H.R. 704, 116th Cong. (1st Sess. 2019).

[39] H.R. 3407, 116th Cong. (1st Sess. 2019)

[40] National Science and Technology Council. *Strategy for American Leadership in Advanced Manufacturing*. October 2018. Available at https://trumpwhitehouse.archives.gov/wp-content/uploads/2018/10/Advanced-Manufacturing-Strategic-Plan-2018.pdf.

[41] Lawrence Livermore National Laboratory. *National Ignition Facility achieves fusion ignition*. December 13, 2022. Available at https://www.llnl.gov/news/national-ignition-facility-achieves-fusion-ignition.

traditional grant-based funding and the creation of INFUSE, a program targeting the development of public-private partnerships for fusion. These fusion energy activities and others were recently authorized in the Energy Act of 2020[42] and the CHIPS and Science Act[43].

RESEARCH SECURITY

Background

In recent years, several incidents have led to the concern that other countries are taking advantage of the openness of the academic research environment in the United States. [44] This sense of unfair competition is entwined with concerns about U.S. economic and national security. Threats to research security primarily arise from the failure of researchers applying for federal funding to disclose foreign affiliations, commitments, and sources of funding that may present a conflict of interest. Foreign talent recruitment programs have been found to incentivize or coerce participants to acquire "through illicit as well as licit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government."[45] The academic research community has called for a coordinated and harmonized approach that balances the need to address security risks with the importance of scientific openness, international collaboration, and competing for global STEM talent.

Recent Legislative Actions

Over the past 4 years, the Science, Space, and Technology Committee has worked to address many of these research security concerns and build a more effective and resilient R&D ecosystem. This Committee has consistently strived to balance security risks and the importance of scientific openness and international collaboration. Over the last four years, through the NDAA process and the CHIPS and Science Act, Congress has implemented:

- **Securing American Science and Technology Act.** The Fiscal Year 2020 NDAA included the Securing American Science and Technology Act, which established an interagency committee within the White House Office of Science and Technology Policy (OSTP) to coordinate research security across the Federal government.
    - The bill also established the National Science, Technology, and Security Roundtable at the National Academy of Sciences to facilitate collaboration between universities, federal agencies, law enforcement, and other stakeholders.
- **NSPM-33.** In response to the Securing American Science and Technology Act, the Trump Administration released National Security Presidential Memorandum-33 in January 2021 to direct a national response to safeguard the security and integrity of America's R&D enterprise.
- **Disclosure Requirements.** The Fiscal Year 2021 NDAA included language that directed all Federal research agencies to require applicants to disclose foreign funding when receiving Federal research awards. This requirement ensures that there are consistent conflict of interest polices across agencies.

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[42] P.L. 116-260.
[43] P.L. 117-167
[44] JASON, The MITRE Corporation. *Fundamental Research Security*. December 2019. McLean, VA. Available at https://www.nsf.gov/news/special_reports/jasonsecurity/JSR-19-2IFundamentalResearchSecurity_12062019FINAL.pdf.
[45] National Science & Technology Council. Recommended Practices for Strengthening the Security and Integrity of America's Science and Technology Research Enterprise. January 2021. Available at https://trumpwhitehouse.archives.gov/wp-content/uploads/2021/01/NSTC-Research-Security-Best-Practices-Jan2021.pdf.

- **CHIPS and Science Act.**
  - **Prohibits Malign Foreign Talent Programs.** Title IV prohibits all federally funded research grantees from being a member of a malign foreign talent program or participating in similar activities.
  - **Prohibits Federal Employee's Participation in Foreign Talent Programs.** Title IV prohibits federal agency personnel from participating in foreign talent programs and requires researchers working on federally funded research projects to disclose any participation in foreign talent recruitment programs.
  - **Requires Annual Training on Foreign Threats.** Title IV requires all federally funded grantees to take annual training on research policies and foreign threats and directs OSTP to work with NSF and NIH to develop training for all grantees across the Federal research agencies.
  - **Requires Plans to Protect Sensitive Basic Research.** Title III directs NSF to develop a plan to identify research areas that may involve access to classified or controlled unclassified information and to exercise due diligence processes in granting access to such information.
  - **Bans Confucius Institutes.** Title III bans NSF funding from going to organizations hosting Confucius Institutes.
  - **Provides New Tools and Resources to Combat Foreign Theft.** Title III creates an Office of Research Security and Policy at NSF and gives the office and the Inspector General additional resources and new authorities to use analytical tools to detect and combat foreign influence, theft, and grant fraud. Title IV gives Federal research agencies the authority to require the submission of supporting documentation and the authority to act on findings that identify undue foreign influence or grant fraud.
  - **Requires Institutional Disclosure of Foreign Support.** Title III directs NSF to collect annual summaries of foreign financial support from universities and grants NSF the authority to request copies of contracts or documentation related to such disclosures.
  - **Gives Universities Tools to Protect Sensitive Research from Cyber Theft**. Title II directs NIST to assist universities in adopting the Cybersecurity Framework to help mitigate cybersecurity risks related to conducting research. In addition, title III directs the development of a national secure computing enclaves program to protect sensitive research information at American universities from cyber theft.

Further Reading:

- **The Perils of Complacency - America at a Tipping Point in Science & Engineering**
- **Protecting U.S. Technological Advantage**
- **Phase 2: Competing in the Next Economy – Adapting to a Changing World**
- **Defeating China and Saving Democracy**