

Analysis of Competitiveness/NSF Legislation (117th Congress)
Updated 2.3.2022

	America COMPETES Act of 2022 (H.R. 4521) As introduced in the House of Representatives, January 2022
General	Full Title: <i>America Creating Opportunities for Manufacturing, Pre-Eminence in Technology, and Economic Strength (COMPETES) Act of 2022</i> Sections of interest: Division B—Research and Innovation Title III—National Science Foundation for the Future (p. 259) Title V—Broadening Participation in Science (p. 204) Title VI—Miscellaneous Science and Technology Provisions (p. 528) Division D—Financial Diplomacy and Leadership Title II—Investing in Alliances and Partnerships (p. 895) Division I—Committee on the Judiciary Title III—Immigration Provisions (p. 1689) Division J—Committee on Education and Labor Title III—Higher Education (1938)
DIVISION B—RESEARCH AND INNOVATION	
Title III—National Science Foundation for the Future	
General	Formerly the <i>National Science Foundation for the Future Act</i> (H.R. 2225)
Authorization of Appropriations	Sec. 10303 (p. 265) – See attached table for details. <ul style="list-style-type: none"> • Authorizes appropriations for FY 2022-2026. • Would grow NSF to \$17.9 billion by FY 2026 (FY 2021 = \$8.5 billion). • Of the total, \$3.4 billion would be earmarked for the new SES Directorate (see below), leaving \$14.5 billion for NSF and \$11.4 billion for R&RA by FY 2026 (FY 2021 R&RA = \$6.9 billion) • The SES Directorate’s share of the R&RA budget would grow from 14% in FY 2022 to 23% in FY 2026.
New Directorate	Sec. 10308 (p. 384) – Directorate for Science and Engineering Solutions (SES) <ul style="list-style-type: none"> • Establishment is subject to availability of funds. • Directorate would be included in the Research & Related Agencies budget line (not as a separate line like EHR). • Create an advisory committee like other directorates. • Directorate will be evaluated after 6 years and recommendations made about whether it should continue.
<i>Staffing</i>	Led by an Assistant Director like other directorates.
<i>Purpose/Goals</i>	To accelerate the translation of fundamental research and to advance technologies, support use-inspired research, facilitate commercialization and use of federally funded research, and expand the pipeline of students and researchers in areas of societal and national importance .

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<i>Activities</i>	<ul style="list-style-type: none"> • Fund transformational advances in use-inspired and translational research. • Translate research into S&E innovations. • And others, including “identify social, behavioral, and economic drivers and consequences of technological innovations.”
<i>Existing Programs</i>	Would move convergence accelerators , growing convergence big idea , and other programs as determined by the Director to SES.
<i>Focus Areas</i>	Director shall identify and regularly update up to 5 focus areas to guide the directorate. The bill suggests (but does not mandate) consideration of the following societal challenges : <ul style="list-style-type: none"> • Climate change/environmental sustainability • Global competitiveness and domestic job creation in critical technologies • Cybersecurity • National security • STEM education and workforce • Social and economic inequality
<i>Technology Research Institutes</i>	NSF may award grants for the establishment of Technology Research Institutes in key technology areas to conduct fundamental research, conduct research on key technologies to solve challenges with social, economic, health, scientific, and national security implications, and others.
<i>Low-Income Scholarship Program</i>	Scholarships to low-income individuals to pursue associate, undergraduate or graduate level degrees in math, engineering, or computer science. Authorizes \$100 million.
<i>Entrepreneurial Fellowships</i>	Fellowships to PhD scientists and engineers to develop leaders capable of maturing promising ideas and technologies from lab to market and forge connections between academic research and government, industry, and finance. Authorizes \$100 million.
<i>Transfer of Funds</i>	Funds can be transferred outside the SES directorate to other directorates; however, funds <u>cannot</u> be transferred from other directorates to SES.
<i>Roadmap</i>	Within 1 year, the Director deliver to Congress a roadmap describing the strategic vision that will guide SES funding decisions over the next 3 years.
<i>Appropriations</i>	See attached funding tables.
Broadening Participation	Sec. 10305 (p. 313) <ul style="list-style-type: none"> • Codifies the NSF INCLUDES Initiative. • Establish a 5-year pilot program to enhance partnerships between “emerging research institutions” and institutions classified as “very high research activity.” (p.31)
Broader Impacts	Sec. 10306 (p. 332) <ul style="list-style-type: none"> • Enter into agreement with an outside organization to assess how BI review criterion is applied across NSF and make recommendations for improving effectiveness. • Award grants to support activities to increase the efficiency, effectiveness, and availability of resources for implementing the BI review criterion (e.g., training and workshops; repositories and clearinghouses for sharing best practices and facilitating collaboration; and tools for evaluating and

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	documenting societal impacts of research).
Research Integrity and Security	Sec. 10306 (p. 333)
<i>Definition of Foreign Country of Concern</i>	<ul style="list-style-type: none"> • Defines “foreign country of concern” as the specific following countries: China, North Korea, Russia, Iran. • Leaves open the possibility for the State Department to add other countries to this list.
<i>Office of Research Security and Policy; Chief of Research Security</i>	<ul style="list-style-type: none"> • Maintain a research security and policy office in the Office of the NSF Director with at least 4 FTEs. • Coordinate all research security policy issues across agency. • Includes position of Chief of Research Security. • NSF will enter agreement with a “qualified independent organization” to create a risk assessment center, which will also assist with developing an online resource. • Conduct risk assessments of award applications and disclosures to NSF; request universities to submit documentation related to foreign appointments, employment, and foreign talent programs; and substitute or remove an individual from an award, reduce award amount, or terminate award if the NSF Director determines activities interfere with the award activities or create duplication.
<i>Malign Foreign Talent Recruitment Program Prohibition</i>	<p>NSF-specific language is nearly identical to government-wide language in Title VI, Subtitle E, Sec. 10651 (p. 623)</p> <ul style="list-style-type: none"> • As part of an application, investigators certify they are not an active participant in a malign foreign talent program, nor will they be during the award period. • Research institutions must also certify that their investigators are made aware of this requirement. • These requirements DO NOT prohibit making scholarly presentations or participating in benign international conferences/exchanges. • This requirement will not apply retroactively to prior awards.
<i>Security Training Modules</i>	<ul style="list-style-type: none"> • NSF work with NIH and other agencies to develop online research security training modules for the research community, including modules focused on international collaboration/travel, foreign influence, proper use of funds, disclosure, and conflicts. • NSF will seek stakeholder input on these modules.
<i>Online Resources</i>	<p>Develop an online resource on the NSF website that includes:</p> <ul style="list-style-type: none"> • Research security policies • Unclassified guidance on potential security risks • Examples of beneficial international collaborations versus examples of potential security threats
<i>Responsible Conduct of Research</i>	<ul style="list-style-type: none"> • Update the NASEM report, “On Being a Scientist: A Guide to Responsible Conduct in Research.” • Amend existing responsible conduct of research training to include “faculty and other senior personnel” in addition to postdoctoral researchers.
Research Ethics	<p>Sec. 10306 (p. 346)</p> <ul style="list-style-type: none"> • Amend award proposal instructions to include a requirement for an ethics statement to be included. • Award research grants to assess potential ethical and societal implications of NSF research and technologies.

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Research Reproducibility and Replicability	Sec. 10306 (p. 349)
<i>Data Management Plans</i>	NSF require every proposal to include a machine-readable data management plan, including a description of how the awardee will achieve and preserve public access to data, software, and code. NSF will provide resources and training for researchers and students on developing high quality data management plans and equip program officers and review panels with resources and training to assess the quality of the plans.
<i>Open Repositories</i>	NSF coordinate with heads of other sciences agencies and solicit public input in the development and dissemination of a set of criteria for trusted open repositories, accounting for discipline-specific needs. NSF may also award grants to universities or non-profits to develop, upgrade or maintain open data repositories.
Fundamental Research	Sec. 10306 (p. 331)
<i>Climate Change Research</i>	(p. 353) Included in the list of activities are: <ul style="list-style-type: none"> • “research on climate-related human behaviors and institutions” • “research on climate-related risk, vulnerability, resilience, and adaptive capacity of coupled human-environment systems, including risks to ecosystem stability and risks to vulnerable populations”
<i>Violence Research</i>	(p. 355) <ul style="list-style-type: none"> • Award grants on research to improve understanding of the nature, scope, causes, consequences, prevention, and response to all forms of violence.
<i>Social, Behavioral and Economic Sciences</i>	(p. 356) States that the NSF director shall: <ul style="list-style-type: none"> • Actively communicate opportunities and solicit proposals for social, behavioral, and economic science researchers to participate in cross-cutting and interdisciplinary programs, including the Convergence Accelerator and Big Ideas activities, and the Mid-Scale Research Infrastructure programs; and • Ensure social, behavioral, and economic science researchers are represented on relevant merit review panels for such activities.
<i>Measuring Impacts of Federally Funded R&D</i>	(p. 356) NSF director shall award grants for research and development of data, models, indicators, and associated analytical tools to improve understanding of the impacts of Federally funded research on society, the economy, and the workforce/job creation.
<i>Technology and Behavioral Science Research</i>	(p. 363) NSF director shall award grants to “increase understanding of social media and consumer technology access and use patterns and related psychological and behavioral issues, particularly for adolescents; and explore the role of social media and consumer technology in rising rates of depressive symptoms, suicidal ideation, drug use, and deaths of despair...”
Research Infrastructure	Sec. 10307 (p. 371)
<i>Computing Enclave Pilot Program</i>	NSF shall establish a pilot program to award grants to ensure the security of federally-supported research data and to assist regional institutions and

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	researchers in compliance with regulations around sensitive information. Authorizes \$38 million.
<i>National Secure Data Service</i>	NSF work with the Chief Statistician of the U.S. to establish a demonstration project within NCSES to develop, refine, and test models to inform the creation of government-wide data linkage and access infrastructure for statistical activities. Authorizes \$9 million.
STEM Education/ Workforce	Sec. 10304 (p. 273)
<i>PreK-12 STEM</i>	<ul style="list-style-type: none"> • Decadal Survey of STEM Education Research – Calls on NASEM to review and assess PreK-12 STEM ed research and make recommendations for research priorities over next 10 years. • Grant program to fund at least 3 multidisciplinary Centers for Transformative Education Research and Translation. • NASEM Study – Review research literature and identify research gaps on the interconnected factors that foster and hinder implementation of PreK-12 STEM innovations, present compendium of promising practices, models, programs and technologies. • Pre-K-8 Informal STEM Opportunity – Support research to advance the engagement of students in Pre-K-8 in STEM through before-school, after-school, out-of-school, or summer activities. • National Coordination Network for Science and Technical Education – Establish a network of centers to coordinate research, training and best practices, serve as a clearinghouse for resources, and develop partnerships between PreK-12 schools, 2- and 4-year institutions, and industry.
<i>Undergraduate STEM</i>	<ul style="list-style-type: none"> • Support research on STEM education and workforce needs, including greater collaboration with industry to enhance education and improve alignment with workforce needs. • Innovations in STEM Education at Community Colleges – Support research on the nature of learning and teaching at community colleges and to improve outcomes for students who enter the workforce upon completion of their STEM degree or credential or transfer to a 4-year institution.
<i>Graduate STEM</i>	<ul style="list-style-type: none"> • Adds “graduate students” to existing NSF mentoring plan requirements for grants. • Award grants to facilitate “career exploration of academic and non-academic career options and for providing opportunity-broadening experiences for graduate students and postdoctoral scholars that can be considered, adopted, or adapted by other institutions...” • Support research grants on the graduate education system, including effects of traineeships, fellowships, and other factors. • Calls for an independent evaluation of NSF’s role in supporting graduate student education and training.
<i>Graduate Research Fellowship Program</i>	<ul style="list-style-type: none"> • Increase the number of fellowships to at least 3,000 annually over the next 5 years. • Increase the cost-of-education allowance to institutions from \$12,000 to at least \$16,000. • Directs NSF to ensure outreach is made to applicants from fields of study that are in areas of critical national need, from all regions of the country, and from historically underrepresented populations.
<i>Workforce Data</i>	<ul style="list-style-type: none"> • Calls for a portfolio analysis of NSF’s skilled technical workforce investments. • Assess the feasibility and benefits of adding new questions or topics to NCSES surveys on the skilled technical workforce, working conditions and work-life balance, harassment and discrimination, sexual orientation and general identity, and immigration and emigration.
Title V—Broadening Participation in Science	

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STEM Opportunities	Title V, Subtitle A – Formerly the <i>STEM Opportunities Act</i> (H.R. 204)
<i>Policies for Caregivers</i>	Sec. 10503 (p. 442) Within 6 months, OSTP provide guidance to science agencies to establish policies providing flexibility to researchers with caregiving responsibilities, including flexibility in time, no-cost extensions, and grant supplements.
<i>Data on Federal Research Grants</i>	Sec. 10504 (p. 444) Each year, all federal science agencies collect standardized record-level annual information on demographics, primary field, award type, institution type, review rating, budget request, funding outcome, and awarded budget for all research grant applications.
<i>Implicit Bias in Federal Grant Review</i>	Sec. 10505 (p. 446) <ul style="list-style-type: none"> • Each federal science agency to implement policy recommendations per OSTP’s 2016 report “Reducing the Impact of Bias in the STEM Workforce.” • Agencies implement 2-year pilot activities for program officers and members of standing review committees re: research related to implicit bias in the review of extramural research grants. • Based on lessons learned from the pilots, agencies develop and implement evidence-based policies and practices to minimize the effects of implicit bias in grant review.
<i>Collection of Demographic Data</i>	Sec. 10506 (p. 447) Every 5 years, NSF survey grantees on the demographics of STEM faculty, including by race, gender, ethnicity, citizenship status, and years since completion of doctoral degree. NSF publish statistical summary data collected by the survey.
<i>Cultural and Institutional Barriers to STEM</i>	Sec. 10507 (p. 449) OSTP/NSF develop guidance to universities and federal labs for best practices for conducting periodic climate surveys of STEM departments/divisions and providing educational opportunities (workshops) re: identifying cultural or institutional barriers to recruitment, retention, or advancement of women, racial and ethnic minorities, and others underrepresented in STEM. Nonprofit scientific and professional societies representing one or more STEM disciplines are eligible to apply for grants to offer such workshops.
<i>Research Grants and Dissemination</i>	Sec. 10508 (p. 456) Authorizes grants to study and disseminate information related to the above activities under this title, including analyzing record-level data collected on grant applicants and studying best practices for work-life accommodations.
<i>Increasing Diversity Among STEM Faculty</i>	Sec. 10509 (p. 458) NSF award grants to universities for the development and assessment of innovative reform efforts to increase the recruitment, retention, and advancement of underrepresented minority groups in STEM careers. Grants can be used for institutional assessment activities (data analysis and policy review), implementation of institution-wide improvements in workload distribution, development of training courses, workshops, and other professional development activities.

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Combatting Sexual Harassment in Science	Title V, Subtitle D—Formerly the <i>Combatting Sexual Harassment in Science Act</i> (H.R. 2695)
<i>Research Grants</i>	Sec. 10543 (p.517) NSF award grants to expand research to better understand the factors contributing to, and consequences of, sexual harassment and gender harassment affecting individuals in the STEM workforce.
<i>Data Collection</i>	Sec. 10544 (p. 518) Convene working group of federal statistical agencies to develop questions on harassment in STEM departments to gather national data on the prevalence, nature, and implications of sexual and gender harassment at universities, and include such questions in relevant NCSSES surveys.
<i>Interagency Working Group</i>	Sec. 10546 (p. 521) OSTP establish an interagency working group for the purpose of coordinating federal science agency efforts to reduce the prevalence of harassment involving grant personnel.
<i>National Academies Study</i>	Sec. 10547 (p. 526) National Academies study the influence of sexual harassment and gender harassment in universities on career advancement.
Title VI—Miscellaneous Science and Technology Provisions	
Early Career Research Fellowships	Sec. 10602 (p. 529) <ul style="list-style-type: none"> NSF may establish a 2-year pilot program to award grants to highly qualified early-career investigators to carry out an independent research programs for no more than 2 years.
National Science and Technology Strategy	Title VI, Sec. 10601 (p. 531) <ul style="list-style-type: none"> OSTP develop a comprehensive national science and technology strategy for the U.S. for meeting the R&D objectives for the following 4 years. President to submit to Congress each year a report on the national S&T strategy for the U.S., including a description of strategic objectives and priorities necessary for maintaining global leadership; programs, policies, and activities that the President recommends across federal agencies to achieve the strategic objectives; and global trends in S&T, including potential threats to U.S. leadership.
Quadrennial S&T Review	Sec. 10612 (p. 534) Starting in 2022 and every 4 years thereafter, OSTP shall review the U.S. S&T enterprise and include recommendations for maintaining global leadership. To include an integrated view of, and recommendations for S&T policy across the government while considering economic and national security, assess and recommend priorities for research programs, assess global competition, and others.
Malign Foreign Talen Recruitment Program Prohibition	Sec. 10651 (p. 623) – Government-wide language is nearly identical to NSF-specific provision in Sec. 10306d (p. 340) <ul style="list-style-type: none"> As part of an application, investigators certify they are not an active participant in a malign foreign talent program, nor will they be during the award period. Research institutions must also certify that their investigators are made aware of this requirement.

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DIVISION D—FINANCIAL DIPLOMACY AND LEADERSHIP	
Fulbright-Hays Program	<p>Title II, Sec. 30218 (p. 992) Authorizes \$105.5 million for the Fulbright-Hays program for a 5 year period beginning in FY 2022.</p>
DIVISION H—IMMIGRATION PROVISIONS	
Doctoral STEM Graduates	<p>Title III, Sec. 80303 (p. 1708) Exempts STEM* PhD graduates from numerical limits on immigrant visas, instead requiring them to pay a \$1,000 supplemental fee to fund scholarships for low-income American students in science and engineering. <i>*Agricultural sciences, natural resources and conservation, computer and information sciences and support services, engineering, biological and biomedical sciences, mathematics and statistics, military technologies, physical sciences, or medical residency and fellowship programs, as included in the Classification of Instructional Programs taxonomy.</i></p>
DIVISION J—COMMITTEE ON EDUCATION AND LABOR	
Title VI International Education Programs	<p>Title III, Sec. 90301 (p. 1938) Authorizes \$208.1 million for Title VI international education programs for FY 2022 and such sums as may be necessary thereafter.</p>
Confucius Institutes	<p>Title III, Sec. 90302 (p. 1964) Institutions of higher education maintaining contracts with Confucius Institutes are not eligible for Federal funds under the Higher Education Act, unless the Dept. of Education and NASEM can evaluate the institution of higher education has protections in place to ensure full control and transparency over the Confucius Institute. Institutions of higher education maintaining contracts with Confucius Institutes may be subject to public inspections.</p>
Disclosures of Foreign Gifts to Universities	<p>Title III, Sec. 90304 (p. 1971)</p> <ul style="list-style-type: none"> • Amends the Higher Education Act to require disclosure of gifts to or contracts with universities from a foreign source totaling \$100,000 in one year or \$250,000 over the last 3 years. • Institutions of higher education are to maintain a policy requiring faculty, professional staff, and other staff engaged in research to disclose any gifts received from, or contracts entered into with, a foreign source totaling \$50,000 or more. • These provisions apply to universities that have \$50 million in federal funding in any of the previous 5 years.

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Appendix A: Funding Tables for the *NSF for the Future Act* (H.R. 4521, Division B, Title III)

Table 1: Authorization Levels, FY 2022-FY2026

...	FY 2021 Enacted	FY 2022	%	FY 2023	%	FY 2024	%	FY 2025	%	FY 2026	%	5-Year Total
NSF Total	8,486,759,000	12,504,890,000	47.3%	14,620,800,000	16.9%	15,945,020,000	9.1%	17,004,820,000	6.6%	17,939,490,000	5.5%	78,015,020,000
R&RA	6,909,800,000	10,025,000,000	45.1%	11,870,000,000	18.4%	13,050,000,000	9.9%	14,000,000,000	7.3%	14,800,000,000	5.7%	63,745,000,000
<i>SES (NEW)</i>	0	1,400,000,000		2,300,000,000	64.3%	2,900,000,000	26.1%	3,250,000,000	12.1%	3,400,000,000	4.6%	13,250,000,000
<i>Mid-scale</i>	0	55,000,000		60,000,000	9.1%	70,000,000	16.7%	75,000,000	7.1%	80,000,000	6.7%	340,000,000
EHR	968,000,000	1,583,160,000	63.5%	1,654,520,000	4.5%	1,739,210,000	5.1%	1,823,470,000	4.8%	1,921,600,000	5.4%	8,721,960,000
MREFC	241,000,000	249,000,000	3.3%	355,000,000	42.6%	370,000,000	4.2%	372,000,000	0.5%	375,000,000	0.8%	1,721,000,000
<i>Mid-scale</i>		76,250,000		80,000,000	4.9%	85,000,000	6.3%	90,000,000	5.9%	100,000,000	11.1%	431,250,000
AOAM	345,640,000	620,000,000	79.4%	710,000,000	14.5%	750,000,000	5.6%	770,000,000	2.7%	800,000,000	3.9%	3,650,000,000
NSB	4,500,000	4,620,000	2.7%	4,660,000	0.9%	4,700,000	0.9%	4,740,000	0.9%	4,780,000	0.8%	23,500,000
OIG	17,850,000	23,120,000	29.5%	26,610,000	15.1%	31,110,000	16.9%	34,610,000	11.3%	38,110,000	10.1%	153,560,000

Table 2: SES Directorate as a percentage of R&RA

	R&RA Total	SES Auth	%
2021	6,909,800,000	-	0.0%
2022	10,025,000,000	1,400,000,000	14.0%
2023	11,870,000,000	2,300,000,000	19.4%
2024	13,050,000,000	2,900,000,000	22.2%
2025	14,000,000,000	3,250,000,000	23.2%
2026	14,800,000,000	3,400,000,000	23.0%

Table 3: SES Directorate as a percentage of NSF

	NSF Total	SES Auth	%
2021	0	-	0.0%
2022	12,504,890,000	1,400,000,000	11.2%
2023	14,620,800,000	2,300,000,000	15.7%
2024	15,945,020,000	2,900,000,000	18.2%
2025	17,004,820,000	3,250,000,000	19.1%
2026	17,939,490,000	3,400,000,000	19.0%