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The National Science Foundation: FY2017 Appropriations and Funding History

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Summary

The National Science Foundation (NSF) supports both basic research and education in the non-medical sciences and engineering. NSF is a major source of federal support for U.S. university research, especially in certain fields such as mathematics and computer science. It is also responsible for significant shares of the federal science, technology, engineering, and mathematics (STEM) education program portfolio and federal STEM student aid and support.

Overall, the Obama Administration sought $7.964 billion for NSF in FY2017, a $501 million (6.7%) increase over the FY2016 estimate of $7.463 billion. This request included $7.564 billion in discretionary budget authority and $400 million in new one-time mandatory budget authority.

NSF has six major appropriations accounts: Research and Related Activities (RRA), Education and Human Resources (EHR), Major Research Equipment and Facilities Construction (MREFC), Agency Operations and Award Management (AOAM), National Science Board (NSB), and Office of Inspector General (OIG). The FY2017 request would have increased total budget authority in three accounts relative to the FY2016 estimate: RRA by $392 million (6.5%), EHR by $73 million (8.3%), and AOAM by $43 million (13%). The request would have provided NSB and OIG with about the same amount as in FY2016 and decreased MREFC account funding by $7 million (3.6%). The new mandatory budget funding request was split between two accounts—RRA ($346 million) and EHR ($54 million). Mandatory funding is not usually part of NSF's budget request for major accounts.

As reported by the Senate, S. 2837 would have provided a total of $7.510 billion to NSF for FY2017. This amount is $46 million (0.6%) above the FY2016 estimated funding level, $54 million (0.7%) below the FY2017 discretionary funding request, and $454 million (5.7%) below the request including new mandatory funding. The bill would have kept funding for the major accounts nearly the same as the FY2016 estimate, except for MREFC, which would have increased by $46 million (23%).

As reported by the House, H.R. 5393 would have provided a total of $7.406 billion to NSF for FY2017. This amount is $57 million (0.8%) below the FY2016 estimated funding level, $158 million (2.1%) below the President's FY2017 discretionary funding request, and $558 million (7.5%) below the request including new mandatory funding. The bill would have kept funding for the EHR, NSB, and OIG accounts nearly the same as in the FY2016 estimate, increased the RRA and AOAM accounts by $46 million (0.8%) and $10 million (3%), respectively, and decreased the MREFC account by $113 million (57%).

A series of continuing appropriations acts (P.L. 114-223, P.L. 114-254, P.L. 115-30) provided funding for NSF from October 1, 2016, through May 5, 2017, at 99.5-99.8% of the FY2016 funding level. The Consolidated Appropriations Act, 2017 (P.L. 115-31), signed by the President on May 5, 2017, provides $7.472 billion in discretionary funding to NSF, which is 0.1% above the FY2016 enacted amount.

Overall growth in the NSF budget slowed after FY2003. Median annual growth in NSF funding was 9% between FY1953 and FY2003 and 3% between FY2004 and FY2016. Most of NSF's funding supports scientific and technological research. Further, the portion of NSF spending that goes to research increased over the past decade. Within the NSF total, RRA has accounted for the lion's share of growth in obligations since FY2003. Agency appropriations levels were last authorized in FY2010 and expired in FY2013; various reauthorization measures were introduced in the 114th Congress that included proposed funding levels for FY2017.

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Introduction

The National Science Foundation (NSF) supports both basic research and education in the non-medical sciences and engineering. Congress established the foundation through the National Science Foundation Act of 1950 to "promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." The NSF is a major source of federal support for U.S. university research, especially in certain fields such as mathematics. It is also responsible for significant shares of the federal science, technology, engineering, and mathematics (STEM) education program portfolio and federal STEM student aid and support.

This report describes selected items from the Obama Administration's FY2017 budget request for NSF and tracks legislative action on FY2017 appropriations to the foundation. It also details selected authorizations of NSF appropriations proposed in the 114th Congress, summarizes budget and appropriations action from FY2015 and FY2016, and presents information on historical funding for the foundation.

NSF has six major appropriations accounts: Research and Related Activities (RRA), Education and Human Resources (EHR), Major Research Equipment and Facilities Construction (MREFC), Agency Operations and Award Management (AOAM), National Science Board (NSB), and the Office of the Inspector General (OIG). At times, authorizations and appropriations have been specified at the RRA subaccount level, and NSF's budget justifications detail activities and obligations at that level. The majority of NSF's primary mission activities are funded through RRA, EHR, and MREFC. NSF adopted its current appropriations account structure in FY2003. In general, NSF's major accounts have been comparable since then.[1]

Appropriations to NSF are typically included in annual Commerce, Justice, Science and Related Agencies Appropriations Acts. (The Congressional Research Service tracks these acts on CRS.gov, at http://www.crs.gov/AppropriationsStatusTable/index.) NSF's budget justifications are published on the agency's website at http://www.nsf.gov/about/budget/.

FY2017 Budget and Appropriations Actions

The Obama Administration sought $7.964 billion for NSF in FY2017, a $501 million (6.7%) increase over the FY2016 estimate of $7.463 billion (see **Table 1**). This request included $7.564 billion in discretionary budget authority and $400 million in new one-time mandatory budget authority (excluding new mandatory funding, the total NSF request was $101 million (1.3%) greater than the FY2016 appropriation).

The request would have increased budget authority in three accounts relative to the FY2016 estimate: RRA by $392 million (6.5%), EHR by $73 million (8.3%), and AOAM by $43 million (13%). The NSB and OIG accounts would have received about the same amount as in FY2016. Funding for the MREFC account would have decreased by $7 million (3.6%). The requested mandatory budget funding would have been split between two accounts—$346 million for RRA and $54 million for EHR. It is not typical for NSF to request or receive mandatory funding for major accounts.[2]

[1] In FY2008, NSF shifted the EPSCoR program from the Education and Human Resources (EHR) account to the Research and Related Activities (RRA) account.

[2] NSF receives a small amount of mandatory funding from H-1B Nonimmigrant Petitioner Fees (40% of total H-1B

As reported by the Senate Committee on Appropriations on April 21, 2016, S. 2837, the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2017, would have provided a total of $7.510 billion to NSF for FY2017. This amount would have been $46 million (0.6%) above the FY2016 estimated funding level, $54 million (0.7%) below President Obama's FY2017 discretionary funding request, and $454 million (5.7%) below the request including new mandatory funding. This bill would have kept funding for each of the major accounts at nearly the same level as the FY2016 estimate, except for the MREFC account, which would have increased by $46 million (23%).[3]

As reported by the House Committee on Appropriations on June 6, 2016, H.R. 5393, the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2017, would have provided a total of $7.406 billion to NSF for FY2017. This amount would have been $57 million (0.8%) below the FY2016 estimated funding level, $158 million (2.1%) below President Obama's FY2017 discretionary funding request, and $558 million (7.5%) below the request including new mandatory funding. The bill would have kept funding for the EHR, NSB, and OIG accounts nearly the same as the FY2016 estimate, increased the RRA and AOAM accounts by $46 million (0.8%) and $10 million (3%), respectively, and decreased the MREFC account by $113 million (57%).[4]

The Consolidated Appropriations Act, 2017 (P.L. 115-31), signed by the President on May 5, 2017, provides $7.472 billion in discretionary funding to NSF, 0.1% above the FY2016 enacted amount. The Further Continuing and Security Assistance Appropriations Act, 2017 (P.L. 114-254), provided funding at about 99.8% of the FY2016 funding level for the NSF through April 28, 2017.[5] The Continuing Appropriations and Military Construction, Veterans Affairs, and Related Agencies Appropriations Act, 2017 (P.L. 114-223), provided funding for the NSF from October 1, 2016 through December 9, 2016, at the FY2016 funding rate subject to a 0.496% across-the-board decrease.[6]

The FY2017 NSF budget justification highlighted many of the same programs as in FY2016. Specifically, the document identified two areas of major emphasis, four cross-foundation investments, and six on-going NSF-wide priorities. The two areas of major emphasis—a new classification in the FY2017 budget document—are Clean Energy Research and Development (R&D) and strengthening support for core activities:

- The FY2017 request would have increased funding across multiple offices and RRA directorates for Clean Energy R&D by $141 million to $512 million total, a 37.9% increase. Clean Energy R&D appears to have broadly included Clean Energy Technology, listed as one of the cross-foundation investments in FY2016.

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receipts collected, as authorized by P.L. 105-277 and P.L. 108-447). These H-1B fees are used for two programs: the low-income scholarship program, Scholarships in STEM (S-STEM); and the Innovative Technology Experiences for Students and Teachers (ITEST) program. FY2017 fees for NSF from the H-1B account are projected to be $100 million, equal to the FY2016 estimate. See NSF's FY2017 budget justification, p. EHR-21, for more information.

[3] U.S. Congress, Senate Committee on Appropriations, *Departments of Commerce and Justice, Science, and Related Agencies Appropriations Bill, 2017*, report to accompany S. 2837, 114th Cong., 2nd sess., April 21, 2016, S.Rept. 114-239 (Washington: GPO, 2016), p. 116.

[4] U.S. Congress, House Committee on Appropriations, *Commerce, Justice, Science, and Related Agencies Appropriations Bill, 2017*, report to accompany H.R. 5393, 114th Cong., 2nd sess., June 7, 2016, H.Rept. 114-605 (Washington: GPO, 2016), pp. 54-71.

[5] For more information on P.L. 114-254, see CRS Report R44723, *Overview of Further Continuing Appropriations for FY2017 (H.R. 2028)*, coordinated by James V. Saturno.

[6] House Joint Resolution 99 (P.L. 115-30) amended P.L. 114-223 to provide continuing FY2017 appropriations for NSF from April 28, 2017, through May 5, 2017.

- Strengthening support for core activities would have been funded by the new mandatory budget authority request of $400 million to support "fundamental, curiosity-driven research," with a focus on supporting early-career investigators. The budget justification reported that the mandatory funding would have allowed for an estimated 800 additional research grants to be funded.

The foundation's four cross-foundation investments aim to bring researchers from different fields of science and engineering together to address cross-disciplinary questions. As in FY2016, these activities included the following:

- Understanding the Brain (UtB, $142 million requested, 3.6% decrease from FY2016 estimate);
- Risk and Resilience ($43 million requested, 4.9% increase);
- Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS, $62 million requested, 27.7% increase); and
- NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES, $16 million requested, 3.2% increase).

NSF identified six ongoing foundation-wide priorities for FY2017. These included the following:

- Cyber-Enabled Materials, Manufacturing, and Smart Systems (CEMMSS, $257 million requested, 0.3% increase over the FY2016 estimate);
- Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education (CIF21, $100 million requested, 24.4% decrease);
- Innovation Corps (I-Corps, $30 million requested, no change);
- Research at the Interface of Biological, Mathematical, and Physical Sciences (BioMaPS, $30 million requested, 4.8% decrease);
- Science, Engineering, and Education for Sustainability (SEES, $52 million requested, 29.8% decrease); and
- Secure and Trustworthy Cyberspace (SaTC, $150 million requested, 15.4% increase).

The NSF Research Traineeship (NRT) program was no longer included in the foundation-wide priorities list, though NRT was noted as a crosscutting program with funding from the RRA and EHR accounts. The overall FY2017 request for NRT was $58.6 million, an 8.3% increase from the FY2016 estimate (including a 9.4% decrease in requested funding through RRA and a 21.4% increase through EHR); this remained lower than the $74.4 million in enacted funding level for NRT in FY2015. For another widely tracked crosscutting program, the Graduate Research Fellowship (GRF), the FY2017 request was about the same as the FY2016 estimate ($332 million).

The report to accompany S. 2837, S.Rept. 114-239 (referred to as the "Senate report" in this section), specifically addressed one of these NSF-wide funding priorities, stating "The Committee supports the NSF's request for the Innovation Corps [I–Corps] program ..." The report to accompany H.R. 5393, H.Rept. 114-605 (referred to as the "House report" in this section), recommended $5 million above the requested level for I-Corps "to enable greater participation

nationally." The explanatory statement accompanying P.L. 115-31 directs NSF to provide the requested level of $30 million for I-Corps.[7]

Broadly, both reports expressed support for programs that focus on such things as cybersecurity and broadening participation in STEM fields from underrepresented populations. As reported, neither S. 2837 nor H.R. 5393 would have included the $400 million in new mandatory funding requested to strengthen support for core services. The requested mandatory funding is not included in the Consolidated Appropriations Act, 2017.

Table 1. NSF Funding by Major Account, FY2015-FY2017

(budget authority in millions of dollars)

			FY2017			
Account	**FY2015 Actual**	**FY2016 Estimate**	**Request**	**House Committee-Reported**	**Senate Committee-Reported**	**Enacted**
Research and Related Activities (RRA)	**6041.6**	**6033.7**	**6425.4**	**6079.4**	**6033.6**	**6033.7**
Discretionary	*6041.6*	*6033.7*	*6079.4*	*6079.4*	*6033.6*	*6033.7*
Mandatory	*0*	*0*	*346.0*	*0*	*0*	*0*
Education and Human Resources (EHR)	**886.3**	**880.0**	**952.9**	**880.0**	**880.0**	880.0
Discretionary	*886.3*	*880.0*	*898.9*	*880.0*	*880.0*	*880.0*
Mandatory	*0*	*0*	*54.0*	*0*	*0*	*0*
Major Research Equipment and Facilities Construction (MREFC)	**144.8**	**200.3**	**193.1**	**87.1**	**246.6**	**209.0**
Agency Operations and Award Management (AOAM)	**306.6**	**330.0**	**373.0**	**340.0**	**330.0**	**330.0**
National Science Board (NSB)	**4.2**	**4.4**	**4.4**	**4.4**	**4.4**	**4.4**
Office of the Inspector General (OIG)	**14.6**	**15.2**	**15.2**	**15.2**	**15.2**	**15.2**
NSF, Total	**7398.0**	**7463.5**	**7964.0**	**7406.1**	**7509.8**	**7472.2**
Discretionary	*7398.0*	*7463.5*	*7564.0*	*7406.1*	*7509.8*	*7472.2*
Mandatory	*0*	*0*	*400.0*	*0*	*0*	***0***

Source: FY2017 *NSF Budget Request to Congress*; H.R. 5393 as reported by the House Committee on Appropriations, and H.Rept. 114-605; S. 2837, as reported by the Senate Committee on Appropriations, and S.Rept. 114-239; and the Consolidated Appropriations Act, 2017 (P.L. 115-31).

Notes: The term "n/s" means "not specified." Totals may not add due to rounding.

[7] Explanatory Statement, Consolidated Appropriations Act, 2017, Division B (Commerce, Justice, Science, and Related Agencies Appropriations Act, 2017), *Congressional Record*, vol. 163, no. 76—Book II (May 3, 2017), p. H3375.

Research and Related Activities (RRA)

The Obama Administration sought a $392 million (6.5%) increase in funding for RRA in FY2017, for a total of $6.425 billion. Of this amount, $6.079 billion was requested as discretionary funding and $346 million was requested as new mandatory budget authority. As reported by the Senate Committee on Appropriations, S. 2837 would have provided $6.034 billion in discretionary funding, keeping RRA funding at the same level as in FY2016. As reported by the House Committee on Appropriations, H.R. 5393 would have provided $6.079 billion in discretionary funding, which was the same as the level of requested discretionary funding and represents a $45.8 million increase over FY2016. Neither bill would have provided mandatory funding. The Consolidated Appropriations Act, 2017 (P.L. 115-31), provides $6.034 billion for RRA, equal to the FY2016 estimate.

The FY2017 budget request sought increases for all of the RRA subaccounts except for the U.S. Arctic Research Commission (USARC), which would not have changed (see **Table 2**). The largest percentage increase would have gone to Engineering (ENG, 9.4%). The largest increase in dollars would have gone to Mathematical and Physical Sciences (MPS, $87.3 million). Other subaccounts would have received an increase of between 6.0% and 6.5%, except for Integrated Activities (IA), which would have received a 2.9% increase. The FY2017 request also included an increase for the widely tracked Experimental Program to Stimulate Competitive Research (EPSCoR) from $160 million to $171 million (an increase of 6.7%), of which $8.56 million was requested as new mandatory funding.

S. 2837 did not specify funding allocations within RRA. However, Senate report language did specify funding levels for three programs: $10 million for the Historically Black Colleges and Universities Excellence in Research program, $18 million for the Advancement of Women in Academic Science and Engineering Careers program (ADVANCE), and "not less than the fiscal year 2016 enacted level for EPSCoR" ($160 million).

Similarly, H.R. 5393 did not specify allocations within RRA, but House report language did specify funding levels for three programs: $171 million for EPSCoR; $48 million for the International Ocean Drilling Program (IODP); and $147 million for "NSF's contributions to the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative," which are part of NSF's Understanding the Brain (UtB) cross-foundation investment.

Both the House and Senate reports noted support for NSF's peer review process. The House report further directed agency actions regarding research abstracts, including a continuation of agency efforts to ensure that award abstracts are written in "plain English," stating that they "serve as a public justification for NSF funding decisions by articulating how the project serves the national interest."

The Consolidated Appropriations Act, 2017 (P.L. 115-31) did not specify funding allocations within RRA, except to direct that no more than $544 million remain available for polar research and operations support and U.S. Antarctic program activities. The explanatory statement accompanying the act further directed that, of RRA funding, no less than $160 million is for EPSCoR.[8]

[8] The explanatory statement further approved any language in the Senate and House reports that was unchanged by the explanatory statement or appropriations act.

Table 2. NSF Funding by RRA Subaccount, FY2015-FY2017

(budget authority in millions of dollars)

Account	FY2015 Enacted	FY2016 Estimate	FY2017 Request	FY2017 House Committee-Reported	FY2017 Senate Committee-Reported	FY2017 Enacted
Biological Sciences (BIO)	**736.2**	**744.2**	**790.5**	**n/s**	**n/s**	**n/s**
Discretionary	*736.2*	*744.2*	*745.7*	–	–	–
Mandatory	*0*	*0*	*44.8*	–	–	–
Computer and Information Science and Engineering (CISE)	**933.0**	**935.8**	**944.8**	**n/s**	**n/s**	**n/s**
Discretionary	*933.0*	*935.8*	*938.4*	–	–	–
Mandatory	*0*	*0*	*56.4*	–	–	–
Engineering (ENG)	**923.5**	**916.2**	**1002.7**	**n/s**	**n/s**	**n/s**
Discretionary	*923.5*	*916.2*	*946.4*	–	–	–
Mandatory	*0*	*0*	*56.3*	–	–	–
Geosciences (GEO)	**1319.0**	**1318.5**	**1398.8**	**n/s**	**n/s**	**n/s**
Discretionary	*1319.0*	*1318.5*	*1319.6*	–	–	–
Mandatory	*0*	*0*	*79.3*	–	–	–
Mathematical and Physical Sciences (MPS)	**1376.3**	**1349.2**	**1436.5**	**n/s**	**n/s**	**n/s**
Discretionary	*1376.3*	*1349.2*	*1355.1*	–	–	–
Mandatory	*0*	*0*	*81.4*	–	–	–
Social, Behavioral, and Economic Sciences (SBE)	**276.2**	**272.2**	**288.8**	**n/s**	**n/s**	**n/s**
Discretionary	*276.2*	*272.2*	*272.4*	–	–	–
Mandatory	*0*	*0*	*16.4*	–	–	–
Office of International Science and Engineering (OISE)	**48.5**	**49.1**	**52.1**	**n/s**	**n/s**	**n/s**
Discretionary	*48.5*	*49.1*	*49.1*	–	–	–
Mandatory	*0*	*0*	*3.0*	–	–	–
International and Integrative Activities (IIA)	**427.5**	**447.1**	**459.9**	**n/s**	**n/s**	**n/s**
Discretionary	*427.5*	*447.1*	*451.3*	–	–	–
Mandatory	*0*	*0*	*8.6*	–	–	–
U.S. Arctic Research Commission (USARC)	**1.4**	**1.4**	**1.4**	**n/s**	**n/s**	**n/s**

Account	FY2015 Enacted	FY2016 Estimate	FY2017 Request	FY2017 House Committee-Reported	FY2017 Senate Committee-Reported	FY2017 Enacted
Discretionary	*1.4*	*1.4*	*1.4*	*–*	*–*	*–*
Mandatory	*0*	*0*	*0*	*–*	*–*	*–*
Research and Related Activities (RRA) Total	**6041.6**	**6033.7**	**6425.4**	**6079.4**	**6033.6**	**6033.7**
Discretionary	*6041.6*	*6033.7*	*6079.4*	*6079.4*	*6033.6*	*6033.7*
Mandatory	*0*	*0*	*346.0*	*0*	*0*	*0*

Source: FY2017 *NSF Budget Request to Congress*; H.R. 5393 as reported by the House Committee on Appropriations, and H.Rept. 114-605; S. 2837, as reported by the Senate Committee on Appropriations, and S.Rept. 114-239; and the Consolidated Appropriations Act, 2017 (P.L. 115-31).

Notes: The term "n/s" means "not specified." Totals may not add due to rounding.

Education and Human Resources (EHR)

The FY2017 budget request included $953 million for EHR, a $73 million (8.3%) increase over the FY2016 estimate. Of the total, $54 million was requested as mandatory budget authority. As reported by the Senate and House Committees on Appropriations, both S. 2837 and H.R. 5393 would have kept EHR funding at the FY2016 enacted level by providing $880 million in discretionary funding and no mandatory funding. Similarly, P.L. 115-31 provides a total of $880 million in discretionary funding for EHR.

Within EHR, there are four divisions: Division of Graduate Education (DGE), Division of Undergraduate Education (DUE), Division of Human Resource Development (HRD), and Division of Research on Learning in Formal and Informal Settings (DRL). The FY2017 request included increases over FY2016 for each division, the largest of which were requested for DRL ($249.3 million total, an 11.9% increase) and DGE ($305.3 million total, a 9.6% increase). New mandatory funding was requested for each division except for DGE.

By program, the largest increase in the FY2017 EHR budget request was for EHR Core Research (ECR): STEM Learning, within DRL.[9] The FY2017 request for ECR: STEM Learning was $52 million (including $9 million in requested mandatory funding), double the FY2016 estimate of $26 million. Congress did not fund a similar requested increase for FY2016. The Senate and House reports did not specify an appropriations amount for DRL or its ECR program, nor does the final appropriations act.

NSF's budget justification stated that "overall, there are no significant shifts in EHR's priorities between FY2016 and FY2017," and noted that EHR would intensify its engagements and cross-discipline collaborations. One of the ongoing EHR priority programs is CyberCorps: Scholarships

[9] Each EHR division has an EHR Core Research program (ECR). ECR: STEM Learning is in the Division of Research on Learning in Formal and Informal Settings (DRL). According to the October 24, 2014, ECR: Fundamental Research in STEM Education program solicitation (NSF15-509), DRL's "ECR projects are grounded in theory, ask well formulated research questions, employ relevant data and analytic techniques, and contribute to the growing body of literature on STEM education research." Other ECRs include in DGE, ECR: STEM Professional Workforce Preparation; in HRD, ECR: Broadening Participation and Institutional Capacity in STEM activity; and in DUE, ECR: STEM Learning Environments.

for Service, for which President Obama requested $70 million, an increase of $20 million over the FY2016 estimate (40% increase). The Senate report recommended $55 million for this program (10% increase); the House report did not specify an amount. The explanatory statement accompanying P.L. 115-31 directs NSF to provide $55 million for CyberCorps—a $5 million increase over the FY2016 estimate—and "no less than $7.5 million for qualified community colleges as directed by the Senate."[10]

President Obama requested no change in total funding for several EHR programs including

- Advancing Informal STEM Learning (AISL, $63 million—no change in total, but $8 million of the $63 million was requested as mandatory funding),
- STEM+C Partnerships ($52 million—no change in total, but $31 million of the $52 million was requested as mandatory funding),
- Advanced Technological Education (ATE, $66 million),
- Robert Noyce Teacher Scholarship Program ($61 million),
- Louis Stokes Alliance for Minority Participation (LSAMP, $46 million),
- Historically Black Colleges and Universities Undergraduate Program (HBCU-UP, $35 million), and
- Tribal Colleges and University Program (TCUP, $14 million).

The Senate report recommended funding these programs at the requested level using only discretionary funds. The House report specified not less than the requested levels for ATE, LSAMP, HBCU-UP, and TCUP. Additionally, the Senate and House reports recommended $5 million and $30 million, respectively, to establish a broadening participation program in STEM fields at Hispanic Serving Institutions (HSIs).

The explanatory statement accompanying P.L. 115-31 also directs NSF to provide funding at the requested levels for AISL, STEM+C, TCUP, the HBCU program, and LSAMP. The explanatory statement further directs NSF to provide at least $15 million to establish an HSI program and "encourages NSF to use this program to build capacity at institutions of higher education that typically do not receive high levels of NSF grant funding."

Major Research Equipment and Facilities Construction (MREFC)

The Major Research Equipment and Facilities Construction (MREFC) account supports large construction projects and scientific instruments. The Obama Administration sought just over $193 million for MREFC in FY2017, $7 million less than FY2016 (3.6% decrease). The Senate report recommended increasing MREFC funding to $247 million ($54 million above the request). The House report recommended decreasing funding to $87 million ($106 million below the request). The Consolidated Appropriations Act, 2017, provides $209 million for MREFC, which is $9 million more than the FY2016 estimate. MREFC is the only NSF account to receive an increase over FY2016 estimated funding levels.

The FY2017 budget request included support for continued construction of the Large Synoptic Survey Telescope (LSST, $67 million requested, 32.7% decrease) and Daniel K. Inouye Solar Telescope (DKIST, $20 million requested, no change).[11] The Senate report recommended funding

[10] The Senate report defined these community colleges as those "that have been designated as a Center of Academic Excellence in information Assurance 2-Year Education [CAE2Y] by the National Security Agency and the Department of Homeland Security" (p. 118).

[11] The Advanced Technology Solar Telescope was renamed the Daniel K. Inouye Solar Telescope in December 2013.

these activities at the requested level. The House report also recommended funding at the requested level for the LSST ($67 million); it further directed NSF to provide quarterly briefings to the committee on the status of the LSST project but did not specify a funding amount. Neither project was referenced in P.L. 115-31 or the explanatory statement.

The budget request included $106 million to begin the construction of two Regional Class Research Vessels (RCRVs) to support science in U.S. coastal waters. The Senate report would have increased funding to $159 million to support the construction of three new RCRVs; the House report did not discuss this program. The explanatory statement directs NSF to provide $122 million to build three RCRVs. This amounts to $41 million per ship, compared to the FY2017 request of $53 million per ship.

The House report stated that the "recommendation fully funds the requested amounts for the Antarctic Infrastructure Modernization for Science program" (AIMS, $5 million requested for preconstruction planning).[12] P.L. 115-31 specifies that up to $544 million shall remain available for polar research and operations support and for U.S. Antarctic program activities.

Both the Senate and House reports also directed the Government Accountability Office (GAO) to provide an independent perspective on the technical risks and cost overruns for MREFC programs. The National Ecological Observatory Network (NEON) is transitioning from the construction phase to the operational phase, and NSF reported that construction is expected to be complete by the end of FY2017. Consequently, no MREFC funding was requested for NEON, and NSF requested $65 million through the Research and Related Activities account for ongoing operations and maintenance costs for the project.

Other Accounts and Initiatives

The Obama Administration sought $373 million for the Agency Operations and Award Management (AOAM) account, a $43 million (13%) increase over FY2016. A multi-year plan to relocate NSF headquarters accounted for $34 million of this increase. The Senate report recommended $330 million (same as FY2016). The House report recommended $340 million ($10 million above FY2016). The Consolidated Appropriations Act, 2017, provides $330 million for AOAM. The act further specifies that up to $40.7 million shall be available for costs associated with NSF relocating to the new headquarters, which is $2.6 million below the FY2017 request of $43.3 million.

The budget request included funding for the National Science Board (NSB) and the Office of Inspector General (OIG) at approximately the same levels as in FY2016 ($4 million and $15 million, respectively). In line with the House and Senate report recommendations, P.L. 115-31 provides funding amounts nearly equal to the FY2016 estimates for both accounts ($4.4 million for NSB and $15.2 million for OIG).

The FY2017 request also included funding for NSF activities under three multi-agency initiatives[13] including the

[12] AIMS is part of NSF's broader activities to increase U.S. operational efficiency in the Antarctic ($23.5 million total requested), implementing recommendations from the U.S. Antarctic Program Blue Ribbon Panel report, *More and Better Science in Antarctica Through Increased Logistical Effectiveness*, Washington, DC, July 2012, available at https://www.nsf.gov/geo/plr/usap_special_review/usap_brp/rpt/index.jsp.

[13] See the National Science and Technology Council (NSTC) activities under the "NSF-Wide Investments" section of the NSF FY2017 budget request, pp. 82, 87, and 94, as well as the "Summary Tables" section, p. 9.

- National Nanotechnology Initiative (NNI, $415 million requested, about the same as in FY2016),[14]
- Networking and Information Technology Research and Development (NITRD, $1.254 billion requested, an increase of $59 million [4.9%], most of which [$56 million] was requested as new mandatory funding),[15] and
- U.S. Global Change Research Program (USGCRP, $348 million, which is $9 million [2.6%] more than the FY2016 estimate).[16]

The Senate and House reports did not include recommendations for these initiatives. As well, the Consolidated Appropriations Act, 2017, and the accompanying explanatory statement do not specify funding levels for the initiatives.

Authorizations of Appropriations

Authorizations of appropriations to NSF, which were last enacted in the America COMPETES Reauthorization Act of 2010 (P.L. 111-358), expired in FY2013.[17] Members of the 114th Congress introduced measures to reauthorize provisions from P.L. 111-358, including provisions that would have authorized appropriations to NSF.

As reported by the Senate Committee on Commerce, Science, and Transportation on June 29, 2016, S. 3084, the American Innovation and Competitiveness Act (AICA), would have authorized $7.510 billion for NSF in FY2017. However, provisions to authorize appropriations for NSF were not included in the AICA bill language as enacted on January 6, 2017 (P.L. 114-329). As passed by the House in 2015, H.R. 1806, the America COMPETES Reauthorization Act of 2015, would have authorized $7.597 billion for NSF in FY2017, specifying funding levels for major accounts and RRA subaccounts.[18]

Funding levels initially proposed in each of these acts would have provided reduced authorizations of appropriations compared to the FY2013 NSF authorization levels under P.L. 111-358. Compared to NSF budget amounts, the proposed reauthorization levels were higher than NSF's actual and estimated budget amounts in FY2015 and FY2016. **Table 3** shows the FY2013 authorization levels, appropriations to NSF in FY2015 and FY2016, FY2017 requested amounts, and proposed authorized funding levels for NSF in FY2017 under selected reauthorization measures from the 114th Congress.

[14] For more information on the NNI program, see CRS Report RL34401, *The National Nanotechnology Initiative: Overview, Reauthorization, and Appropriations Issues*, by John F. Sargent Jr.

[15] For more information on the NITRD program, see CRS Report RL33586, *The Federal Networking and Information Technology Research and Development Program: Background, Funding, and Activities*, by Patricia Moloney Figliola.

[16] For more information on FY2016 federal R&D funding, including the multi-agency NNI, NITRD, and USGCRP initiatives, see CRS Report R43944, *Federal Research and Development Funding: FY2016*, coordinated by John F. Sargent Jr.

[17] See CRS Report R43880, *The America COMPETES Acts: An Overview*, by Heather B. Gonzalez.

[18] Additionally, H.R. 1898, the America Competes Reauthorization Act of 2015, would have authorized $8.099 billion for NSF in FY2017, specifying funding levels by major account. Of the three proposed reauthorization acts, only H.R. 1898 would have provided funding at or above NSF's FY2017 request. H.R. 1898 was introduced on April 21, 2015, and Congress took no further action on the bill.

Table 3. NSF Appropriation Authorizations Under Selected, Proposed Reauthorization Acts

(in millions of dollars)

Account	FY2013 Authorized	FY2015 Actual	FY2016 Estimate	FY2017 Request[a]	Proposed Reauthorization Acts[b] H.R. 1806	Proposed Reauthorization Acts[b] H.R. 1898
Research and Related Activities (RRA)	6,637.8	6,041.6	6,033.7	6,425.4	6,186.3	6,495.6
Biological Sciences (BIO)	*n/s*	*736.2*	*744.2*	*790.5*	*823.0*	*n/s*
Computer and Information Science and Engineering (CISE)	*n/s*	*933.0*	*935.8*	*944.8*	*1,038.0*	*n/s*
Engineering (ENG)	*n/s*	*923.5*	*916.2*	*1002.7*	*1,010.0*	*n/s*
Geosciences (GEO)	*n/s*	*1319.0*	*1318.5*	*1398.8*	*1,200.0*	*n/s*
Mathematical and Physical Sciences (MPS)	*n/s*	*1376.3*	*1349.2*	*1436.5*	*1,500.0*	*n/s*
Social, Behavioral, and Economic Sciences (SBE)	*n/s*	*276.2*	*272.2*	*288.8*	*150.0*	*n/s*
Office of International Science and Engineering (OISE)	*n/s*	*48.5*	*49.1*	*52.1*	*38.5*	*n/s*
Integrative Activities (IA)	*n/s*	*427.5*	*447.1*	*459.9*	*425.3*	*n/s*
U.S. Arctic Research Commission (USARC)	*n/s*	*1.4*	*1.4*	*1.4*	*1.5*	*n/s*
Education and Human Resources (EHR)	1,041.8	886.3	880.0	952.9	866.0	1,010.7
Major Research Equipment and Facilities Construction (MREFC)	236.8	144.8	200.3	193.1	200.3	200.0
Agency Operations and Award Management (AOAM)	363.7	306.6	330.0	373.0	325.0	372.6
National Science Board (NSB)	4.9	4.2	4.4	4.4	4.4	4.5
Office of the Inspector General (OIG)	15.0	14.6	15.2	15.2	15.2	15.6
NSF, Total	**$8,300.0**	**$7,398.0**	**$7,463.5**	**7964.0**	**$7,597.1**	**$8,099.0**

Source: America COMPETES Reauthorization Act of 2010 (P.L. 111-358); FY2017 NSF congressional budget justification; H.R. 1806, as passed by the House on May 20, 2015; and H.R. 1898, as introduced on April 21, 2015.

Notes: The term "n/s" means "not specified." Amounts in the "FY2015 actual" column represent total, actual budgetary resources, including annual appropriations, unobligated balances, transfers, and other adjustments. Italicized account names represent RRA subaccounts.

a. Amounts include both discretionary and new mandatory funding requests. See **Table 1** and **Table 2** for a breakdown of discretionary and mandatory funding requests for NSF major accounts and RRA subaccounts.

b. These acts may include proposed reauthorizations for more than one fiscal year. This table only includes FY2017 proposed reauthorization amounts.

NSF Funding History

The following sections provide information on authorizations of appropriations, as well as funding data and trends, since the foundation was established in 1950.

Long-term Funding Trends

Table 4, **Figure 1**, and **Figure 2** show the trends in NSF authorizations, budget requests, and appropriations since the foundation was first authorized in the early 1950s. Except in FY1957, current and constant dollar actual appropriations to NSF grew rapidly between FY1951 and FY1966. After FY1967, appropriations fluctuated (up some years and down in others) until about FY1988. NSF experienced periods of generally sustained growth in current and constant dollar appropriations between FY1989 and FY1995 and again between FY1998 and FY2003. Since FY2004, growth in the NSF budget has slowed compared to prior years.

Table 4. NSF Authorizations, Budget Requests, and Appropriations: FY1951-FY2017

(in millions of current and constant [FY2017] dollars)

	Current ($ millions)			Constant (FY2017 $ millions)		
Fiscal Year	Authorization	Request	Appropriation	Authorization	Request	Appropriation
1951	such sums	—	0	such sums	—	2
1952	such sums	14	4	such sums	107	27
1953	such sums	15	5	such sums	113	36
1954	such sums	15	8	such sums	111	59
1955	such sums	14	14	such sums	103	105
1956	such sums	31	53	such sums	223	381
1957	such sums	41	40	such sums	286	277
1958	such sums	65	52	such sums	437	348
1959	such sums	140	138	such sums	927	910
1960	such sums	160	153	such sums	1,046	998
1961	such sums	190	176	such sums	1,223	1,132
1962	such sums	210	263	such sums	1,338	1,678
1963	such sums	358	323	such sums	2,254	2,030
1964	such sums	589	353	such sums	3,664	2,195
1965	such sums	488	420	such sums	2,981	2,569
1966	such sums	530	480	such sums	3,172	2,871
1967	such sums	525	481	such sums	3,049	2,793
1968	such sums	526	495	such sums	2,953	2,779
1969	525	500	400	2,818	2,684	2,147
1970	478	500	440	2,433	2,547	2,241
1971	538	513	513	2,607	2,487	2,487

	Current ($ millions)			Constant (FY2017 $ millions)		
Fiscal Year	Authorization	Request	Appropriation	Authorization	Request	Appropriation
1972	653	622	622	3,020	2,879	2,879
1973	697	653	649	3,090	2,896	2,879
1974	633	583	579	2,621	2,414	2,400
1975	808	672	764	3,032	2,523	2,868
1976	787	755	715	2,763	2,652	2,511
1977	811	802	776	2,655	2,626	2,541
1978	879	944	863	2,699	2,897	2,649
1979	930	934	911	2,641	2,653	2,588
1980	1,002	1,006	992	2,617	2,629	2,591
1981	1,115	1,148	1,025	2,652	2,732	2,439
1982	n/a	1,354	1,039	n/a	3,014	2,314
1983	n/a	1,073	1,094	n/a	2,289	2,333
1984	n/a	1,292	1,341	n/a	2,663	2,762
1985	n/a	1,502	1,502	n/a	2,995	2,995
1986	1,517	1,569	1,524	2,958	3,060	2,971
1987	1,685	1,686	1,623	3,214	3,215	3,095
1988	n/a	1,893	1,717	n/a	3,497	3,172
1989	2,050	2,050	1,923	3,642	3,642	3,416
1990	2,388	2,149	2,082	4,095	3,685	3,570
1991	2,782	2,485	2,316	4,607	4,115	3,836
1992	3,245	2,742	2,571	5,246	4,433	4,155
1993	3,505	3,037	2,734	5,534	4,795	4,316
1994	n/a	2,753	2,983	n/a	4,254	4,609
1995	n/a	3,200	3,264	n/a	4,842	4,938
1996	n/a	3,360	3,220	n/a	4,991	4,783
1997	n/a	3,325	3,270	n/a	4,854	4,773
1998	3,506	3,367	3,431	5,055	4,855	4,947
1999	3,773	3,773	3,676	5,372	5,372	5,234
2000	3,886	3,921	3,912	5,421	5,470	5,457
2001	n/a	4,572	4,431	n/a	6,229	6,036
2002	n/a	4,473	4,823	n/a	5,996	6,466
2003	5,536	5,036	5,323	7,283	6,624	7,002
2004	6,391	5,481	5,589	8,203	7,036	7,174
2005	7,378	5,745	5,482	9,183	7,150	6,823
2006	8,520	5,605	5,589	10,269	6,756	6,737

	Current ($ millions)			Constant (FY2017 $ millions)		
Fiscal Year	**Authorization**	**Request**	**Appropriation**	**Authorization**	**Request**	**Appropriation**
2007	9,839	6,020	5,890	11,546	7,065	6,912
2008	6,600	6,429	6,125	7,587	7,391	7,042
2009	7,326	6,854	6,494[a]	8,325	7,789	7,379[a]
2010	8,132	7,045	6,873	9,161	7,936	7,742
2011	7,424	7,424	6,806	8,197	8,197	7,514
2012	7,800	7,767	7,033	8,457	8,421	7,626
2013	8,300	7,373	6,884	8,847	7,859	7,338
2014	n/a	7,626	7,172	n/a	7,992	7,517
2015	n/a	7,255	7,344	n/a	7,502	7,594
2016	n/a	7,724	7,463	n/a	7,862	7,597
2017	n/a	7,964	7,472	n/a	7,964	7,472

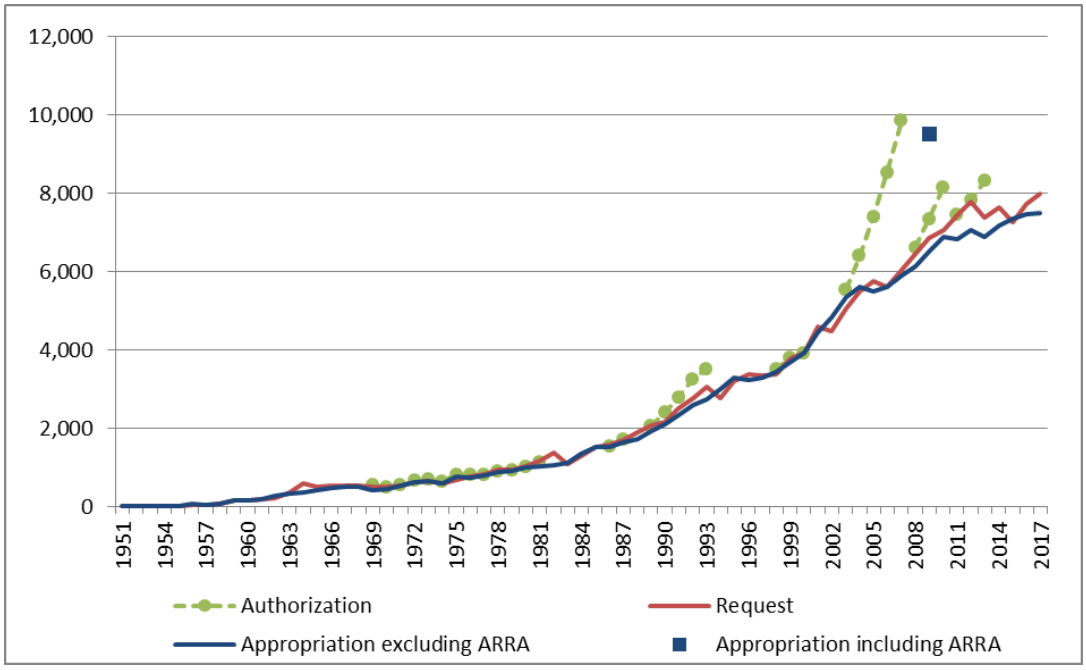
Source: Funding data in the "Authorization" columns are from selected FY1951 to FY2013 NSF authorization acts. Funding data in the "Request" and "Appropriations" columns are from National Science Foundation, Budget Internet Information System, "NSF Requests and Appropriations History," NSF.gov, June 13, 2016, http://dellweb.bfa.nsf.gov/NSFRqstAppropHist/NSFRequestsandAppropriationsHistory.pdf, and P.L. 115-31. To calculate constant FY2017 dollars, CRS used the Gross Domestic Product (Chained) Price Index found in Office of Management and Budget, *Historical Tables*, "Table 10.1," February 2, 2016, available at https://obamawhitehouse.archives.gov/sites/default/files/omb/budget/fy2017/assets/hist10z1.xls.

Notes: As per communication between CRS and NSF dated March 20, 2014, the "Appropriation" column shows funding provided in annual appropriations acts plus adjustments required in those acts, other laws, committee reports, etc. Adjustments include rescissions, sequestration, funding transfers across NSF accounts, supplemental appropriations (not including American Recovery and Reinvestment Act, P.L. 111-5, funding in FY2009), and other changes. Resulting amounts most closely align with NSF's approved Current Plans. The term "n/a" means "not available." The term "such sums" means "such sums as may be necessary" to carry out agency powers and duties.

a. FY2009 appropriation amounts do not include American Recovery and Reinvestment Act (ARRA), P.L. 111-5, supplemental funding, which provided an additional $3,002 million to NSF. With ARRA included, total FY2009 appropriations to NSF were $9,496 million in current dollars and $10,791 million in constant (FY2017) dollars.

Figure 1. Current Dollar NSF Authorizations, Budget Requests, and Appropriations: FY1951 to FY2017

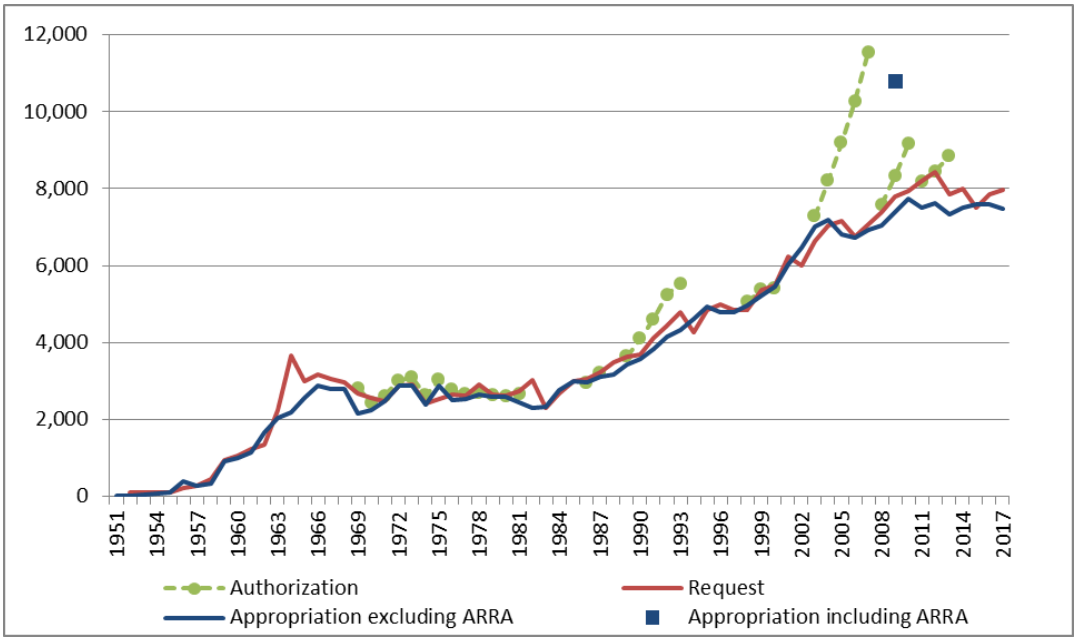
(in millions of current dollars)



Source: Table 4.

Figure 2. Constant Dollar NSF Authorizations, Budget Requests, and Appropriations: FY1951 to FY2017

(in millions of constant [2017] dollars)



Source: Table 4.

NSF Obligations by Major Account

Table 5 shows NSF obligations by major account since FY2003. Prior years are not comparable due to changes in NSF account structure. Most of the growth in total NSF obligations since FY2003 has accrued to the main research account, RRA, which increased by about $1.890 billion in current dollars (45.6%) between FY2003 and the FY2017 enacted amount. Total NSF obligations increased by about $2.094 billion (39%) during this same period.

Table 5. NSF Obligations by Major Account, FY2003-FY2017

(in millions of current dollars)

Fiscal Year	RRA	EHR	MREFC	AOAM	NSB	OIG	NSF Total
2003	4,144	846	179	189	3	9	5,369
2004	4,388	850	184	219	2	9	5,652
2005	4,328	750	165	223	4	10	5,481
2006	4,449	700	234	247	4	11	5,646
2007	4,758	696	166	248	4	12	5,884
2008	4,853	766	167	282	4	12	6,084
2009[a]	5,152	846	161	294	4	12	6,469
2010	5,615	873	166	300	4	14	6,972
2011	5,608	861	125	299	4	14	6,913
2012	5,758	831	198	299	4	14	7,105
2013	5,559	835	196	294	4	14	6,902
2014	5,775	832	200	306	4	14	7,131
2015	6,042	886	145	307	4	15	7,398
2016[b]	6,034	880	200	330	4	15	7,463
2017[c]	6,034	880	209	330	4	15	7,472

Source: FY2005 to FY2017 annual NSF congressional budget justifications.

Notes: NSF adopted its current appropriations account structure in 2003. For this table, CRS adjusted FY2003 to FY2007 RRA and EHR obligations data to reflect the transfer of the EPSCoR program between these accounts in FY2008. This table treats EPSCoR as part of RRA for all years in the data set.

a. FY2009 appropriations amounts do not include American Recovery and Reinvestment Act (ARRA), P.L. 111-5, one-time supplemental funding. With ARRA included, FY2009 appropriations were $9,496 million ($3,002 supplemental) total for NSF; 7,686 million ($2,500 million supplemental) for RRA; $945 million ($100 million supplemental) for EHR; $552 million ($400 million supplemental) for MREFC; and $14 million ($2 million supplemental) for OIG.

b. Estimated funding levels, as per NSF's FY2017 budget request to Congress. Prior years are actual.

c. Enacted funding levels, per P.L. 115-31.

d.

Policy Implications

Continuing appropriations acts (often known as continuing resolutions [CRs]) that provide short-term funding until appropriations decisions are finalized can lead to uncertainty for agencies.[19] On one hand, CRs allow for ongoing appropriations discussions without a funding gap. On the other hand, they may lead to reductions or delays in agency operations, such as hiring staff, beginning new projects, and granting awards and contracts. Further, the three CRs that affected agency funding levels for the first approximately seven months of FY2017 reduced NSF operations slightly below FY2016 estimated levels, including a 0.496% across-the-board decrease from FY2016 funding levels that was in effect until December 9, 2016, and a 0.19% decrease in effect from December 10, 2016 until April 28, 2017.

In the longer term, differences between program authorizations and appropriations, and a lack of consensus between some House and Senate Appropriations Committee recommendations, may lead to planning challenges for agencies and the broader scientific community. For example, the COMPETES acts sought to double funding for NSF; while the NSF budget increased between FY2008 and FY2013, appropriations did not reach authorized levels. For FY2017, there was a distinct difference between House and Senate recommended funding levels for the major facilities (MREFC) account; such discrepancies in recommendations may reflect broader policy disagreements. Having a clear signal from Congress on likely budgetary resources may better aid future program planning.

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[19] See CRS Report RL34700, *Interim Continuing Resolutions (CRs): Potential Impacts on Agency Operations*, by Clinton T. Brass.