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on the

National Science Foundation's

Merit Review Process

Fiscal Year 2013

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FY 2013 Report on the NSF Merit Review Process

I. Executive Summary

This annual report to the National Science Board (NSB) includes data and other information about the National Science Foundation (NSF or the Foundation) Merit Review Process for fiscal year (FY) 2013.

In FY 2013, NSF acted on 48,999 competitively reviewed full proposals. This is a small increase of about 0.8% from the number of proposals acted on in FY 2012, but an increase of over 53% from the number of proposals acted on in FY 2001. In FY 2012, two large divisions began requiring the submission of preliminary proposals for most programs within the divisions. The total number of full proposals and preliminary proposals acted on by NSF in FY 2013 (53,690) was 0.1% less than the total number of full proposals and preliminary proposals acted on in FY 2012 (53,748), but an increase of 57% from the total number of full and preliminary proposals acted on in FY 2001.

The Foundation made 10,829 awards in FY 2013, 695 (6%) fewer than in FY 2012 and 15 fewer than in FY 2003. This corresponds to a 22% success rate for competitively reviewed proposals. As indicated by data in **Appendix 1**, the average funding rate varies by NSF directorate, from a low of 18% in Education and Human Resources to a high of 26 % in Geosciences.[1]

In FY 2013, 81% of program funds awarded went to academic institutions.

FY 2013 saw a continuation of the recent balance between standard and continuing grants with 35% of funds being awarded as new standard grants compared to 12% as new continuing grants and 22% as continuing grant increments and supplements. In FY 2005, these numbers were 23%, 14%, and 29%, respectively.

The average number of months of salary support for individual Principal Investigators (PIs) or Co-PIs per research grant per year continued its decadal downward trend and is now just over 0.8 months. The running three-year mean number of research proposals a PI submitted before receiving an award remained 2.4 over the three-year period FY 2011 – FY 2013 and the moving three-year average PI success rate remained at 35%, its lowest level over the past decade. The percentage of early-career PIs improved slightly to 22% in FY 2013, from 21% in FY 2012.

Among proposals from PIs who provided information on their gender, race, ethnicity, or disability status, the proportion of proposals from PIs who identified themselves as female was 25.3%. The proportion of proposals from under-represented racial or ethnic minorities was 8.1% and the proportion from PIs with a disability was 1.4%.

[1] The Office of International and Integrative Activities is not included in this comparison.

The Foundation exceeded its "time to decision" goal of informing at least 70% of PIs of funding decisions within six months of receipt of their proposals. In FY 2013, 76% of all proposals were processed within six months.

Proposals that are externally reviewed are reviewed by three methods: panel only, mail + panel, and mail only. In FY 2013, 63% of proposals were reviewed by panel only, 27% by mail + panel, and 6% by mail only. These percentages are consistent with the trend over the last 15 years towards greater reliance on panels. In addition, about 4% of proposals were not reviewed externally. The latter include, for example, proposals for travel, symposia, Early Concept Grants for Exploratory Research, Grants for Rapid Response Research, and Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) Track 1 proposals. This is a decrease from 5% in FY 2012.

II. Introduction

The National Science Foundation Act of 1950 directs the Foundation "to initiate and support basic scientific research and programs to strengthen scientific research potential and science education programs at all levels."[2] NSF achieves its unique mission by making merit-based awards to researchers, educators, and students at just over 1,900 U.S. colleges, universities and other institutions.

All proposals are evaluated using the two NSB-approved criteria: *intellectual merit* and *broader impacts*. These are stated in the NSF *Grant Proposal Guide*. The language describing the merit review criteria in the *Grant Proposal Guide* was revised in October 2012 to incorporate new recommendations from the National Science Board.[3] This revised language applied to proposals submitted on or after January 14, 2013, or in response to deadlines that were on or after January 14, 2013. Additional criteria, as stated in the program announcement or solicitation, may be required to highlight the specific objectives of certain programs or activities. About 96% of NSF's proposals are evaluated by external reviewers as well as by NSF staff. The remaining proposals fall into special categories that are, by NSF policy, exempt from external review and may be internally reviewed only, such as proposals for small workshops, Early-concept Grants for Exploratory Research (EAGERs), Grants for Rapid Response Research (RAPIDs), and proposals to the Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) activity[4] (see **Section III.F9** and **Appendix 10**).

This *FY 2013 Report on the NSF Merit Review Process* responds to a National Science Board (NSB) policy, endorsed in 1977 and amended in 1984, requesting that the NSF Director submit an annual report on the NSF merit review process. **Section III** of the report provides summary data about proposals, awards, and funding rates. Longitudinal data are given to provide a perspective over time. **Section IV** provides information about the process by which proposals are reviewed and awarded.

NSF's annual portfolio of funding actions (award or decline) is associated with proposals, requests for supplements, Intergovernmental Personnel Act agreements, and contracts. The bulk of this report deals with two overlapping subsets of these actions. Most of **Section III.A – E** looks at <u>competitively reviewed proposals</u>. **Section III.F** primarily discusses <u>research proposals</u>. The research proposal category includes proposals for what could be considered a typical research project and consists of a large subset (80%) of the competitively reviewed proposals.

In this document, two types of average are reported, the median and the arithmetic mean. The latter will be referred to simply as the mean. Funding rate and proposal success rate are used

[2] 42 CFR 16 §1862, available at http://www4.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00001862----000-.html. [Accessed 10.26.2012.]
[3] The NSF *Grant Proposal Guide* (GPG) applicable for the first quarter of FY 2013 is available at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpg_index.jsp. The version of the GPG applicable for the remainder of FY 2013 may be found at http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_index.jsp.
[4] In FY 2012, NSF inaugurated the Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) activity. See **Section III.F9.2**.

interchangeably to refer to the proportion of proposals acted on in a fiscal year that resulted in awards.

Directorates are often referred to by their acronyms BIO (Biological Sciences), CISE or CSE (Computer and Information Science and Engineering), EHR (Education and Human Resources), ENG (Engineering), GEO (Geosciences), MPS (Mathematical and Physical Sciences), and SBE (Social, Behavioral and Economic Sciences). Some tables and figures include data pertaining to the Office of International and Integrative Activities, abbreviated as IIA. Acronyms for three units that existed prior to FY 2013 are mentioned in the text of the report: OPP (Office of Polar Program), OCI (Office of Cyberinfrastructure), and OISE or ISE (Office of International Science and Engineeering). A list of acronyms may be found in **Appendix 20**.

III. Proposals and Awards

A. Proposals, Awards, and Proposal Success Rates

Table 1 shows the change in the number of proposals, number of awards, and proposal success rates through time. These data are for all competitively reviewed proposals.[5] The reader may also be interested in success rates for research proposals which may be found in **Section III.F**. Note that a proposal is included in a given year based on whether the action (division director's recommendation to award or decline[6]) was taken that year, not whether the proposal was received in that year.

In this, and many subsequent tables, results for FY 2009 and FY 2010 include funding actions made possible by the $3 billion additional appropriation that NSF received under the American Recovery and Reinvestment Act (ARRA). Approximately $2.5 billion of the ARRA appropriation was obligated in FY 2009. The remainder was obligated in FY 2010, primarily as facilities awards.

NSF completed action on 48,999 proposals in FY 2013, a 0.8% increase from FY 2012, resulting in 10,829 awards, a 6% decrease from FY 2012. Consequently, in FY 2013 the proposal success rate was 22%. **Appendix 1** provides proposal, award, and success rate data by NSF directorate and office.

Table 1 - NSF Proposal, Award, and Proposal Success Rate Trends

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Proposals	31,942	35,165	40,075	43,851	41,722	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999
Awards	9,925	10,406	10,844	10,380	9,757	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829
Success Rate	31%	30%	27%	24%	23%	25%	26%	25%	32%	23%	22%	24%	22%

Source: NSF Enterprise Information System 10/01/13.

In addition to the full proposals in **Table 1**, in FY 2013 NSF also received 4,691 preliminary proposals, which are required for some NSF programs. See **Appendix 2** for additional data and information on preliminary proposals.

[5] The category of actions associated with "competitively reviewed proposals," excludes actions on preliminary proposals, contracts, IPA agreements, continuing grant increments, Graduate Research Fellowships, and similar.
[6] The merit review process is managed by NSF's program units (divisions and offices) and is completed when the division director or office head concurs with a program officer's recommendation to award or decline a proposal. For simplicity, this step will be referred to as completion of an award or decline action on a proposal. If that action is to recommend that an award be made, further processing takes place within the Office of Budget and Financial Administration before an award is issued by NSF. More details may be found in **Section IV.B**.

B. Diversity of Participation

To advance the goals described in NSF's Strategic Plan (FY 2011 – 2016), one of the core strategies described is broadening the participation in NSF's activities by members of groups that are currently under-represented in STEM disciplines. This includes ensuring the participation of researchers, educators and students from under-represented groups in NSF's programs as well as preparing and engaging a diverse STEM workforce, motivated to participate at the frontiers of research and education.

Table 2 provides data on proposal, award, and success rates by PI characteristics (gender, under-represented ethnic or racial group, disability, new and prior PI status). Gender, disability, and ethnic or racial data are based on self-reported information in proposals. About 88% of PIs provided gender information and 87% provided ethnic/racial information. (90% of proposals were from PIs who provided gender information[7], 91% were from PIs who provided race or ethnicity information[8], and 70% were from PIs who provided information about disability status.) The under-represented ethnic/racial PIs category in **Table 2** includes American Indian /Alaska Native, Black/African American, Hispanic or Latino, and Native Hawaiian/Pacific Islander but excludes Asian and White-Not of Hispanic Origin.

Table 2 - Competitively Reviewed Proposals, Awards and Proposal Success Rates by PI Characteristics

		2001	2005	2006	2007	2008	2009	2010	2011	2012	2013
All PIs	Proposals	31,942	41,722	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999
	Awards	9,925	9,757	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829
	Omnibus						*9,975*	*12,547*			
	ARRA						*4,620*	*449*			
	Funding Rate	31%	23%	25%	26%	25%	32%	23%	22%	24%	22%
Female PIs	Proposals	5,839	8,266	8,510	9,197	9,431	9,727	11,903	11,488	10,795	11,152
	Awards	1,894	2,107	2,233	2,493	2,556	3,297	2,982	2,602	2,775	2,556
	Omnibus						*2,247*	*2,887*			
	ARRA						*1,050*	*95*			
	Funding Rate	32%	25%	26%	27%	27%	34%	25%	23%	26%	23%
Male PIs	Proposals	25,510	31,456	31,482	32,650	32,074	32,091	38,695	35,211	32,932	32,866
	Awards	7,867	7,305	7,765	8,451	7,986	10,437	9,080	7,739	7,816	7,316
	Omnibus						*7,169*	*8,760*			
	ARRA						*3,268*	*320*			
	Funding Rate	31%	23%	25%	26%	25%	33%	23%	22%	24%	22%
PIs from under-represented racial or ethnic groups	Proposals	1,728	2,468	2,608	2,798	2,762	2,945	3,613	3,441	3,291	3,303
	Awards	509	569	638	713	670	889	812	735	718	651
	Omnibus						*649*	*790*			
	ARRA						*240*	*22*			
	Funding Rate	29%	23%	24%	25%	24%	30%	22%	21%	22%	20%

[7] As a group, the success rate for PIs who do not indicate their gender tends to be consistently lower than PIs that do. For example, in FY 2013, the success rate for PIs whose gender was not known was 19%.
[8] However, for only 83% was the information sufficient to determine whether or not the PI belonged to an under-represented racial or ethnic group. (E.g., some report only one of race or ethnicity; some report "Unknown.")

		2001	2005	2006	2007	2008	2009	2010	2011	2012	2013
New PIs	Proposals	13,280	17,660	18,061	18,971	18,989	19,044	24,116	21,703	20,174	19,905
Former	Awards	3,136	3,001	3,240	3,660	3,622	4,706	4,024	3,322	3,408	3,327
Definition	*Omnibus*						*2,967*	*3,868*			
	ARRA						*1,739*	*156*			
	Funding Rate	24%	17%	18%	19%	19%	25%	17%	15%	17%	17%
New PIs	Proposals	11,872	15,467	15,877	16,445	16,483	16,840	21,545	19,238	17,943	17,635
Revised	Awards	2,702	2,687	2,842	3,151	3,132	4,174	3,620	2,976	3,063	3,013
Definition[9]	*Omnibus*						*2,613*	*3,487*			
	ARRA						*1,561*	*133*			
	Funding Rate	23%	17%	18%	19%	19%	25%	17%	15%	17%	17%
Prior PIs	Proposals	18,662	24,062	24,294	25,606	25,439	26,137	31,426	29,835	28,439	29,094
Former	Awards	6,789	6,756	7,185	7,803	7,527	9,889	8,972	7,849	8,116	7,502
Definition	*Omnibus*						*7,008*	*8,679*			
	ARRA						*2,881*	*293*			
	Funding Rate	36%	28%	30%	30%	30%	38%	29%	26%	29%	26%
Prior PIs	Proposals	19,569	26,130	26,172	27,660	27,424	28,341	33,997	32,324	30,670	31,364
Revised	Awards	6,947	7,070	7,475	8,202	7,892	10,421	9,376	8,216	8,461	7,816
Definition	*Omnibus*						*7,362*	*9,060*			
	ARRA						*3,059*	*316*			
	Funding Rate	36%	27%	29%	30%	29%	37%	28%	25%	28%	25%
PIs with	Proposals	409	454	434	448	448	470	545	543	483	488
Disabilities	Awards	115	95	107	104	109	149	108	107	134	122
	Omnibus						*105*	*105*			
	ARRA						*44*	*3*			
	Funding Rate	28%	21%	25%	23%	24%	32%	20%	20%	28%	25%

Source: NSF Enterprise Information System, as of October 1, 2013.

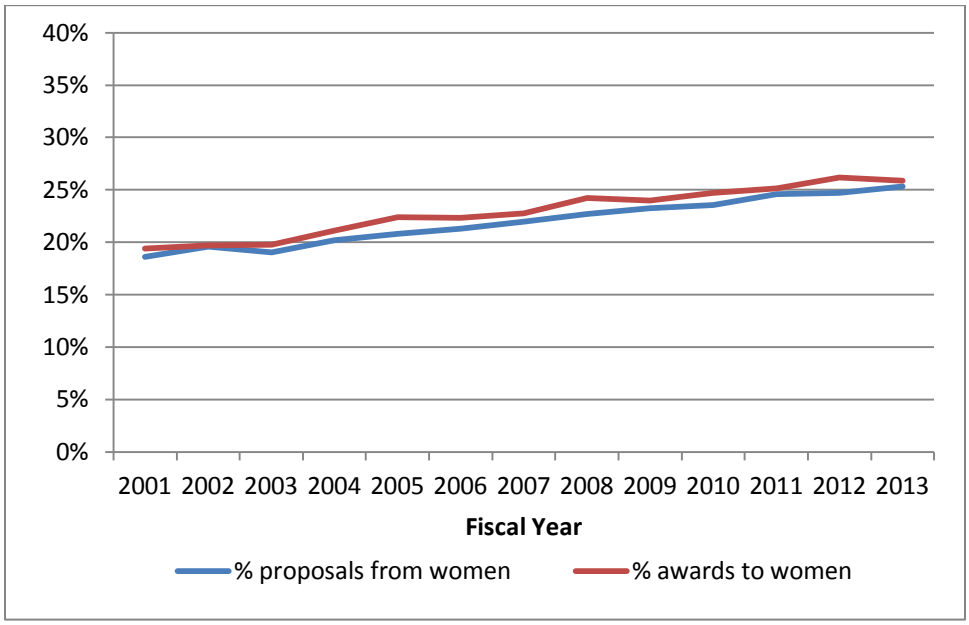
Gender

In general, while fewer proposals are received from women than men, the success rate for female PIs is slightly higher than that for male PIs. The proportion of proposals from female PIs was 25.3% in FY 2013.[10] As may be seen in **Figure 1**, over the past decade, there has been a relatively steady rate of increase in the proportion of proposals that are submitted by women and a corresponding upward trend in the proportion of awards that are made to women. Since the success rate for women exceeds that for men, the proportion of awards to women is always slightly higher than the proportion of proposals from women.

[9] In FY 2009, in conjunction with NSF's implementation of the American Recovery and Reinvestment Act, NSF revised its definition of a new PI which became, "A new PI is an individual who has not served as the PI or Co-PI on any award from NSF (with the exception of doctoral dissertation awards, graduate or post-doctoral fellowships, research planning grants, or conferences, symposia and workshop grants.)" Previously, a new PI was considered to be any individual who had not previously been a PI on any NSF award.

[10] This is calculated as a percentage of the number of proposals from PIs who provided information about gender. The proportions for PIs from other under-represented groups are calculated similarly except that, in **Figure 2**, the number of PIs who provided information sufficient to determine whether they belong to an under-represented racial or ethnic group has been estimated for the years FY 2001 – FY 2009, by using the same fraction of PIs as was found in FY 2010. Based on fluctuations seen in FY 2010 – FY 2013, it is estimated that this may introduce errors in the percentages of proposals and awards from under-represented racial or ethnic groups that have an absolute magnitude of less than 0.05%, much less than the variation seen in **Figure 2**. Data in **Figure 3** are treated in a similar way.

Figure 1 - Percentage of Proposals from and Awards to Women

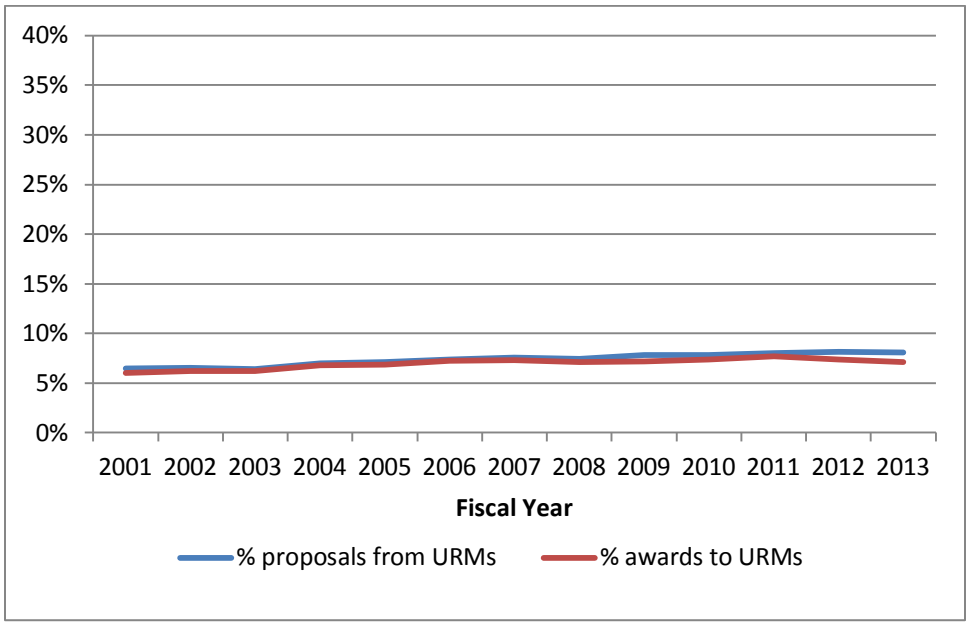


Source: NSF Enterprise Information System 10/01/13.

Under-represented Racial or Ethnic Groups

The success rate for PIs from under-represented racial or ethnic groups (URMs) is slightly lower than the average success rate over all PIs. The number of proposals from PIs from under-represented racial or ethnic groups remains low but has grown more rapidly than the total number of proposals submitted to NSF (see **Figure 2**).

Figure 2 - Percentage of Proposals from and Awards to Researchers from Under-represented Racial or Ethnic Groups



Source: NSF Enterprise Information System 10/01/13.

Figure 2 shows that, since FY 2003, there has been a relatively steady rate of increase in the proportion of proposals that are submitted by PIs who identify themselves as belonging to under-represented racial or ethnic groups with only slight decreases going from 2002 to 2003, 2007 to 2008, 2009 to 2010 and 2012 to 2013. The proportion has increased from 6.4% in FY 2003 to 8.1% in FY 2013. The increase in the proportion of awards that are made to under-represented racial and ethnic groups has been more uneven than was seen for women, and has reversed since FY 2011, falling from 7.7% in FY 2011 to 7.1% in FY 2013 after increasing from 6.2% in FY 2003.

Table 3 provides data on proposal, award and success rates by PI race and ethnicity.

Table 3 – Competitively Reviewed Proposals, Awards and Success Rates, by PI Race and Ethnicity[11]

		2005	2006	2007	2008	2009	2010	2011	2012	2013
American Indian/Alaska Native	Proposals	112	112	97	91	88	118	129	83	113
	Total Awards	30	32	32	23	29	28	36	18	28
	Omnibus					*20*	*28*			
	ARRA					*9*	*0*			
	Funding Rate	27%	29%	33%	25%	33%	24%	28%	22%	25%
Black/ African American	Proposals	842	915	1,034	997	1,022	1,280	1,201	1,154	1,124
	Total Awards	199	201	240	246	298	270	243	263	203
	Omnibus					*233*	*262*			
	ARRA					*65*	*8*			
	Funding Rate	24%	22%	23%	25%	29%	21%	20%	23%	18%
Native Hawaiian/ Pacific Islander	Proposals	27	28	26	30	23	38	42	40	32
	Total Awards	5	9	6	8	8	10	11	6	5
	Omnibus					*5*	*8*			
	ARRA					*3*	*2*			
	Funding Rate	19%	32%	23%	27%	35%	26%	26%	15%	16%
Asian	Proposals	7,368	7,916	8,801	8,952	9,550	11,626	10,829	10,382	10,511
	Total Awards	1,302	1,530	1,801	1,780	2,465	2,124	1,907	1,914	1,887
	Omnibus					*1,691*	*2,071*			
	ARRA					*774*	*53*			
	Funding Rate	18%	19%	20%	20%	26%	18%	18%	18%	18%
White	Proposals	29,928	29,861	30,676	30,217	29,975	36,153	33,200	30,596	30,766
	Total Awards	7,564	7,885	8,499	8,153	10,499	9,306	7,826	8,020	7,372
	Omnibus					*7,144*	*8,958*			
	ARRA					*3,355*	*348*			
	Funding Rate	25%	26%	28%	27%	35%	26%	24%	26%	24%

[11] This table differs from a similar one included in reports for years up to FY 2011. Before FY 2012, individuals who identified a race and indicated that they were Hispanic or Latino were only counted in the Hispanic or Latino category. Beginning in FY 2012, such individuals are included in both the appropriate racial group and in Hispanic or Latino. Previously, except for those who were Hispanic or Latino, individuals who identified multiple races were not included in the table. A "multiracial" category has been added to the table.

		2005	2006	2007	2008	2009	2010	2011	2012	2013
Multiracial	Proposals	322	301	279	284	337	512	433	448	439
	Total Awards	87	78	81	76	112	118	99	113	110
	Omnibus					80	112			
	ARRA					32	6			
	Funding Rate	27%	26%	29%	27%	33%	23%	23%	25%	25%
Hispanic or Latino	Proposals	1,471	1,525	1,639	1,611	1,755	2,092	2,019	1,934	1,956
	Total Awards	324	378	433	382	533	476	438	412	401
	Omnibus					*373*	*465*			
	ARRA					*160*	*11*			
	Funding Rate	22%	25%	26%	24%	30%	23%	22%	21%	21%

Source: NSF Enterprise Information System, 10/01/13.

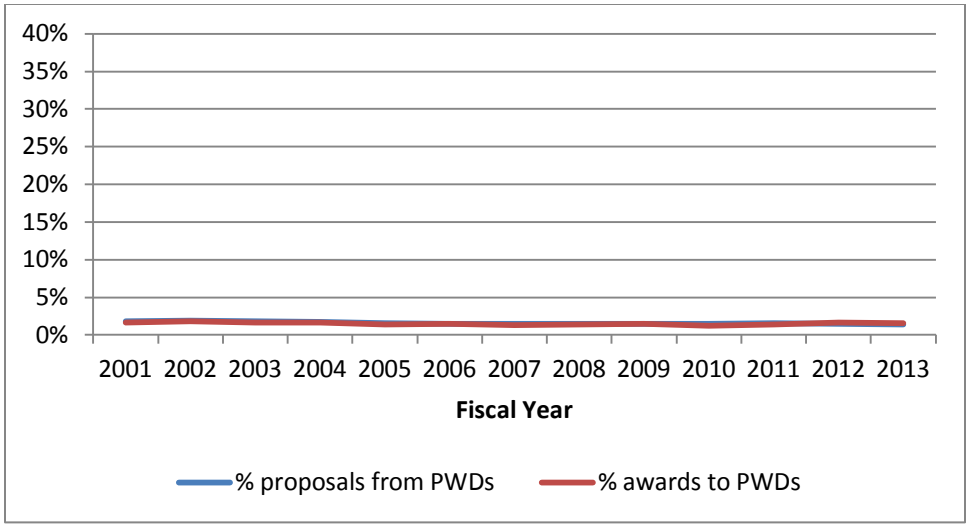
Very few PIs identify themselves as belonging to the categories American Indian/Alaska Native or Native Hawaiian/Pacific Islander. Because of the small numbers involved, the year-to-year fluctuations in success rates for these groups tend to be greater than for other ethnic groups. The proportion of submissions from under-represented racial and ethnic groups in FY 2013 (8.1%[12]) is smaller than their representation in the U.S. population but is similar to their representation in the full-time faculty of Ph.D. granting institutions (7.5%[13]). Among racial and ethnic groups that submitted more than 1,000 proposals in FY 2013, the success rate is highest for the groups White (24%) and Hispanic or Latino (21%). It is lowest for Asian (18%) and Black/African American (18%). **Appendix 3** provides proposal, award, and funding rate information by PI race, ethnicity and gender, by directorate.

PIs with a Disability

The proposal success rate for PIs identifying themselves as having a disability has remained comparable to the overall success rate for all PIs (**Table 2**), being slightly lower than the all-PI success rate for most of FY 2005 - FY 2011 and higher in FY 2012 and FY 2013. Unlike women and under-represented racial and ethnic groups, the proportion of proposals that come from researchers with disabilities has not grown from FY 2001 – FY 2013 (**Figure 3**). Instead it has declined from approximately 1.9% in FY 2002 to approximately 1.4%[14] in FY 2013. In FY 2013, as in FY 2012, the success rate for proposals from PIs with disabilities, approximately 25%, was slightly higher than the overall NSF success rate. However, the proportion of proposals that are from PIs with disabilities is low.

[12] The ratio of the number of PIs in an under-represented racial or ethnic minority to the total number of PIs who provided sufficient information to determine whether or not they belonged to such a minority.
[13] Based on 2008 data reported in: "Science and Engineering Indicators 2012." (NSB 12-01).
[14] In FY 2013, approximately 70% of competitively reviewed proposals were from PIs who indicated whether or not they had a disability. Of these, 1.4% reported that they did have a disability.

Figure 3 - Percentage of Proposals from and Awards to PIs with a Disability (PWDs)

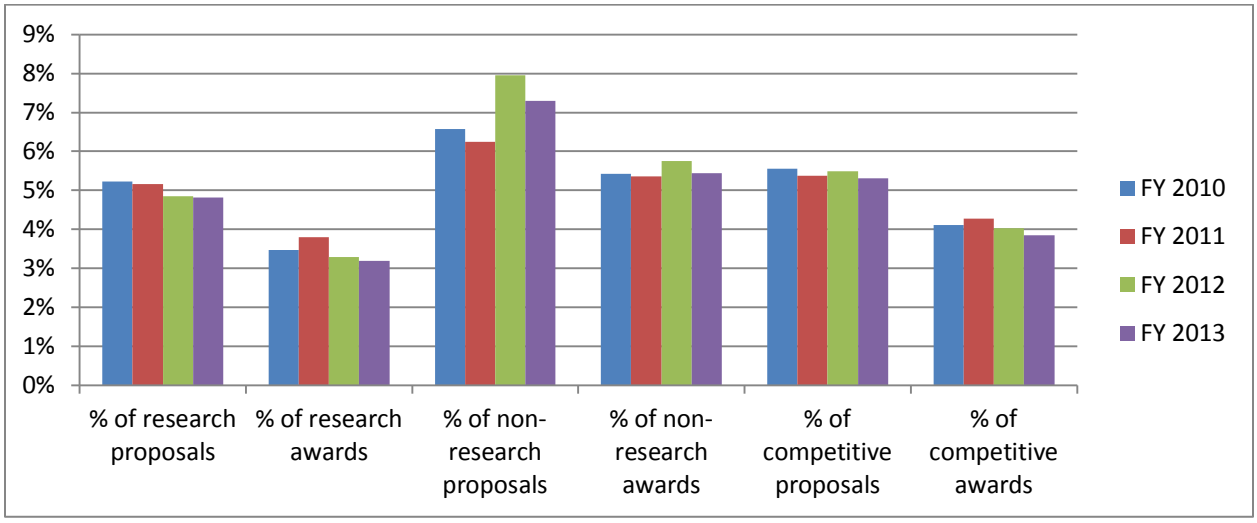


Source: NSF Enterprise Information System 10/01/13.

Minority-Serving Institutions

Figure 4 shows the proportion of proposals from and awards to minority-serving institutions[15] (MSIs) in recent years.

Figure 4 –Proposals from and Awards to MSIs, by Fiscal Year and Proposal Category[16]



Source: NSF Report Server 4/13/14.

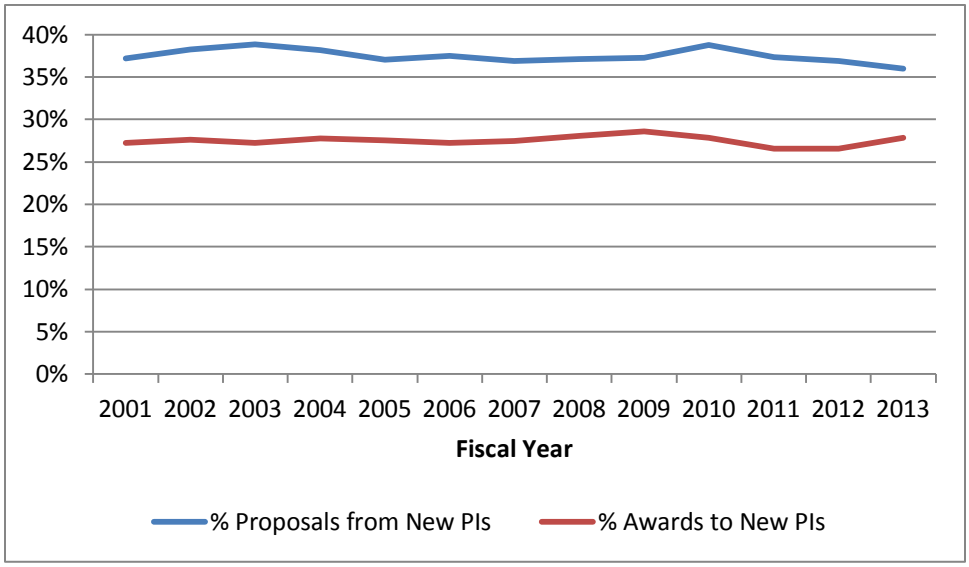
[15] These are institutions reported as Historically Black Colleges and Universities, Hispanic-Serving Institutions, or Tribal Colleges and Universities.

[16] Research proposals are defined at the beginning of **Section III.F**. Non-research proposals are those competitive proposals that are not research proposals.

New PIs

The success rate for PIs who have not previously had an NSF award is lower than that for PIs who have previously submitted a successful NSF proposal (17% compared to 25%; see **Table 2**). In FY 2013, the proportion of proposals from new PIs was 36% (**Figure 5**). Since FY 2001, this number has fluctuated between approximately 36% and 39%. Since FY 2010, the proportion of proposals from new PIs declined from 38.8% to 36%. **Appendix 4** provides funding rate information by new PI and prior PI status, by directorate.

Figure 5 - Percentage of Proposals from and Awards to New PIs



Source: NSF Enterprise Information System 10/01/13.

There is a slight uptick in the proportion of awards going to new PIs in FY 2013 (**Figure 5**). This is primarily due to a decline in the success rate of prior PIs from FY 2012 to FY 2013. The success rate of new PIs remained relatively constant at 17% in both years.

C. Types of Awards

NSF uses three kinds of funding mechanisms: grants, cooperative agreements, and contracts. Most of NSF's projects support or stimulate scientific and engineering research and education, and are funded using grants or cooperative agreements. A grant is the primary funding mechanism used by NSF. A grant may be funded as either a standard award (in which funding for the full duration of the project, generally 1-5 years, is awarded in a single fiscal year) or a continuing award (in which funding of a multi-year project is provided in, usually annual, increments).

The use of standard and continuing grants allows NSF flexibility in balancing current and future obligations, and managing funding rates. For continuing grants, the initial funding increment is accompanied by a statement of intent to continue funding the project in subsequent increments (called "continuing grant increments" or CGIs)[17] until the project is completed. The continued

[17] While the original award is a competitive action, the continuing grant increment is a non-competitive grant.

funding is subject to NSF's judgment of satisfactory progress, availability of funds, and receipt and approval of required annual reports. As shown below in **Table 4**, in FY 2013, NSF devoted 35% of its total budget to new standard grants and 12% to new continuing grants. Cooperative agreements are used when the project requires substantial agency involvement during the project performance period (e.g., research centers and multi-user facilities). Contracts are used to acquire products, services and studies (e.g., program evaluations) required primarily for NSF or other government use.

Table 4 - Percentage of NSF Funding by Type of Award

CATEGORY	2005	2006	2007	2008	2009	2010	2011	2012	2013
Standard Grants	23%	25%	26%	28%	44%	37%	34%	35%	35%
New Continuing	14%	13%	14%	13%	8%	13%	11%	11%	12%
CGIs and Supplements	29%	28%	26%	26%	18%	18%	23%	22%	22%
Cooperative Agreements	24%	23%	22%	23%	21%	23%	23%	23%	23%
Other	10%	11%	11%	11%	9%	9%	9%	10%	8%

Source: NSF Enterprise Information System. Percentages may not sum to 100 due to rounding. ARRA awards were generally made as standard grants. "Other" includes contracts, fellowships, interagency agreements, and IPA agreements.

D. Awards by Sector/Institution

In FY 2013, of the program funds awarded by NSF, approximately 81% went to academic institutions, 11% to non-profit and other organizations, 6% to for-profit businesses, and 3% to Federal agencies and laboratories. As shown in **Table 5**, the proportion awarded to academic institutions is at its highest level in the past nine years.

Table 5 - Distribution of Funds by Type of Organization

Sector/Institution	2005	2006	2007	2008	2009	2010	2011	2012	2013
Academic Institutions	76%	76%	76%	76%	76%	77%	77%	80%	81%
Non-Profit and Other Organizations	15%	15%	15%	13%	13%	11%	13%	12%	11%
For-Profit	7%	7%	7%	8%	6%	6%	6%	5%	6%
Federal Agencies and Laboratories	2%	2%	3%	3%	4%	5%	5%	3%	3%

Source: NSF Enterprise Information System 10/01/13. Percentages may not sum to 100 due to rounding.

Figure 6 shows how funds to academic institutions are distributed. Academic institutions are categorized according to the proportion of NSF funding received (i.e., grouping those receiving the largest proportion of NSF funding – the top 10, 50, and 100 academic institutions).

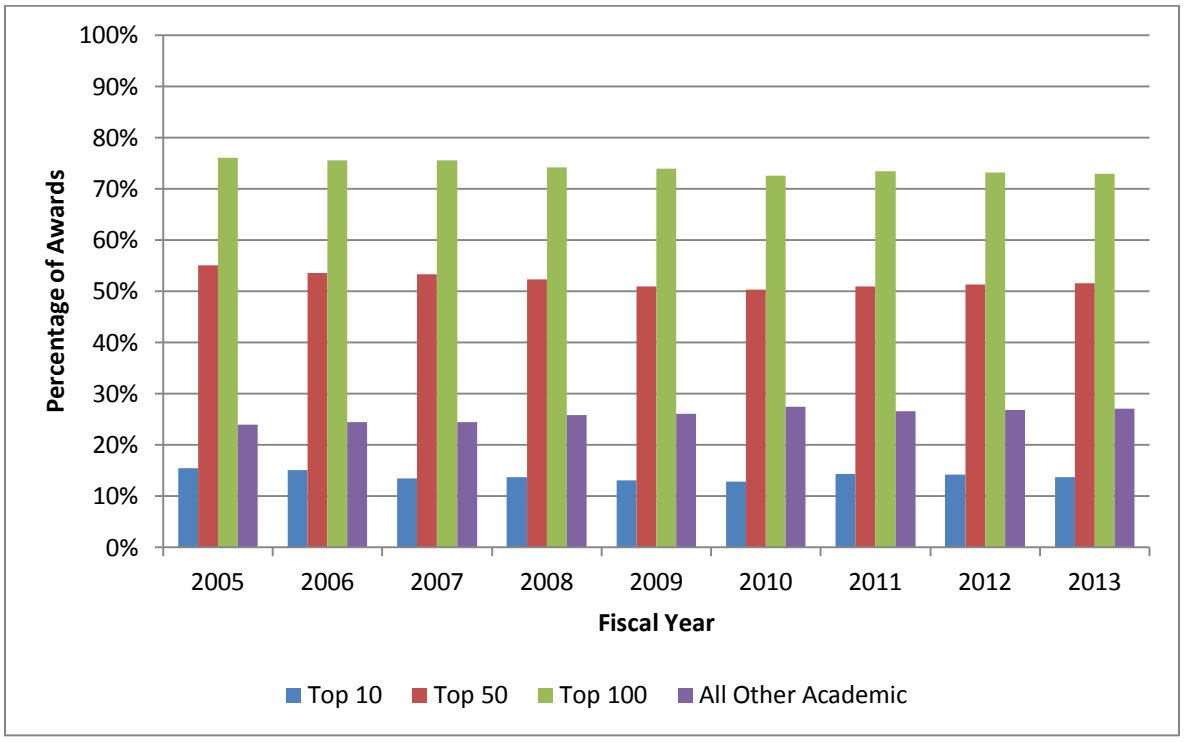
The Foundation tracks proposal success rates[18] for different types of academic institutions. For FY 2013, the average proposal success rate was 24% for the top 100 Ph.D.-granting institutions (classified according to the amount of FY 2013 funding received). In comparison, the rate was

[18] This report uses the term "proposal success rate" to refer to the rate at which submitted proposals are successful in obtaining funding. For example, if a program processed 200 proposals in the year, making 50 awards and declining the remaining 150, then the "proposal success rate" for that program in that year would be 25%.

13% for Ph.D.-granting institutions that are not in the top 100 NSF-funded category. The proposal success rate for four-year institutions was 22% and for two-year institutions it was 16% in FY 2013. For minority-serving institutions, the FY 2013 proposal success rate was 16%.

The Foundation promotes geographic diversity in its programs. For example, the mission of the Experimental Program to Stimulate Competitive Research (EPSCoR) is to assist the NSF in its statutory function "to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education."[19]

Figure 6 - Percentage of Awards to Academic Institutions (By Amount Received)



Source: NSF Enterprise Information System 10/01/13.

The EPSCoR program was designed for those jurisdictions that have historically received lesser amounts of NSF Research and Development (R&D) funding. In FY 2013, 28 states, the Commonwealth of Puerto Rico, the U.S. Virgin Islands and Guam were eligible to participate in aspects of the program. For three of the 28 states, Iowa, Tennessee, and Utah, the prior 3-year rolling average of NSF research funds received was over 0.75% of NSF's Research and Related Activities budget and these jurisdictions were not eligible to participate in new Research Infrastructure Improvement initiatives in FY 2013. **Appendix 5** provides data on proposals, awards, and proposal success rates for the EPSCoR jurisdictions.

[19] 42 CFR 16 §1862, http://www4.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00001862----000-.html.

NSF made numerous outreach presentations to institutions across the country in an effort to help increase their participation and success in NSF programs:

- Two Grants Conferences were held in FY 2013. These conferences were organized by the NSF Policy Office. Both were held in Arlington, Virginia. One was hosted by George Mason University and the other was hosted by Howard University.

- 5 "NSF Days," organized by the Office of Legislative and Public Affairs, were held throughout FY 2013 in Nebraska, Mississippi, Indiana, California, and Virginia.

Representatives from most of NSF's directorates and offices attended each of these conferences. They held separate focus sessions on program opportunities in specific disciplines in addition to providing general information about proposal preparation and the merit review process.

NSF hosted several informational booths at scientific meetings such as the annual meeting of the American Association for the Advancement of Science (AAAS). In addition to these larger NSF-wide organized efforts, outreach workshops were sponsored by several of the individual directorates, as well as by EPSCoR and other NSF-wide programs. Some programs and offices, for example, the NSF Innovation Corps (I-Corps), the Major Research Instrumentation (MRI) program, the INSPIRE program, and the EHR directorate, held webinars for people interested in learning more about the programs involved. Finally, program officers frequently conduct outreach when visiting institutions or participating in scientific meetings. NSF outreach to scientists and engineers from under-represented groups also includes activities such as attendance at workshops for tribal colleges and other minority-serving institutions.

E. Time to Decision (Proposal Dwell Time)

It is important for applicants to receive a timely funding decision. The Foundation's FY 2013 Government Performance and Results Act performance goal calls for informing at least 70% of PIs of funding decisions (i.e. award or decline) within six months of the proposal deadline, target date, or receipt date, whichever is later. In 2013, NSF exceeded the dwell time goal with 76% of applicants informed within 6 months.[20] NSF has consistently exceeded this goal with the exception of FY 2009. In FY 2009, the NSF dwell time performance measure was suspended for the last three quarters to delay processing proposals that would have been declined due to lack of funding. This enabled some of these proposals to be funded with the ARRA appropriation.

Table 6 - Proposal Dwell Time: Percentage of Proposals Processed Within 6 Months

2005	2006	2007	2008	2009*	2010	2011	2012	2013
76%	78%	77%	78%	61%	75%	78%	78%	76%

Source: NSF Enterprise Information System 10/01/13. *Dwell-time goal suspended in FY 2009.

[20] The dwell-time goal was exceeded by 79% of proposals that went through panel-only review and by 54% of proposals that went through mail-only review.

F. Data on Research Grants

The purpose of this section is to provide data on what are referred to as "research grants." The term research grant is used by NSF to represent what could be considered a typical research award, particularly with respect to the award size. Education research grants are included. Excluded are large awards such as centers and facilities, equipment and instrumentation grants, grants for conferences and symposia, grants in the Small Business Innovation Research program, Small Grants for Exploratory Research, and education and training grants.

F1. Research Proposal, Award, & Success Rate Trends

Table 7 provides the proposal, grant, and success rate trends for NSF research grants. The number of new awards made in FY 2013 (7,652) was 5% lower than what was possible in FY 2012 (8,061), due partly to a reduction in the amount of funds available for new awards as a result of the Budget Control Act of 2011 and the American Taxpayer Relief Act of 2012[21], and partly to an increase in mean award size. These factors, together with the increase in the number of research proposals, contributed to a drop in the success rate for research proposals of 7%.[22,23]

Table 7 - Research Proposals, Award and Success Rate Trends

	2001	2005	2006	2007	2008	2009	2010	2011	2012	2013
Proposals	23,096	31,574	31,514	33,705	33,643	35,609	42,225	41,840	38,490	39,249
Awards	6,218	6,258	6,708	7,415	6,999	10,011	8,639	7,759	8,061	7,652
Omnibus						6,346	8,613			
ARRA						3,665	26			
Success Rate	27%	20%	21%	22%	21%	28%	20%	19%	21%	19%

Source: NSF Enterprise Information System 10/01/13.

F2. Research Grant Size and Duration

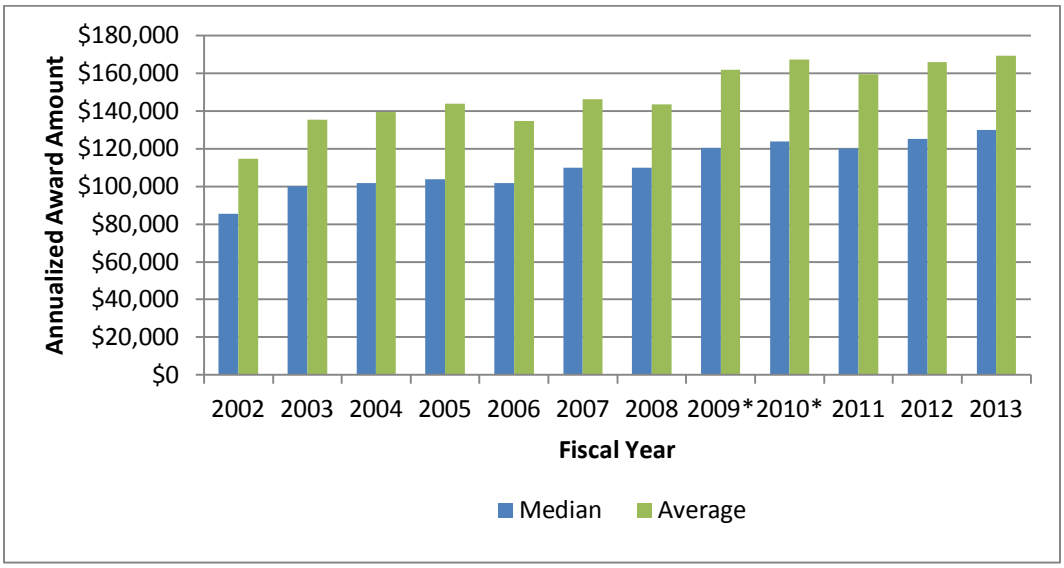
Adequate award size and duration are important for enabling science of the highest quality and ensuring that the proposed work can be accomplished as planned. Larger award size and longer award duration may also permit the participation of more students and allow investigators to devote a greater portion of their time to conducting research.

As indicated in **Figure 7**, in FY 2013 the annualized median award size was $129,970 and the annualized mean award amount was $169,107, a 2% increase from FY 2012. The inflation adjusted average annual award sizes are shown in **Figure 8.** The mean annual award size increased by 17.7% from FY 2005 to FY 2013. The mean annual award size in *constant* dollars fluctuated but remained relatively steady over the same period.[24] The ARRA appropriation

[21] These Acts reinstated and adjusted discretionary spending limits on budget authority and had the effect of imposing an approximately 5% sequestration of discretionary spending appropriated for FY 2013. The net result was that NSF's FY 2013 budget was approximately 2% lower than in FY 2012.
[22] I.e. the ratio of success rates between FY 2013 and FY 2012 is 0.93 [= (7,652/39,249) ÷ (8,061/38,490)].
[23] EAGER and RAPID proposals, which have a high success rate, are approximately 1.4% of the research proposals. If these are removed from the total, then the success rate for research proposals is reduced from 19.5% to 18.4%.
[24] Constant dollars were calculated using the Gross Domestic Product (GDP) (chained) Price Index. This deflator is updated by the Office of Management and Budget and is based on the U.S. Government fiscal year, October 1 to September 30. For this chart, FY 2005 is the reference year (one FY 2005 dollar equals one constant dollar).

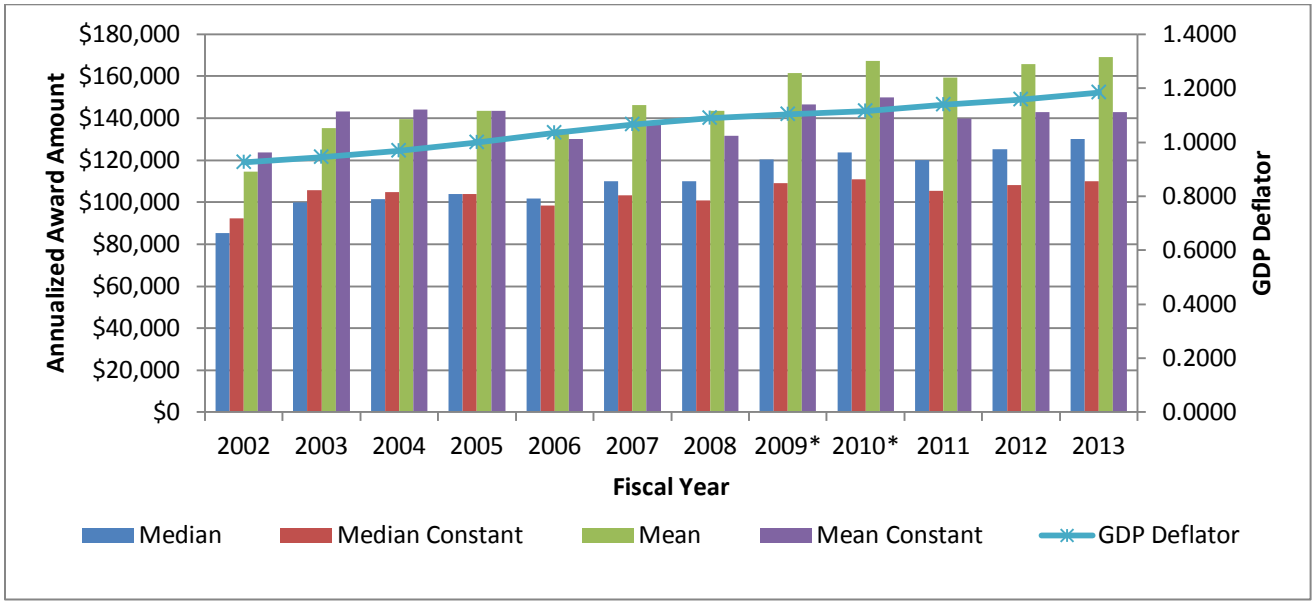
made possible an increase in average annual award size in FY 2009 and FY 2010, relative to FY 2008. The ARRA appropriation also helped to reduce out-year commitments, allowing the higher annual award size to be sustained temporarily after FY 2010.

Figure 7 - Annualized Award Amounts for Research Grants



*FY 2009 and FY 2010 include ARRA funding. Source: NSF Enterprise Information System 10/01/13.

Figure 8 -Annualized Award Amounts for Research Grants in Actual and Constant Dollars



*FY 2009 and FY 2010 include ARRA funding.
Source: Annualized award sizes from NSF Enterprise Information System 10/01/13 and Gross Domestic Product (GDP) deflator from www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/hist10z1.xls, accessed 01/23/2014. Constant dollars use FY 2005 as a baseline.

Data on award size and duration organized by NSF directorate for the last ten years are presented in **Appendix 6**. There is considerable variation between directorates; for example, BIO and CISE award larger grants on average, while ENG, MPS and SBE award smaller grants.

As **Table 8** shows, the average award duration has remained relatively constant.[25] Program officers must balance competing requirements, such as increasing award size, increasing duration of awards, or striving to maintain proposal success rates.

Table 8 - Mean Award Duration for Research Grants

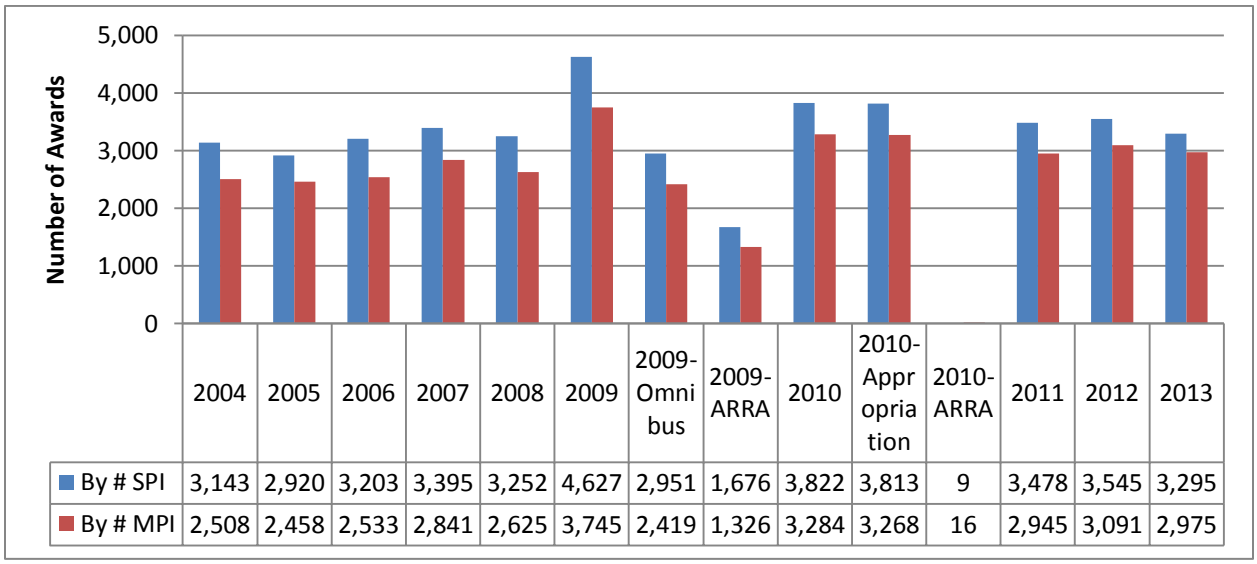
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Duration (Years)	2.9	2.9	3.0	3.0	2.9	2.9	3.0	3.0	2.9	2.9	2.9	3.0

Source: NSF Enterprise Information System 10/01/13.

F3. Number of Investigators per Research Grant

Figure 9 shows the number of research grants made to single PIs (SPI) compared to the number of research grants to projects with multiple PIs (MPI). The number of SPI grants remains greater than the number of MPI grants. **Figure 10** indicates the total amount of funds awarded to SPI research grants in comparison to the amount of funds awarded to MPI research grants.

Figure 9 - Research Grants to Single PIs (SPI) & Multiple PIs (MPI), by Number

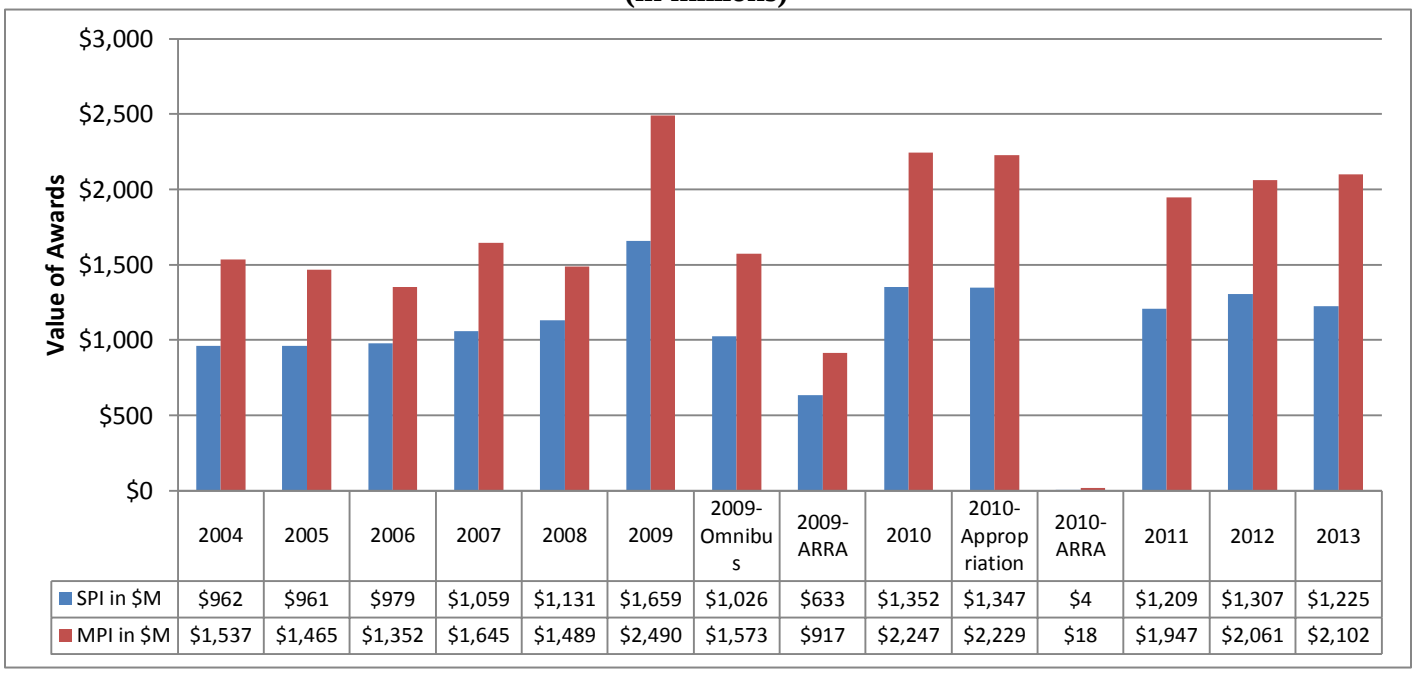


	2004	2005	2006	2007	2008	2009	2009-Omnibus	2009-ARRA	2010	2010-Appropriation	2010-ARRA	2011	2012	2013
By # SPI	3,143	2,920	3,203	3,395	3,252	4,627	2,951	1,676	3,822	3,813	9	3,478	3,545	3,295
By # MPI	2,508	2,458	2,533	2,841	2,625	3,745	2,419	1,326	3,284	3,268	16	2,945	3,091	2,975

Source: NSF Enterprise Information System 10/01/13. Note: In FY2010, a total of only 25 research projects were funded from the ARRA appropriation (including one collaborative project). These are barely visible in the figure.

[25] The number of years is rounded to one decimal place. 0.1 years represents about five weeks. This duration is the initial duration for new awards in each year and does not take into account no-cost extensions.

Figure 10 - Research Grants for Single PIs (SPI) & Multiple PIs (MPI), by Dollar Amount (in millions)

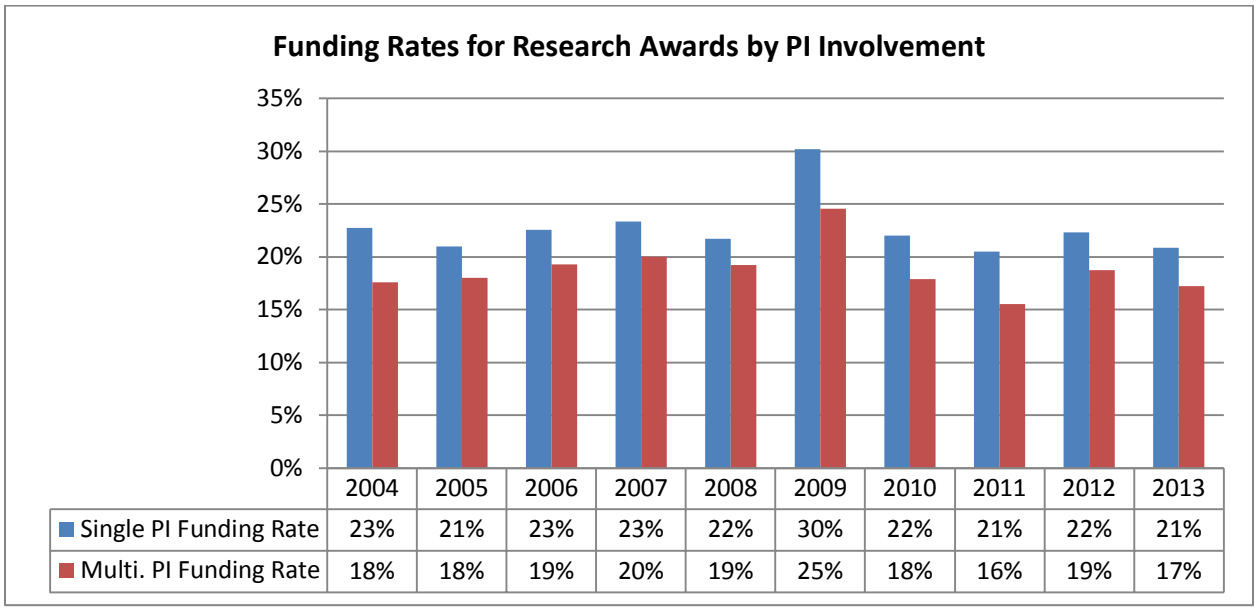


	2004	2005	2006	2007	2008	2009	2009-Omnibus	2009-ARRA	2010	2010-Appropriation	2010-ARRA	2011	2012	2013
SPI in $M	$962	$961	$979	$1,059	$1,131	$1,659	$1,026	$633	$1,352	$1,347	$4	$1,209	$1,307	$1,225
MPI in $M	$1,537	$1,465	$1,352	$1,645	$1,489	$2,490	$1,573	$917	$2,247	$2,229	$18	$1,947	$2,061	$2,102

Source: NSF Enterprise Information System 10/01/13. Note: In FY2010, a total of only 25 research projects were funded from the ARRA appropriation (including one collaborative project). These are barely visible in the figure.

Figure 11 shows the success rates for SPI and MPI research proposals. The difference between the SPI and MPI success rates has varied over the last ten years, but the SPI success rate has been consistently higher.

Figure 11 - Success Rates for Single-PI & Multiple-PI Research Proposals



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Single PI Funding Rate	23%	21%	23%	23%	22%	30%	22%	21%	22%	21%
Multi. PI Funding Rate	18%	18%	19%	20%	19%	25%	18%	16%	19%	17%

Source: NSF Enterprise Information System 10/01/13.

F4. Number of Research Grants per PI

Table 9 indicates the number of active research grants per PI averaged over the three-year period 2011 - 2013.

Table 9 - Number of Grants per PI

	One	Two	Three	Four or More
Fiscal Years 2011-2013	82%	14%	3%	1%

Source: NSF Enterprise Information System 10/01/13.

F5. Number of People Supported on Research Grants

Table 10 shows the number of graduate students, post-doctoral associates, and senior personnel supported on NSF research grants. These data were extracted from the budget details of research grants active in the year indicated. The absolute numbers of post-doctoral associates and graduate students supported peaked in FY 2009, as a result of NSF policy on the use of ARRA funding, but have subsequently declined. From FY 2012, the number of post-doctoral associates supported by research grants declined by 3.2%, and the number of graduate students decreased by 1.5%.[26]

Table 10 - Number of People Supported on NSF Research Grants, by Recipient Type

	2005	2006	2007	2008	2009	2010	2011	2012	2013	% Change, 2005 - 2013
Senior Personnel Supported	22,255	23,186	26,176	26,494	33,536	33,650	35,523	39,862	32,829	48%
Postdocs Supported	4,068	4,023	4,034	3,909	5,580	4,653	4,751	4,596	4,447	9%
Graduate Students Supported	20,442	20,949	22,777	22,936	33,371	24,554	24,855	25,550	25,161	23%

Source: NSF Enterprise Information System 10/01/13.

Appendix 7 provides data on the estimated number of individuals involved in NSF activities supported by all NSF active awards, including senior researchers, post-doctoral associates, teachers, and students across all educational levels. In comparison to FY 2012, the numbers of undergraduate students, K-12 students, and K-12 teachers involved in NSF awards all declined.[27]

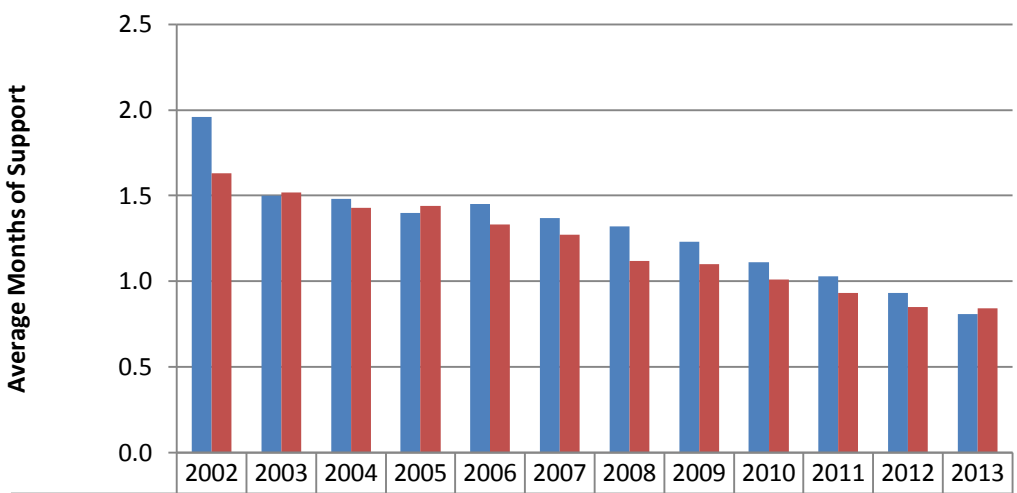
[26] The research grant category does not include most individual post-doctoral fellowships and graduate student fellowship grants. However, the majority of NSF-supported post-doctoral associates and graduate students are supported as part of research grants.

[27] Beginning with Fiscal Year 2011, the methodology used to produce estimates of K-12 students involved was changed. See NSF FY2012 Agency Financial Report, Chapter 2, p. II-40&41 for more information.

F6. Average Number of Months of Salary Support for Single- & Multiple-PI Research Grants

Figure 12 indicates the mean number of months of salary support per individual on single PI and multiple PI research grants. Months of salary support are for PIs and Co-PIs only. There has been a dramatic change in the past decade. Since FY 2002, the average number of months of support has generally decreased for both single and multiple-PI awards. The per-person numbers for single and multiple-PI grants were comparable in 2003-2005, but since then, PIs on multiple-PI awards consistently averaged fewer months of support than single PIs until FY 2013. (See **Appendix 8** for directorate or office level data on months of support.) The per-individual months of support per grant has dropped considerably since the period prior to 2003, with the 2013 numbers being 41% of the 2002 number for single PIs and 52% for PIs and Co-PIs on multiple PI awards. The data by directorate in **Appendix 8** show that, in comparison to NSF as a whole, CISE and ENG awards tend to provide fewer months of salary support for PIs and Co-PIs.

Figure 12 - Average Number of Months of Salary for Single- & Multi-PI Research Grants



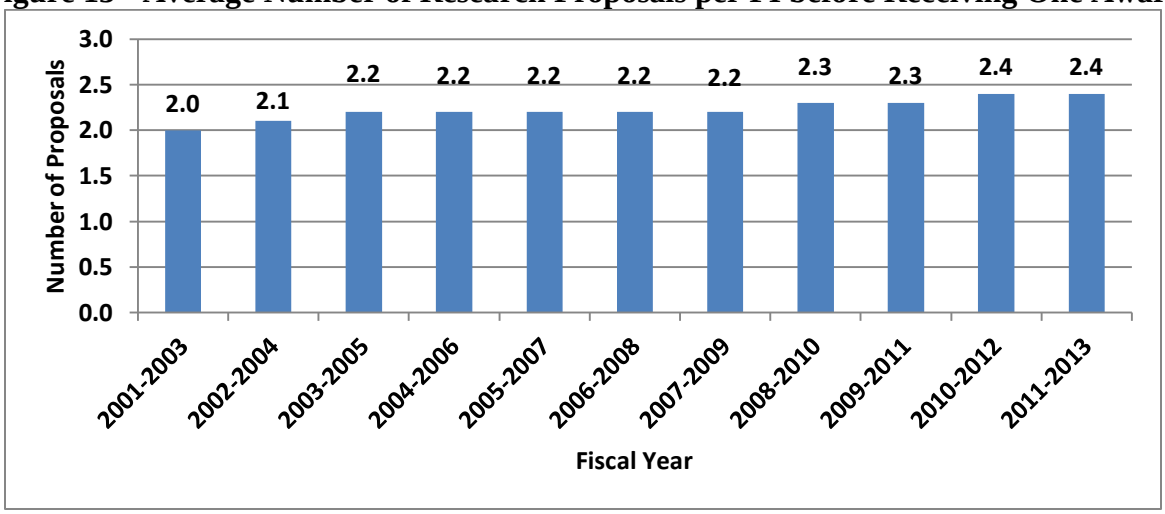
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Single PIs	1.96	1.50	1.48	1.40	1.45	1.37	1.32	1.23	1.11	1.03	0.93	0.81
Multiple PIs	1.63	1.52	1.43	1.44	1.33	1.27	1.12	1.10	1.01	0.93	0.85	0.84

Source: NSF Enterprise Information System 11/27/13.

F7. Investigator Submission and Funding Rates

Figure 13 shows that, on average, the number of proposals an investigator submits before receiving an award has gradually increased over the past decade. This average is calculated across all PIs, including both new and previous PIs. **Appendix 9** provides a directorate-level breakout of the average number of research proposals per PI before receiving one award. This metric is largest for CISE and ENG.

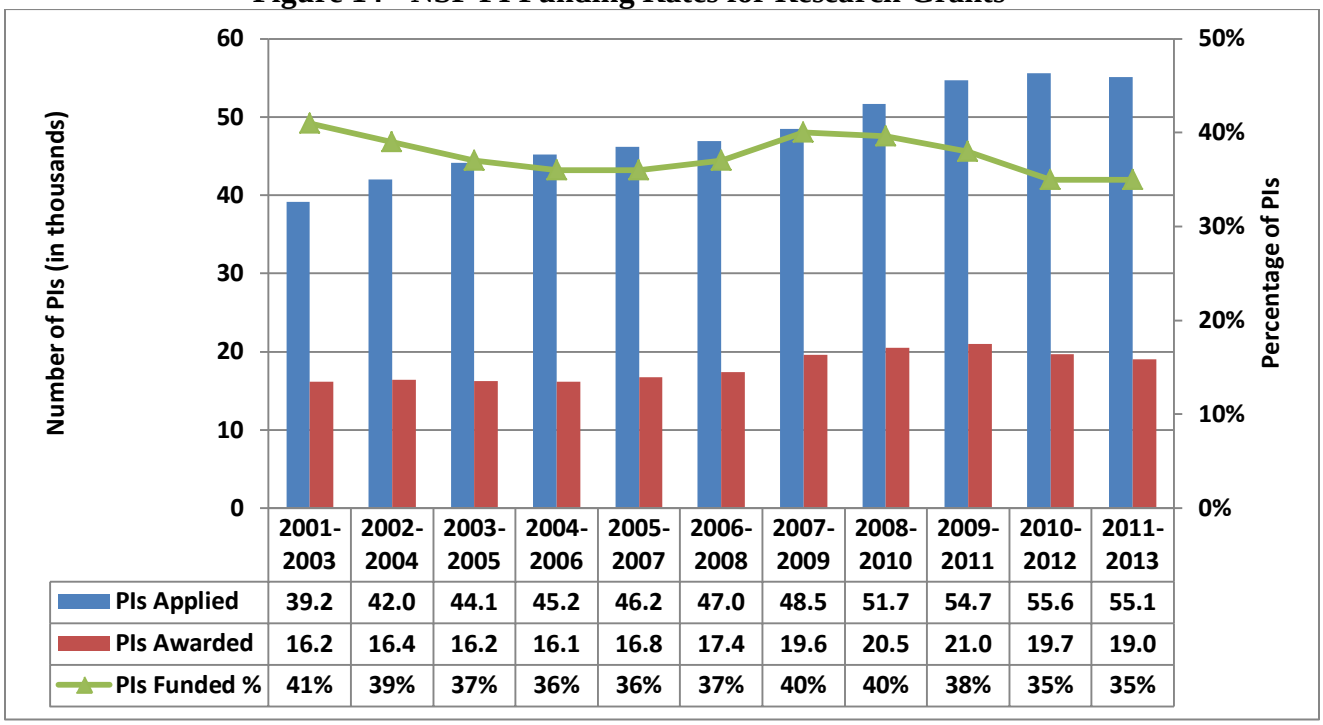
Figure 13 - Average Number of Research Proposals per PI before Receiving One Award



Source: NSF Enterprise Information System 11/23/13.

Figure 14 provides the funding rate for investigators in a three-year period (the number of investigators receiving a grant divided by the number of investigators submitting proposals in the same three-year window). The number of investigators submitting proposals grew over the past decade at a rate that exceeded the rate of growth of NSF's normal appropriation in inflation adjusted dollars. Consequently, the success rate of PIs declined. The decline in PI success rate was temporarily halted by the funds appropriated under ARRA but resumed after this. In the latest three-year window, however, the growth in number of PIs submitting proposals leveled off and the decline of the per-PI success rate slowed.

Figure 14 - NSF PI Funding Rates for Research Grants



	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
PIs Applied	39.2	42.0	44.1	45.2	46.2	47.0	48.5	51.7	54.7	55.6	55.1
PIs Awarded	16.2	16.4	16.2	16.1	16.8	17.4	19.6	20.5	21.0	19.7	19.0
PIs Funded %	41%	39%	37%	36%	36%	37%	40%	40%	38%	35%	35%

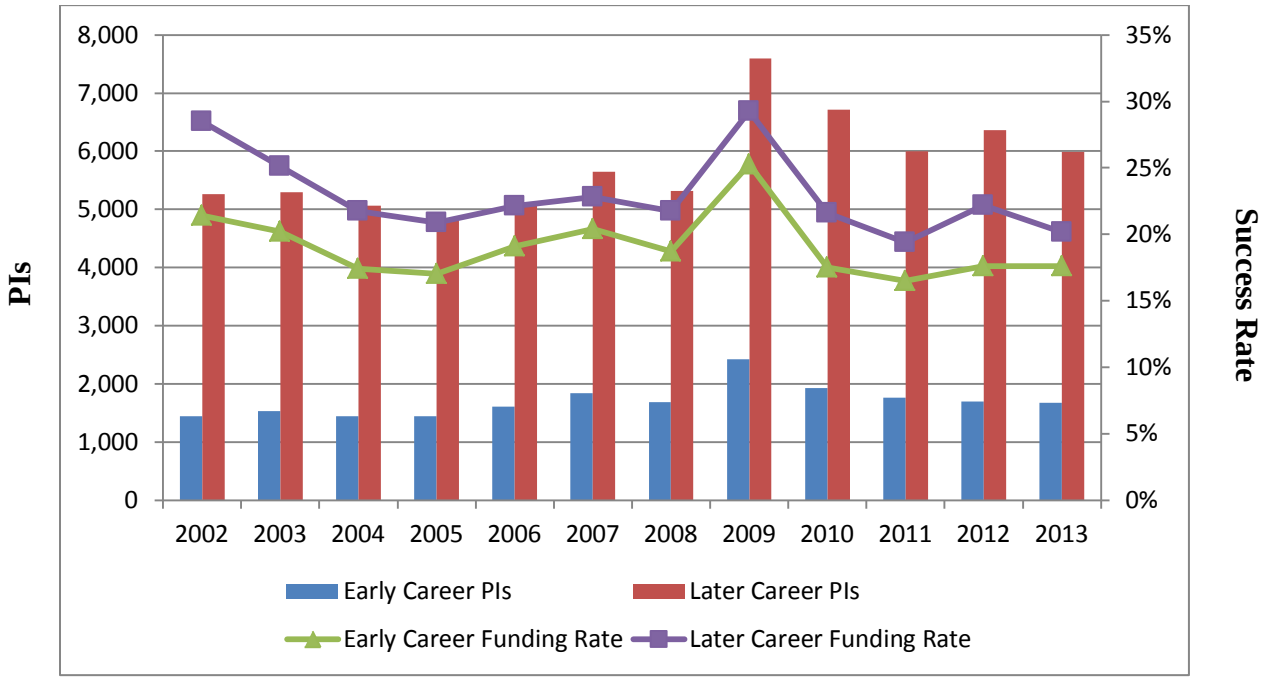
Source: NSF Enterprise Information System 11/23/13.

In 2011-2013, 65% of PIs who submitted proposals during that three-year period did not receive any research award. The number of PIs who submitted proposals in 2011-2013 was 41% higher than the number in 2001-2003.

F8. Early and Later Career PIs

Figure 15 and **Figure 16** indicate the number and percentage of NSF PIs of research awards that are in the early or later stages of their careers. An early career PI is defined as someone within seven years of receiving their last degree at the time of the award. For the purposes of this report, PIs who received their last degree more than seven years before the time of their first NSF award are considered later career PIs.

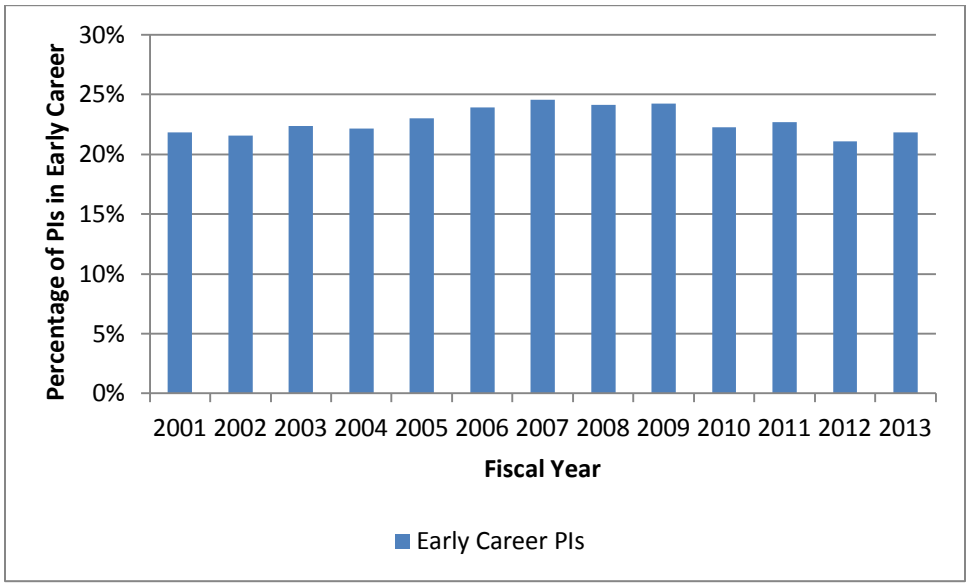
Figure 15 - Number of PIs in Early & Later Stages of Career and Research Proposal Success Rates



Source: NSF Enterprise Information System 10/01/13.

The gap in success rates narrowed in 2013 (**Figure 15**) and the percentage of research awards to early career PIs was 22% (**Figure 16**).

Figure 16 - Relative Proportions of PIs in Early and Later Stages of Careers



Source: NSF Enterprise Information System 10/01/13.

F9. Mechanisms to Encourage Transformative Research

The March 2007 NSB report, *Enhancing Support of Transformative Research at the National Science Foundatio*n (NSB 07-32), has been instrumental in informing NSF's efforts to promote and support potentially transformative research. The statement of the Intellectual Merit review criterion was modified, effective January 5, 2008, to make explicit reference to transformative research. An Important Notice, No. 130, was sent on September 24, 2007 from the NSF Director to presidents of universities and colleges, and heads of other NSF grantee organizations, to inform the community of the change in the merit review criteria and NSF's effort to promote and support potentially transformative concepts.

All NSF programs encourage and support potentially transformative research proposals. NSF also has several mechanisms particularly developed to encourage the submission of certain types of potentially transformative research proposals. These include EArly-concept Grants for Exploratory Research (EAGER), Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE), Creativity Extensions, and Accomplishment-Based Renewals. Information on the latter two types of awards may be found in **Appendix 18**.

F9.1 Small Grants for Exploratory Research (SGER), Early-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID).

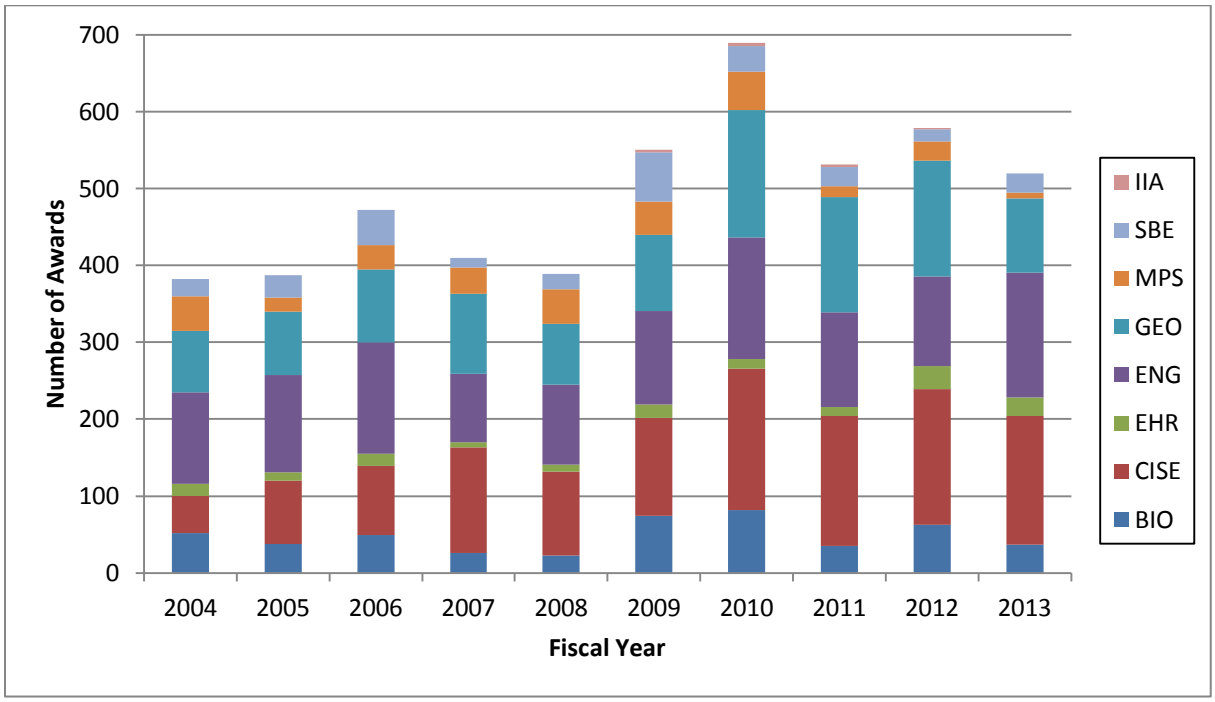
Since FY 1990, the Small Grants for Exploratory Research (SGER) option permitted program officers throughout the Foundation to make small-scale grants without formal external review. Effective January 2009, the SGER funding mechanism was replaced by two separate funding mechanisms EAGER and RAPID, in part to emphasize the importance of funding both potentially transformative research and research requiring an urgent response:

- **EArly-concept Grants for Exploratory Research (EAGER)**
  The EAGER funding mechanism is used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. The work may be considered especially "high-risk/high-payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or inter-disciplinary perspectives. Requests may be for up to $300,000 and up to two years duration.
- **Grants for Rapid Response Research (RAPID)**
  The RAPID funding mechanism is used for proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events. Requests may be for up to $200,000 and of one year duration.

Only internal merit review is required for EAGER and RAPID proposals. Program officers may elect to obtain external reviews to inform their decision. If external review is to be obtained, then the PI is informed of this in the interest of maintaining the transparency of the review and recommendation process.

Figure 17 Shows the change in SGERs, EAGERs and RAPIDs from 2004 to 2013 by Directorate. Additional information on SGERs, RAPIDs, and EAGERs can be found in **Appendix 10**. For years prior to FY 2013, OPP and OCI data are included in the numbers for GEO and CISE. OISE data are included in those for IIA.

Figure 17 - SGER, EAGER and RAPID Awards, by Directorate or Office



Source: NSF Enterprise Information System.

In FY 2009, the total number of SGER, RAPID and EAGER awards was 550, slightly higher than in previous years (see **Appendix 10** for a comparison with SGERs since FY 2004).

FY 2010 saw an increase in the total, to 689, primarily because of RAPIDs awarded to enable researchers to respond to unusual events (earthquakes in Haiti and Chile, and the Gulf of Mexico oil spill). The total number of EAGER and RAPID awards decreased to 531 in FY 2011 and fluctuated in the two subsequent years. Notwithstanding the year-to-year fluctuations, the number of these awards in each year of the period FY 2009 – FY 2013 (annual mean = 574) was larger than anytime during the period FY 2004 – FY 2008 (annual mean = 408), before EAGER and RAPID awards were introduced. There is a considerable variation across directorates in the use of EAGER and RAPID awards. (See **Appendix 10**.) For example, in FY 2013, CISE received more than five times as many EAGER proposals as BIO and nineteen times as many as MPS. RAPID proposals are proportionally more common in GEO than in other units.

In their use of EAGER and RAPID awards, the directorates fall into two clusters (see **Table 11**). Since their introduction, CISE, ENG and GEO have made 29%, 24% and 23% of the EAGER and RAPID awards, respectively, accounting for three-quarters of these awards. BIO, SBE, MPS and EHR have made 10%, 5%, 5% and 3%. However, with the exception of SBE, the average award size is larger for this second group of directorates than for the first group.

Table 11 – Investments in EAGER and RAPID awards since inception, by directorate

	CISE	ENG	GEO	BIO	SBE	MPS	EHR
% of FY 09-13 awards	29.3%	23.9%	22.9%	10.0%	5.3%	4.7%	3.4%
FY 09-13 investment ($ million)	126	67	53	49	13	22	21
Average FY13 award ($ thousand)	166	112	85	204	77	331	236

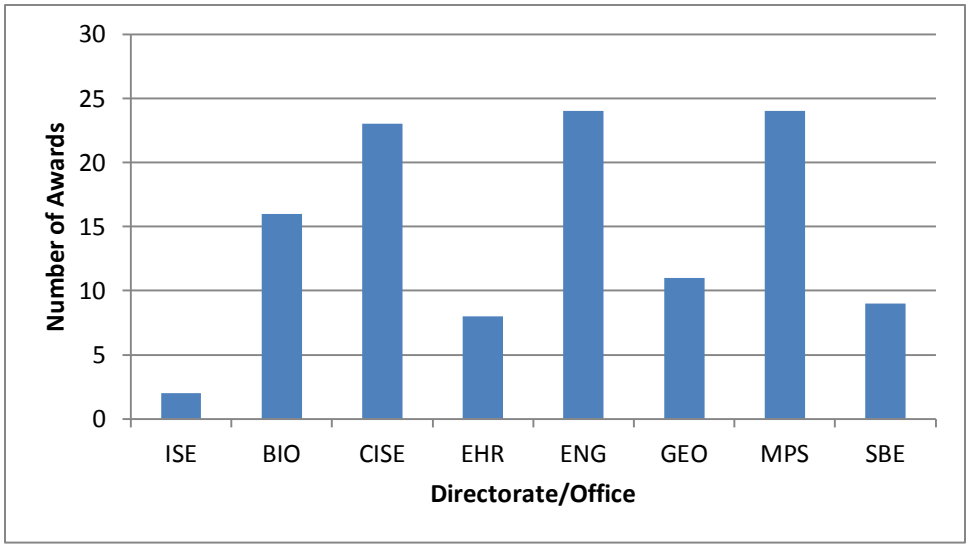
F9.2 Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) Awards.

FY 2012 saw the inauguration of the **Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE)** program. INSPIRE is intended to support transformative, cross-disciplinary science, creating a new type of funding opportunity. INSPIRE is designed to attract unusually creative, high-risk / high-reward interdisciplinary proposals. No favored topics are designated, and the funding opportunity is open to innovative, interdisciplinary proposals that fall within the overall span of NSF-supported areas of science, engineering, and education research. Program managers are encouraged to use new tools, collaboration modes and techniques in the merit review process to widen the pool of prospective discoveries. The program creates new interdisciplinary research opportunities. In FY 2013, the naming of the awards changed slightly from FY 2012. All FY 2013 awards were called INSPIRE Track 1 awards.

In FY 2013, 53 INSPIRE Track 1 awards were made; up from 40 INSPIRE awards made in FY 2012. Reflecting the interdisciplinary nature of these projects, all were co-funded from different units within NSF. **Figure 18** shows the number of INSPIRE awards co-funded by each directorate in FY2013. (By virtue of the way in which the INSPIRE program is organized internally, nearly all INSPIRE awards also included co-funding by the Office of International and Integrative Activities that was separate from any ISE contribution. This is not shown in **Figure 18**.) In 3 instances, the awards were co-funded by units wholly within a single directorate (CISE, ENG and GEO). In 38 cases, the awards were co-funded by units in two

directorates and in 12 cases three directorates co-funded each award. Two awards also had co-funding from the International Science and Engineering section of IIA.

Figure 18 – INSPIRE Awards Co-funded by NSF Directorates in FY2013



Source: NSF INSPIRE Program 1/3/14.

F10. Multi-Panel Review and Inter-Divisional Co-Funding.

NSF does not ask PIs to identify formally whether or not a proposal is interdisciplinary, and it is not possible currently to make a direct count of the number of interdisciplinary proposals NSF receives. Indeed, a precise definition of interdisciplinarity is elusive[28] and likely to be time-dependent. For example, a research area that, when it emerges, straddles the boundary of two different disciplines may, over time, come to be recognized as a new discipline. However, one can examine a number of characteristics of proposals, awards and the review process that may have operational utility by providing information on proposals that cross the boundaries of NSF's established program areas. This section of the report describes two such characteristics.

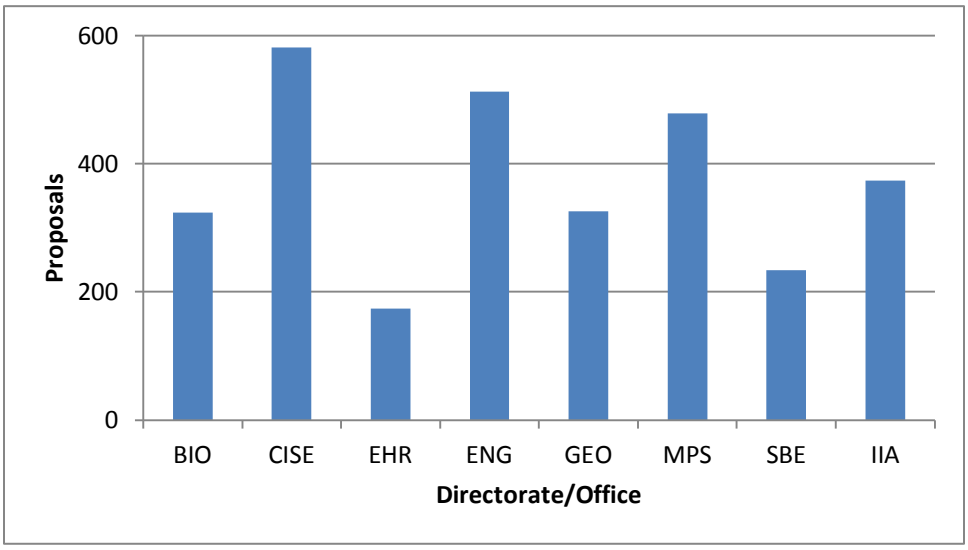
Inter-Divisional Co-funding

One indicator of the number of interdisciplinary awards is the number of awards that are funded by more than one part of NSF. **Figure 19** shows the distribution of co-funding for competitive awards that received funding from more than one division at NSF in FY 2013.

[28] Multiple definitions of interdisciplinarity appear in the literature as well as debate over the distinction between multidisciplinary, interdisciplinary and transdisciplinary. Nor is there a universally accepted definition of "discipline." In a 2005 report, the National Research Council noted that, "No single definition is likely to encompass the diverse range of activities that have been described under the heading of IDR [Interdisciplinary Research]." The report provided the following description: "Interdisciplinary research (IDR) is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or field of research practice." (From "Facilitating Interdisciplinary Research," National Academies Press, 2005.)

The total number of unique, co-funded awards included in **Figure 19** is 1,332, which is approximately 12.3% of FY 2013 competitive awards. The average number of divisions contributing to a co-funded award is 2.3.[29] IIA is included separately in this figure. In FY 2013, its EPSCoR office provided co-funding for 212 awards. IIA also co-funded 52 of the 53 INSPIRE Track 1 awards.

Figure 19 - FY 2013 Awards Co-funded



Source: NSF Report Server 1/22/13.

Co-funding associated with EPSCoR or international activities does not, of itself, imply interdisciplinary proposal content. If we remove awards in which co-funding is between IIA/ISE or IIA/EPSCoR and a single other division, then the number of co-funded awards is approximately 1,055 or 9.7% of FY 2013 competitive awards and the average number of divisions contributing to a co-funded award is again 2.3. Of these awards, 338 are co-funded wholly within a directorate.

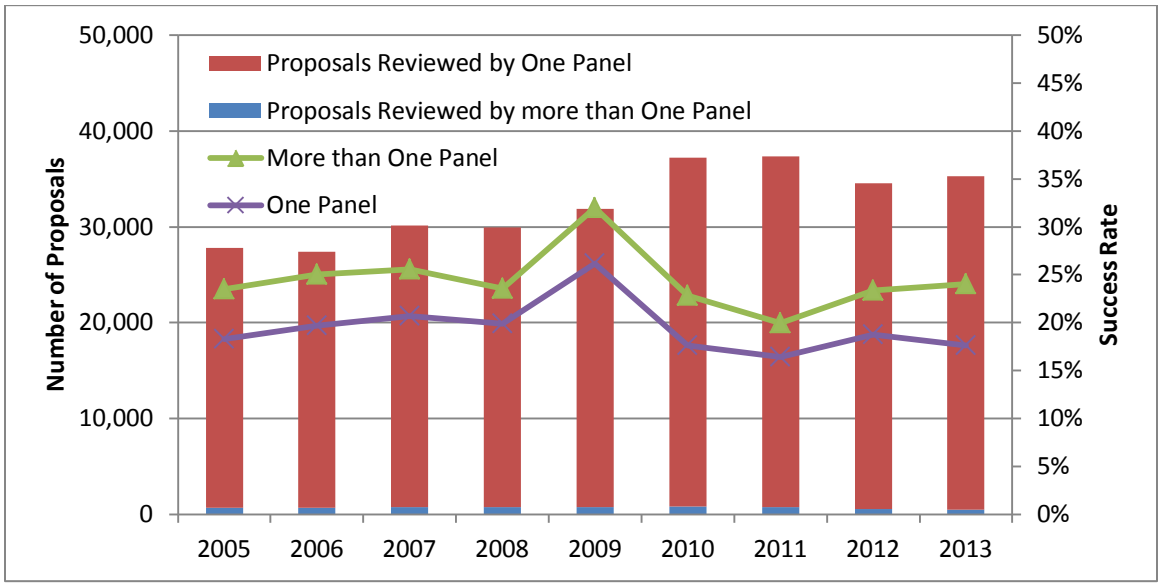
Multi-Panel Review

Interdisciplinary proposals are reviewed in a variety of ways. A relatively small fraction of them are reviewed by multiple panels. One question of interest is whether review by more than one panel leads to a lower success rate than review by a single panel.

[29] In **Figure 19**, awards appear once for each distinct funding source. Awards that receive co-funding from distinct divisions within the same directorate are included. (E.g. an award co-funded by the Division of Physics and the Division of Chemistry would be counted twice in the MPS total.) The figure does not include co-funding by different programs within the same division. In general, co-funding from Directorate front offices is not counted as a separate co-funding source for **Figure 19** unless the front office is the only part of the directorate co-funding an inter-directorate award.

Among proposals reviewed by panels, **Figure 20** shows the number of research proposals that were considered by one panel (red bars), the number reviewed by more than one panel (blue bars), the success rate for single-panel review (purple line), and the success rate for multi-panel review (green line).

Figure 20 – Proposals Undergoing Single- and Multi-Panel Reviews and their Success Rates

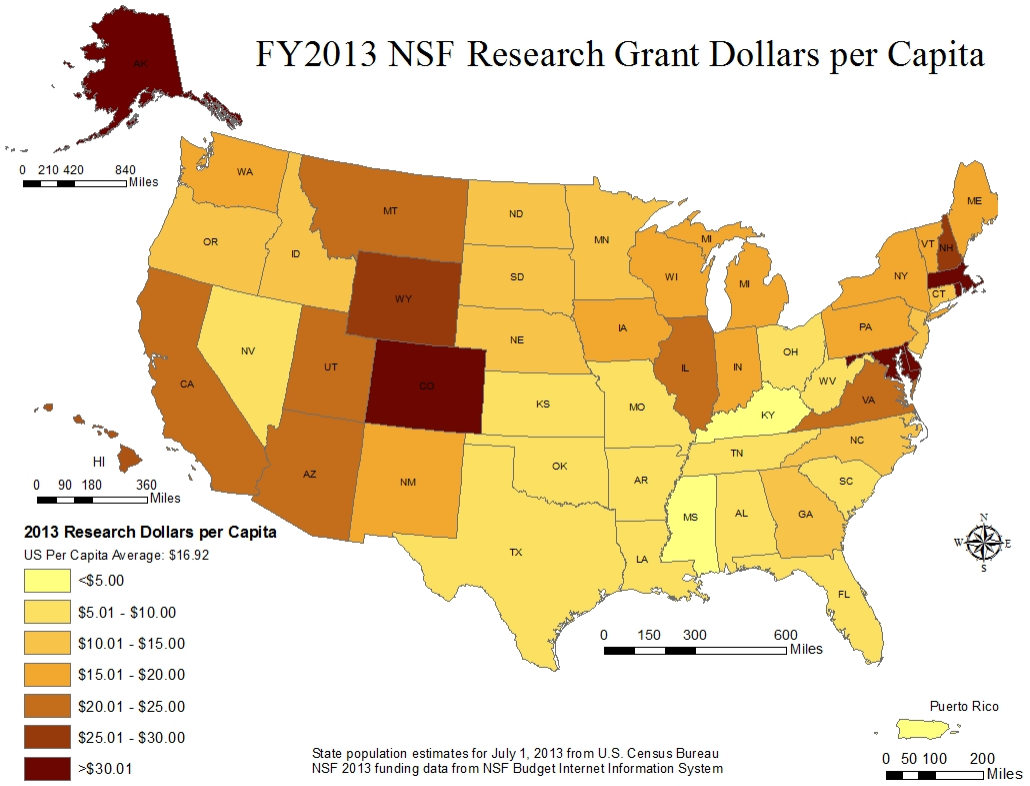


The proportion of empanelled proposals going through multi-panel review is small (1.5% of the total in FY 2013). This number was 2.7% in FY 2006 and has declined every year since then. Most multidisciplinary proposals are not reviewed by multiple panels. However, the success rate for proposals reviewed by more than one panel is consistently 4 to 6 percentage points higher than the rate for proposals that are only reviewed by a single panel.

F11. Geographic Distribution of Research Awards

Figure 21 shows the distribution of the total value of NSF research funds awarded in FY 2013 by state.[30] In **Figure 21**, the shading indicates the NSF research funding by state for FY 2013 normalized by population based on state population estimates for July 1, 2013 from the U.S. Census Bureau. The darker colors indicate a higher amount of funding per capita. The national average (mean) amount per capita is $16.92. The median of FY 2013 funding per capita in the various states is $14.75 per capita.

Figure 21 – NSF Research Funding per Capita



[30] Data on research funding was accessed from the NSF Budget Internet Information System on 3/1/2013. The data include both new awards and the FY 2013 annual increments for continuing grants and cooperative agreements. This is a different approach from the one used in the FY 2012 Merit Review report in which only data for new awards were shown. Data for the District of Columbia are not shown.

IV. The NSF Merit Review Process

A. Merit Review Criteria

In FY 1998, the National Science Board approved the use of the two NSF merit review criteria. In 2007, the NSB modified the criteria to promote potentially transformative research. These criteria were in effect for proposals submitted in the first part of FY 2013. In December 2011, the NSB completed a review of the merit review criteria. The outcome of that review was to retain the existing two NSF merit review criteria but to revise the elements to be considered by reviewers in the application of those criteria.[31] In addition, the NSB articulated principles upon which the two Merit Review Criteria are based. The language in the *Grant Proposal Guide* describing the merit review criteria and the principles on which they are based was revised in October 2012 to incorporate the recommendations from the National Science Board.[32] This revised language applied to proposals submitted on or after January 14, 2013, or in response to deadlines that were on or after January 14, 2013 and is reproduced in **Appendix 11**.

The two NSF-wide merit review criteria are Intellectual Merit and Broader Impacts. The Intellectual Merit criterion encompasses the potential to advance knowledge. The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes. Programs may have additional review criteria particular to the goals and objectives of the program. All relevant review criteria are described in the program announcement or solicitation.

Effective October 1, 2002, NSF returned without review proposals that failed to separately address both merit review criteria within the Project Summary. Since 2006, the number of proposals returned without review for failing to address both NSB merit review criteria has been 1 in 300 or fewer. (See **Table 12**.)

Table 12 - Proposals Returned Without Review for Failing to Address both Merit Review Criteria

Fiscal Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Proposals	176	134	117	124	147	131	116	159	84
Percent of all Proposal Decisions	0.42%	0.32%	0.26%	0.28%	0.33%	0.24%	0.22%	0.33%	0.17%

Source: NSF Enterprise Information System 10/01/13.

B. Description of the Merit Review Process

The NSF merit review process includes the steps listed below and is depicted in **Figure 22**:

- The proposal arrives electronically and is assigned to the appropriate program(s) for review. Some programs also include preliminary proposals as part of the application process. See

[31] "The National Science Foundation's Merit Review Criteria: Review and Revisions." (2011) NSB/MR-11-22.
[32] The NSF *Grant Proposal Guide* (GPG) applicable for the first quarter of FY 2013 is available at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpg_index.jsp. The version of the GPG applicable for the remainder of FY 2013 may be found at http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_index.jsp.

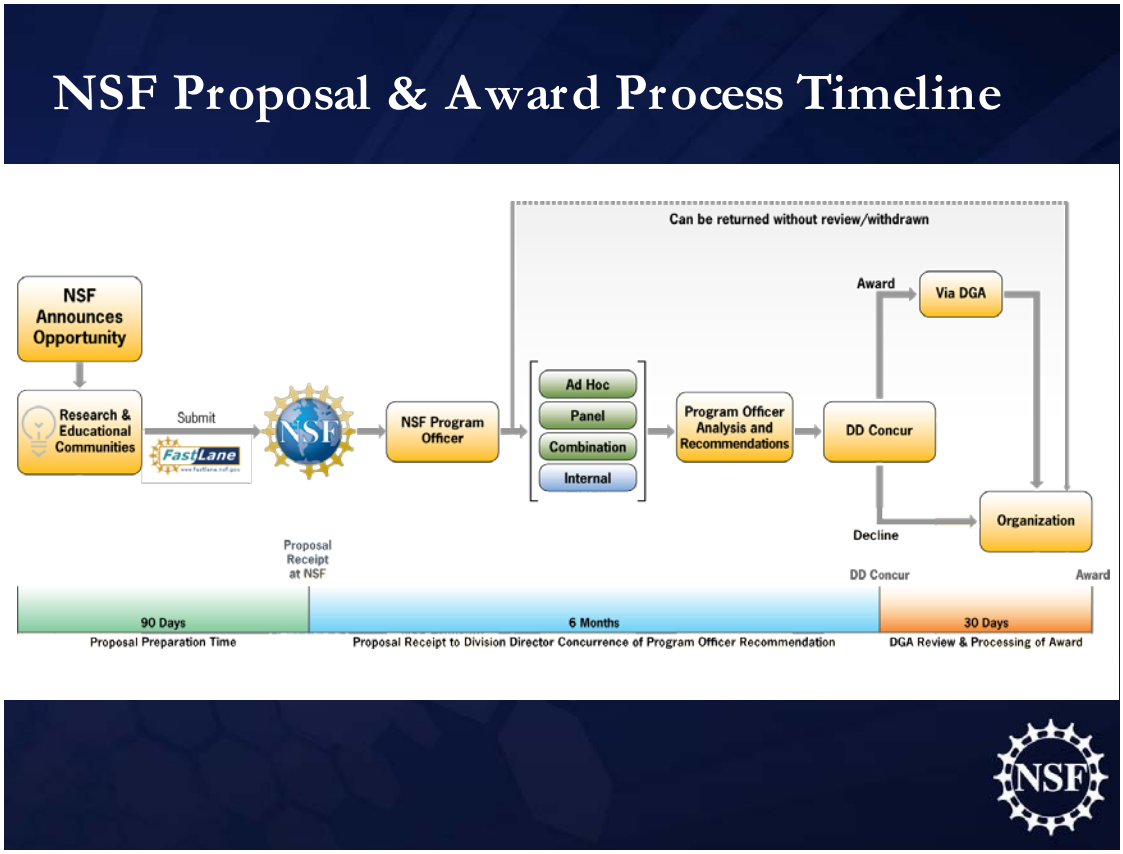
Appendix 2 for more information about preliminary proposals. Proposals that do not comply with NSF regulations, as stated in the *Grant Proposal Guide*, may be returned without review.

- The review process is overseen by a division director, or other appropriate NSF official.
- The program officer (or team of program officers) is responsible for the following:
    - Reviewing the proposal and determining the appropriate level of merit review. (Some proposals do not require external review. These include, for example, EAGERs, RAPIDs, INSPIRE Track 1s, and proposals for small conferences, workshops, or symposia.)
    - Selecting reviewers and panel members. Selection may be based on the program officer's knowledge, references listed in the proposal, individuals cited in recent publications or relevant journals, presentations at professional meetings, reviewer recommendations, bibliographic and citation databases, or proposal authors' suggestions.
    - Checking for conflicts of interest. In addition to checking proposals and selecting reviewers with no apparent potential conflicts, NSF staff members provide reviewers guidance and instruct them how to identify and declare potential conflicts of interest. All NSF program officers receive annual conflict of interest training.
    - Synthesizing the comments of the reviewers and review panel (if reviewed by a panel), as provided in the individual reviews and panel summaries.
    - Recommending action to award or decline the proposal, taking into account external reviews, panel discussion, and other factors such as portfolio balance and the amount of funding available.

The division director, or other appropriate NSF official, reviews all program officer recommendations. Large awards may receive additional review. The Director's Review Board examines award recommendations with an average annual award amount of 2.5% or more of the awarding division's annual budget (prior year current plan). The National Science Board (NSB) reviews recommended awards with an annual award amount at or above 1% of the awarding directorate's prior year current plan or 0.1% of NSF's prior year total budget, whichever is greater.[33] In FY 2013, NSB authorized 9 funding items: 7 awards and 2 increases in funding.[34]

[33] Other items requiring NSB prior approval include new programs, major construction projects that meet certain specifications, as well as programs and awards involving policy issues.
[34] One of the increases in funding authorization did not include an increase in spending U.S. funds but enabled the awardee to increase the expenditure of funds from foreign partners.

Figure 22 -Diagram of the NSF Merit Review Process



After a division forwards an award recommendation to the Office of Budget, Finance, and Award Management (BFA), a grants and agreements officer performs an administrative review of the recommendation. If the results of this review are satisfactory, BFA makes the award.

NSF has several oversight and advisory mechanisms relevant to the merit review process:

- External Committees of Visitors (COV), the membership of which is comprised of scientists, engineers, and educators, assess each major NSF program every 3-5 years. COVs examine the integrity and efficiency of merit review processes and the structure of the award portfolio.

- NSF directorates and offices have Advisory Committees comprised of scientists, engineers, administrators, and educators, from academia, other non-profit organizations, and industry. One of the tasks of these Advisory Committees is to review COV reports and responses from directorates and offices in order to provide guidance to the Foundation. The COV reports and NSF responses are publicly available on the NSF website.

- An external contractor performs an independent verification and validation of programmatic performance measurements, which include aspects of the merit review process.

Additional information about COVs, and NSF Advisory Committees, is given in **Appendix 12**.

C. Program Officer Award/Decline Recommendations

As noted above, the narrative comments and summary ratings provided by external reviewers are essential inputs to program officers who use their professional judgment to make award and decline recommendations to NSF senior management.

NSF program officers are experts themselves in the scientific areas that they manage. They have advanced educational or professional training (e.g., a Ph.D., P.E., or equivalent credentials) in science or engineering and relevant experience in research, education, and/or administration. They are expected to produce and manage a balanced portfolio of awards that addresses a variety of considerations and objectives. When making funding recommendations, in addition to information contained in the external proposal reviews, NSF program officers evaluate proposals in the larger context of their overall portfolio and consider issues such as:

- Support for high-risk proposals with potential for transformative advances in a field;
- Novel approaches to significant research and education questions;
- Capacity building in a new and promising research area;
- Potential impact on human resources and infrastructure;
- NSF core strategies, such as 1) the integration of research and education, and 2) broadening participation;
- Achievement of special program objectives and initiatives;
- Other available funding sources; and
- Geographic distribution.

D. Review Information for Proposers and the Appeal Process

Proposers receive notification of the award/decline decision, copies of all reviews used in the decision with reviewer-identifying information redacted, and a copy of the panel summary (if a panel review was conducted). A "context statement" is also sent that explains the broader context within which any given proposal was reviewed. Program officers are expected to provide additional communication (either in writing or by phone) to proposers in the case of a decline recommendation, if the basis for the decision is not provided in the panel summary.

If, after receiving the reviews and other documentation of the decision, an unsuccessful proposer would like additional information, he or she may ask the program officer for further clarification. If, after considering the additional information, the applicant is not satisfied that the proposal was fairly handled and reasonably reviewed, he or she may request formal reconsideration. Information about the reconsideration process is included in all decline notifications.[35] A reconsideration request can be based on the applicant's perception of procedural errors or on disagreements over the substantive issues dealt with by reviewers. If the relevant NSF assistant director or office head upholds the original action, the applicant's institution may request a second reconsideration from the Foundation's Deputy Director.

[35] Certain types of proposal actions are not eligible for reconsideration. See NSF *Grant Proposal Guide* (GPG) at http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_4.jsp#IVD.

NSF declines approximately 38,000 proposals per year but usually receives only 30-50 requests for formal reconsideration annually. The number of requests for formal reconsideration and resulting decisions at both the Assistant Director and Deputy Director levels from FY 2004 through FY 2013 are displayed in **Appendix 13**. NSF received 28 formal reconsideration requests in FY 2013; 25 decline decisions were upheld and 2 were reversed. One reconsideration request was returned to the PI for failing to follow the procedure described in the Grant Proposal Guide.

E. Methods of External Review

The Foundation's merit review process relies on the use of knowledgeable experts from outside NSF. As stated in the *Grant Proposal Guide* (GPG), proposals usually receive at least three external reviews. Under some circumstances, the requirement for external review can be waived.[36]

NSF programs obtain external peer review by three principal methods: (1) "mail-only," (2) "panel-only," and (3) "mail + panel" review.

In the "mail-only" review method, reviewers are sent links to proposals and asked to submit written comments to NSF through FastLane, NSF's web-based system for electronic proposal submission and review.

"Panel-only" refers to the process of soliciting reviews from panelists who convene to discuss their reviews and provide advice as a group to the program officer.

Many proposals submitted to NSF are reviewed using some combination of these two processes. Those programs that employ the "mail + panel" review process have developed several different configurations, such as:

- Mail reviewers submit reviews before the panel convenes and the panel's discussion is informed by the mail reviews.
- A panel meets to discuss proposals. The panel and/or program staff may identify proposals where additional reviewing expertise would be helpful. After the panel, appropriate reviewers are asked to submit mail reviews to supplement the panel's advice.

The total numbers of individual, narrative reviews and the average numbers of reviews per proposal obtained by the three different review methods are presented in **Table 13.**[37]

[36] Exemptions that program officers may choose to exercise, for example, include proposals for EAGER, RAPID, and INSPIRE grants, and certain categories of workshop and symposia proposals. See **Appendix 10** for more information about EAGER and RAPID proposals.

[37] The table only shows reviews written by individuals. Panel discussions may, and often do, include the input of reviewers who have read the proposal but have not been asked to provide a separate written review. A panel summary therefore often represents a review perspective that is larger than that which is captured in the written reviews. The number of reviews per proposal in the last line of the table therefore underestimates the amount of reviewer input when a panel is part of the review process.

Table 13 - Reviews per Proposal, FY 2013

	All Methods	Mail + Panel	Mail-Only	Panel-Only
Reviews*	187,512	65,006	11,184	111,322
Proposals	46,918	13,394	2,814	30,710
Rev/Prop	4.0	4.9	4.0	3.6

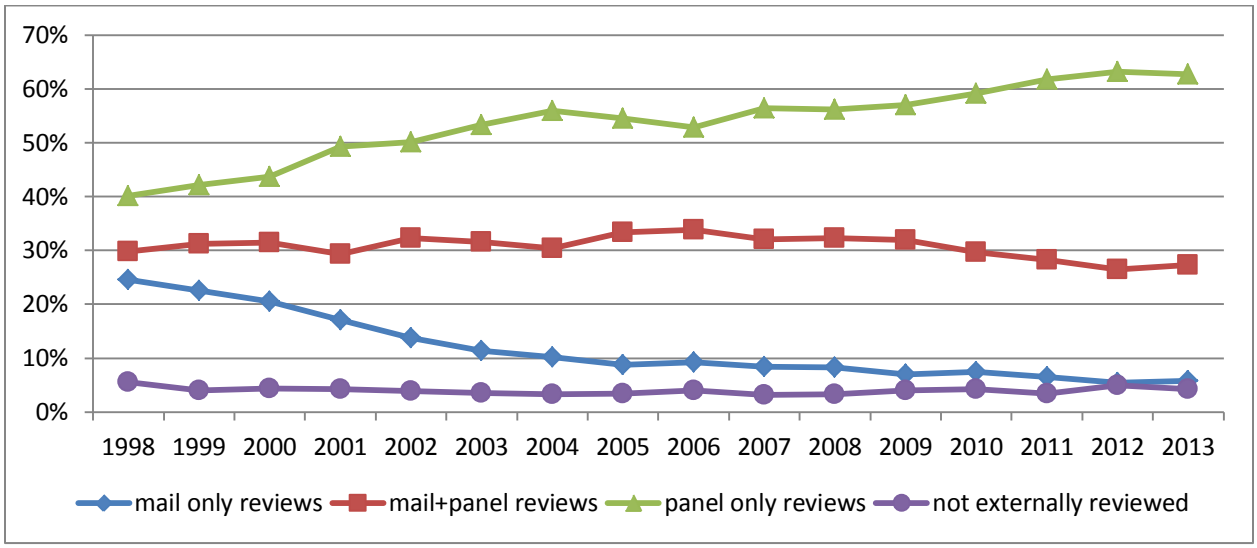
Source: NSF Enterprise Information System 10/01/13.

The mail-plus-panel method had the highest number of reviews per proposal, averaging 4.9, while the panel-only method averaged 3.6. Directorate-level data for FY 2013 are presented in **Appendix 14.**

In addition, site visits (on-site and reverse-site) by NSF staff and external members of the community are often used to review proposals for facilities and centers. NSF program officers are given discretion in the specific use of review methods, subject to approval by the division director or other appropriate NSF official.

The use of various review methods has changed markedly over time, as shown in **Figure 23.** The data for FY 2002 - 2013 are provided in **Appendix 15,** and **Appendix 16** provides FY 2013 data on the review methods used by directorates and offices. **Appendix 17** shows the average review ratings that result from the different methods of review.

Figure 23 - FY 1998-2012 Trend, NSF Review Method



Source: NSF Enterprise Information System, 10/01/13.

There are a number of reasons for the trends in **Figure 23**. Panels allow reviewers to discuss and compare proposals. The panel review process has the advantage that different perspectives can be discussed and integrated, if appropriate. Panels tend to be used for programs that have

* As in the FY 2012 report, we have only counted written reviews prepared by individuals, whether a mail reviewer or a panelist.

deadlines and target dates, as opposed to unrestricted submission windows. Using only panels in the review process tends to reduce proposal processing time (time-to-decision), compared to mail-only reviews. For example, in FY 2013, 79% of all proposals reviewed by panel-only were processed within six months, compared to 69% for mail + panel and 54% for mail-only.[38]

One advantage of mail review is that the expertise of the reviewers can be more precisely matched to the proposal. The mail + panel review process is used frequently because it combines the in-depth expertise of mail review with the comparative analysis of panel review.

In-person review panels also have some drawbacks. For example, some qualified individuals may find it difficult to be absent from home or work for the several days that might be required to travel to NSF and participate in a panel. In addition, the average number of proposals that a panelist is asked to review in a funding cycle is considerably higher than the number of reviews asked of a mail reviewer. This high workload may deter some individuals who would otherwise be willing to participate in the review process.

In recent years, "virtual panels" have emerged as an alternative to in-person review panels. In FY2013, approximately 28%[39] of panels at NSF were held virtually. Virtual panels can help address some of the drawbacks noted with in-person panels, while retaining the comparative analysis provided by a panel review. In addition, virtual panels offer NSF staff and panelists greater flexibility in structuring the panel review. In virtual panels, panelists participate from their remote locations and interact using NSF's Interactive Panel System (IPS), accompanied by a teleconference, videoconference, or a virtual world system such as Second Life. Use of virtual panels supports NSF's efforts to improve career-life balance and broaden the participation of highly qualified individuals in the review process. Examples of groups who may face difficulties participating in in-person review panels include: researchers with young children or who provide elder care; researchers with disabilities that make travel difficult or whose home environment provides special assistive technologies; and researchers with heavy teaching commitments or other work commitments that would make a two-day or three-day absence difficult. **Figure 24** shows the number of proposals reviewed by different types of panels since FY 2005 and the proposal ratings by panel review type (in-person, virtual, and mixed).[40] Mixed panels are panels in which some reviewers participate in person and some use a telephone or video connection to participate from a remote location. Mixed panels tend to have more complicated social dynamics and can be more difficult to moderate; however, they can be useful in broadening participation in the review process or when unforeseen events prevent a reviewer from travelling to an in-person panel.

The fundamental mode of operation of panels is the same whether they are virtual, in-person or mixed; however, for a number of reasons, NSF believes that the use of a virtual panel approach works best when the size of the panel and the number of proposals considered are relatively small. This is reflected in the statistics of the three types of panels shown in **Table 14**.

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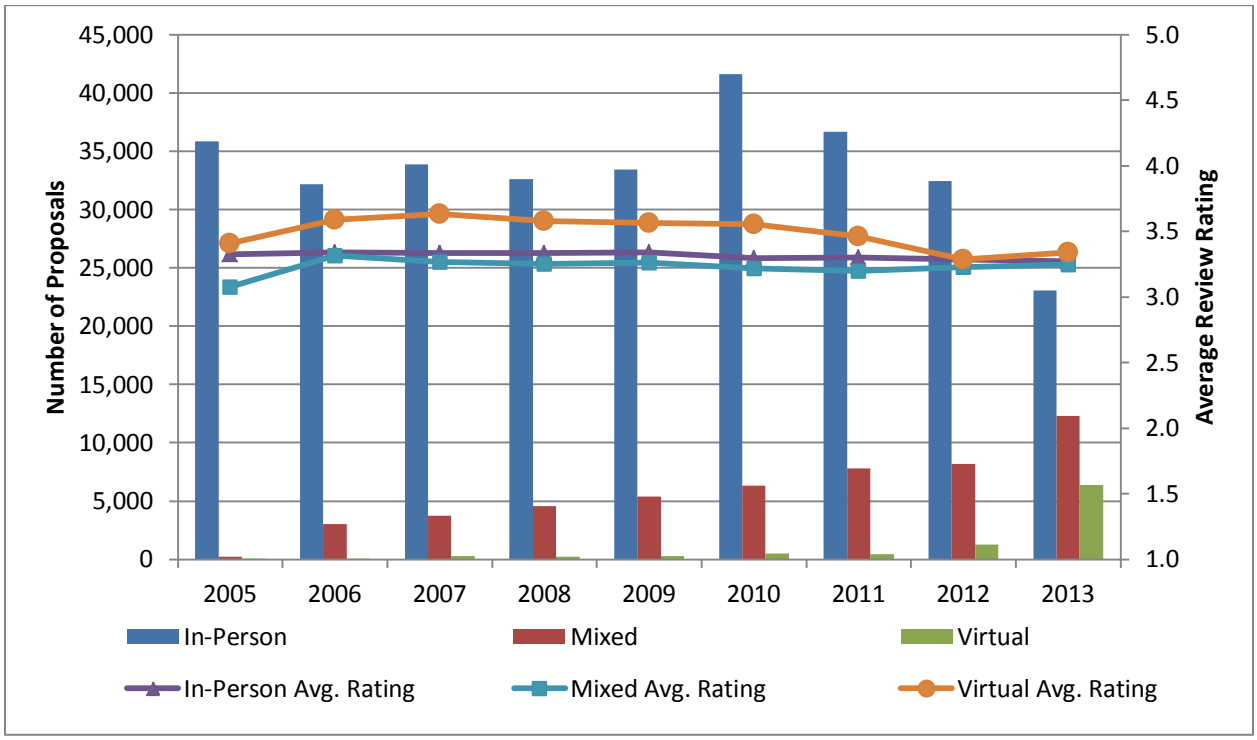
[38] The lower value for mail-only may be a reflection of the fact that a number of the programs that use this method do not have submission deadlines, rather than a direct consequence of the method of obtaining reviews.
[39] Data provided by NSF's Division of Administrative Services.
[40] For consistency with prior years' reports, we repeat the practice of basing this figure on a subset of the competitively reviewed proposals from which certain proposals, such as fellowship proposals, have been excluded.

Figure 24 - FY 2005-2013 Usage and Proposal Rating by Panel Review Type[41]



Source: NSF Enterprise Information System 10/01/13.

Because virtual panels, on average, review fewer proposals per panel than in-person panels (averaging 14.5 and 31.9, respectively), only 14.5% of proposals that were reviewed by panels went through virtual panels in FY 2013.

Table 14 - Data on Virtual, Mixed and In-Person Panels held in FY 2013[42]

	Virtual	Mixed	In-Person	TOTAL
Panels	506	502	821	1,829
Proposals*	7,327	17,013	26,189	50,529
% of Total Panels	27.7%	27.4%	44.9%	100%
% of Total Proposals	14.5%	33.7%	51.8%	100%
Proposals/Panel	14.5	33.9	31.9	27.6
Panelists	2,982	5,006	7,471	15,459
Panelists/Panel	5.9	10.0	9.1	8.5
Proposals/Panelist	2.5	3.4	3.5	3.3

*Proposals that were reviewed by more than one panel are counted once for each panel to which they went. In general, collaborative projects are only included once for each panel in which they are reviewed. Individual reviewers are counted once for each panel on which they serve.

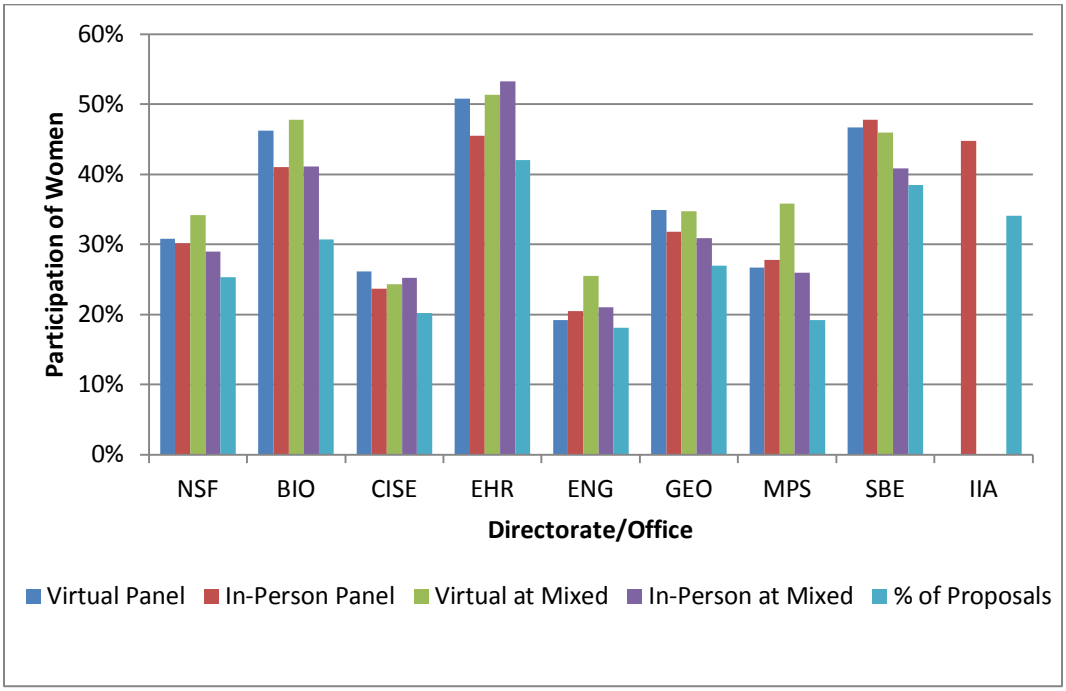
[41] As in previous years, the data in **Figure 24** correspond to panels that reviewed proposals that were recommended for award or decline by division directors in the stated fiscal year. Thus, for example, some of the panels associated with FY 2013 occurred prior to the beginning of FY 2013 and some of the panels that occurred late in FY 2013 are not associated with FY 2013 because proposals from these panels were not recommended until FY 2014.

[42] Unlike **Figure 24**, the data in this table include only those panels that took place in the given fiscal year, FY 2013.

In addition to avoiding the burden of travel to NSF, virtual panelists are also, on average, assigned a smaller workload than in-person panelists.

As noted earlier, demographic data for reviewers is relatively sparse. This is particularly true for race, ethnicity and disability status. However, information on the gender of panelists is more complete and is summarized in **Figure 25**.

Figure 25 – Participation of Female Reviewers in Virtual, In-Person, and Mixed Panels during FY 2013 [43]



Source: NSF Enterprise Information System 1/17/14.

Of the 15,459 panelists[44] in FY 2013, gender information was available for 82.7%. This permitted an examination of whether there was any significant difference between the ratio of male and female panelists in virtual panels and that in in-person panels. Amongst panelists for whom gender information was recorded, 30.14% of panelists on in-person panels and 30.84% of panelists on virtual panels were women. The small difference is not statistically significant. However, for both types of panels, women participate at a higher rate (just over 30%) than their representation amongst proposers (25% for competitive proposals and 24% of research proposals).

In FY 2012, there was a greater difference between the participation of women in in-person and wholly virtual panels (29.39% and 31.92%, respectively) than was seen in FY 2013; however,

[43] The reviewer participation data include only those panels that took place in the given fiscal year, FY 2013. Also shown is the percentage of competitively reviewed proposals with award or decline actions approved by division directors in FY 2013 that came from female PIs. IIA only held in-person panels during FY 2013.
[44] Because some reviewers serve on more than one panel, this number represents 13,054 distinct individuals.

the number of virtual panels in FY 2012 was only 25% of the number in FY 2013 and the difference in the participation of women in in-person and wholly virtual panels in FY 2012 was still not statistically significant.[45]

Mixed panels do exhibit a difference between the demographics of those panelists who attend in-person and of those that participate virtually. Averaging across all of the mixed panels in FY 2013, 75.6% of panelists attended in person and 24.4% attended virtually. Looking only at those panelists for whom gender information was available, 29% of the panelists who attended in-person were women while 34.2% of panelists who participated virtually were women. This difference is statistically significant.[46]

The difference seen in the demographics of in-person and virtual participation in mixed panels in FY 2013 is similar to what was seen in FY 2012 when 27.8% of the panelists who attended in-person were women while 33.4% of panelists who participated virtually were women.[47]

Both in-person and virtual panels use the Interactive Panel System (IPS). A part of FastLane, IPS permits the viewing of proposals, reviews, basic panel discussions, collaboration on panel summaries, and approval of the draft panel summary through the Web.

As noted above, videoconferencing is used by some programs to enhance the participation of virtual panelists. Videoconferencing is also employed in award management and oversight for large center-type projects. The Foundation is continuing its efforts to improve web-based and electronic means of communication to contribute to the quality of the merit review and award oversight processes.

F. Merit Review Pilots

In addition to the forms of merit review used above, in FY 2012 – 2014, NSF is conducting several pilot activities incorporating different variations of the more familiar approaches to merit review. **Table 15** lists these pilots. A brief description of each pilot follows. Proposals for pilot activities that involve deviations from established NSF policies undergo an internal review process established in FY 2012. Pilot activities that can be implemented within existing NSF policies do not require such formal review although programs are encouraged to engage the research community in advance of beginning the pilot and to notify prospective proposers of the forthcoming changes. Examples in this latter category include the use of preliminary proposals for core programs and the elimination of the use of program deadlines.

Virtual Panels

For several years, NSF has experimented with having reviewers participate "virtually" in review panel discussions, using technologies like teleconferencing, videoconferencing or "virtual worlds."[48] In each of FY 2010 and FY 2011, approximately 1% of proposals were reviewed by

[45] The probability that such a difference would arise at random is greater than 0.1.
[46] The probability that such a difference would arise at random is $p < 0.005$.
[47] The probability that such a difference would arise at random is $p < 0.01$.
[48] An example of a virtual world technology used for panel review is the Second Life system.

wholly virtual panels. Based on that experience, NSF began planning a pilot activity to look at the challenges and impacts associated with expanding the use of virtual panels. Motivations for this included: an opportunity to attract potentially untapped reviewer pool resources by removing barriers that might prevent panelists who may not be able to travel due to physical limitations, family responsibilities, or other travel restrictions; greater opportunities to utilize international panelists who are often faced with large travel times and other restrictions; greater flexibility in how virtual panels are structured; enhanced opportunities for reviewer training; and reducing the potential impacts of inclement weather. However, there are challenges such as matching technology to the size and purpose of the panel, technology stability and acceptance, as well as security and policy issues. Assessing these challenges and testing approaches to them were among the reasons for implementing a pilot activity.

Table 15 – Merit Review Pilots

Pilot	Nature of pilot	Units participating
Virtual Panels	The expanded use of review panels in which all panelists participate electronically from distributed locations such as their offices or homes.	NSF-wide
Preliminary Proposals for Core Programs	Core programs move from semi-annual deadlines for full proposals to an annual deadline for preliminary proposals.	BIO/DEB, BIO/IOS
One-Plus	Investigators with promising but unfunded proposals may revise and resubmit their ideas for possible funding in the second half of the annual funding cycle, but only if invited to do so.	SBE/BCS's Geography and Spatial Sciences program
Asynchronous Reviewer Discussions	The use of an access-controlled, program director-moderated message board, open to reviewers over a specified period, to enable the sharing of comments and discussion of a set of proposals.	CISE/CNS, MPS/PHY
Mechanism Design	A review mechanism in which techniques from game theory are used to allow investigators who submit proposals also to take part in the review process.	ENG/CMMI's Sensors and Sensing Systems program
Umbrella-Amendment Solicitation	A proposal-generating mechanism that is designed to implement a community-developed infrastructure. A flexible solicitation mechanism that accommodates both overarching, long-term goals and the ability to be responsive to changing community requirements.	GEO's & CISE/ACI's EarthCube program
Elimination of Program Deadline	A core program that has traditionally had two proposal deadlines per year switched to accepting proposals at any time to see if proposal pressure would be affected.	GEO/EAR's Instrumentation and Facilities Program

The virtual panel pilot activity began in FY 2012 with an assessment of several technological and organizational approaches to virtual meetings, the development of training modules for NSF staff and reviewers, and outreach activities with NSF staff. In FY 2013 and FY 2014, information would be collected about virtual panels and the experiences of participants so that an assessment could be made in FY 2015. The expectation was that at least 5% of review panels in

FY 2013 would be wholly virtual.[49] As it turned out, NSF programs embraced virtual panels to a greater degree than anticipated; 28% of panels held in FY 2013 were wholly virtual. One contributing factor may have been guidance from the Office of Management and Budget which encouraged NSF and other agencies to reduce spending on travel.

Preliminary Proposals for Core Programs

Faced with increasing proposal numbers, reviewer requirements, and declining success rates, in January 2012, two divisions in the Directorate for Biological Sciences, the Division of Environmental Biology (DEB) and the Division of Integrated Organismal Systems (IOS), embarked on a three-year pilot activity to mitigate the stresses involved. This activity replaced semi-annual, full proposal deadlines with an annual proposal submission and review process accomplished in two stages. The first stage requires 4 or 5-page preliminary proposals to be submitted each January. These are reviewed in panels and then, informed by the reviewers' input, program officers invite 15-30% of the proposers to submit full proposals by a second deadline in late summer. In the second stage, full proposals submitted in response to these invitations are reviewed in the fall by a combination of panels and ad hoc reviewers; award/decline decisions are made based on the reviews of the full proposals. This process has decreased the number of ad hoc reviewers required.

One-Plus

One of the goals of this pilot was to accelerate support for highly significant, potentially transformative research. Starting in Fall 2012, the Geography and Spatial Sciences program (GSS) moved from a semi-annual proposal deadline to accepting core research proposals only once each year, with a deadline in early September. However, reviewers were asked to explicitly comment separately on the potential larger-scale, longer-term significance of a project (as outlined in the proposal) if the project *were* to be conducted successfully, as well as the likelihood that the project (as outlined in the proposal) *would* be conducted successfully.

After funding decisions were made, program officers invited a limited number of PIs whose proposals had been declined to revise and resubmit a proposal roughly two months after they received the decline notification. This opportunity was provided based on the identification of projects whose significance and potentially transformative character were evaluated as being high. All other declined PIs had to wait until the next annual deadline for unsolicited proposals before submitting a new or revised proposal.

Proposals submitted for the secondary deadline were evaluated with ad hoc reviews complementing a panel review of the revised proposals.

Asynchronous Reviewer Discussions

This activity pilots an approach to merit review in which, after submitting written individual reviews of their assigned proposals, reviewers use an access-controlled online message board to

[49] See NSF's discussion of Merit Review Process Improvements in the President's FY 2014 budget, submitted to Congress in February, 2013.

participate in an asynchronous discussion of the merits of the proposals. The online discussion is moderated by program staff.

The approach is well known to some research communities, such as some areas of computer science that have used it extensively in the review of submissions to research conferences.

For the pilot in FY 2013, asynchronous panel discussions were used as a pre-cursor to face-to-face or virtual panel meetings. They served to identify those proposals on which there was consensus about their merit (either high or low) and to explore the reasons for divergence when individual reviewers had very different perspectives on proposals. This enabled the subsequent panel meetings to focus their time more effectively.

One division, Computer and Network Systems, used asynchronous discussions in conjunction with nine panels, and a second division, Physics, used asynchronous discussions for two panels. Using feedback from the reviewers and the program staff involved, these divisions concluded that the approach showed promise but that the technology used was too cumbersome in comparison to other platforms for asynchronous discussion used by the research community. NSF's Division of Information Services is examining whether the required capabilities can be incorporated into NSF's Interactive Panel System.

Mechanism Design

The Sensors and Sensing Systems program developed a merit review pilot to test the efficacy of using techniques from game theory to create a review mechanism in which the investigators who submit proposals also take part in the review process.

The mechanism design approach to proposal review is based on the mathematical theory of games, or more precisely reverse game theory, namely how the rules of the game should be designed in order to obtain certain desired goals. This method of review relies on ad hoc mail review of proposals with the reviewers assigned from among the set of PIs whose proposals are being reviewed. Proposals are assembled into relatively homogeneous groups of about 40 proposals per group. Each proposal is assigned for review to seven otherwise non-conflicted PIs from the same group. The reviewers remain anonymous within their group and do not communicate with one another. The reviewers must provide both a written review and an ordering of the seven proposals to which they are assigned. The written review summarizes the strengths and weaknesses of the proposal as perceived by the reviewer. Based on their interpretation of the proposals they have reviewed, each reviewer is asked to provide an ordering of the proposals in what they anticipate will be the consensus ordering of the group. The score of the PI's own proposal is then supplemented with "bonus points" depending upon the degree to which their ranking agrees with the consensus ranking. The award of bonus points is the step that game theory suggests should provide an incentive to each reviewer to give a fair and thorough rating and ranking of the proposals to which he or she is assigned. The NSF program officer then uses the reviewers' comments, ratings and rankings as the primary input for his or her funding recommendations.

Some of the potential benefits of such an approach are:

- To reduce the submission of multiple proposals and repeated resubmission of previously declined proposals;
- To reduce the overall burden on the reviewer community;
- To improve the overall quality of the proposals submitted to the program;
- To make it easier to maintain multiple proposal submission windows per year; and
- To reduce the costs of proposal review.

The main part of this pilot activity will occur in FY 2014 with the first cohort of proposals being those submitted in October 2013. Because of the unconventional nature of this approach, the program undertook a considerable amount of outreach to and discussion with the research community in FY 2013. 131 projects were proposed and the program officer conducting the pilot has been pleased with the quality of the reviews received. One result of this approach is that proposals have received a more comprehensive review than had been previously been the norm for this program.

Umbrella-Amendment Solicitation

The EarthCube Umbrella-Amendment Solicitation is a pilot between GEO and CISE/ACI. It implements a flexible solicitation mechanism that accommodates both overarching, long-term goals, like a program announcement, and the ability to quickly respond to changing community requirements. The umbrella part of the solicitation describes the vision and reasons for the program and does not change over time. This facilitates the tracking of submissions and awards associated with the umbrella theme, and subsequent portfolio analysis, since the solicitation number remains the same. The amendment section of the solicitation specifies the funding mechanism(s) to be employed for the call, proposal due dates or submission windows, and any special review criteria and/or reporting conditions. As the EarthCube design develops with community guidance, new amendments replace old amendments. The pilot began with the EarthCube solicitation (NSF 13-529), released in December 2012. This included the Umbrella portion of the solicitation and the first Amendment section. The second Amendment was released in February 2013 and the third Amendment was released in December 2013 for a March 2014 deadline date.

Elimination of Program Deadline

It has been conjectured that, in some programs, the existence of recurring proposal deadlines may increase the number of proposals submitted to the program. There are a few core programs that accept proposals at any time and their proposal load has seen less dramatic increases than is the average for NSF programs in recent years. The Division of Earth Sciences undertook an experiment in which one of its programs, which had been using two proposal deadlines per year, switched to accepting proposals without deadlines or target dates to see how proposal pressure would be affected. The final regular deadline was in July 2011. Beginning in late July 2012, proposals were accepted at any time. The year between, FY 2012, was a transition year and atypical in that, for budgetary reasons, proposals for equipment acquisition were not solicited in FY 2012. The annual numbers of proposals received before and after the transition year are shown in **Table 16**.

Table 16 – Proposals received by EAR/IF before and after a transition to no deadlines

Fiscal Year[50]	Proposals received
2007	177
2008	198
2009	176
2010	172
2011	173
2013	85

G. Data on Reviewers

The Foundation maintains a central electronic database of several hundred thousand reviewers who can potentially be drawn on to participate in mail or panel reviews. Program officers frequently add new reviewers to this database. Program officers identify potential reviewers using a variety of sources including their own knowledge of the discipline, applicant suggestions, references attached to proposals, published papers, scientific citation indices and other similar databases, as well as input from other reviewers.

Type of Review

Approximately 36,475 individuals served on panels, conducted a mail review for one or more proposals, or served in both functions for proposals for which an award or decline decision was made within FY 2013. Of these individuals, approximately 13,544 (37%) served as panelists (of whom about 3,005 also served as mail reviewers) and 22,931 (63%) served as mail reviewers only. Approximately 6,825 (19%) of these reviewers had never reviewed an NSF proposal before.

Demographics

Reviewers were from all 50 states as well as the District of Columbia, Guam, Palau, Puerto Rico and the US Virgin Islands. Approximately 4,500 reviewers were from outside the United States by address of record.[51] Reviewers were from a range of institutions, including two-year and four-year colleges and universities, Master's level and Ph.D.-granting universities, industry, for-profit and non-profit institutions, K-12 systems, informal science institutions, and government. NSF also maintains data on numbers of reviewers from each state, territory, and country as well as by type of institution.

In FY 2013, out of a total of 36,475 distinct reviewers who returned reviews, 13,268 (36%) provided information about some aspect of gender, race, ethnicity and disability status. Of those

[50] In the transition year, FY 2012, proposals for Acquisition or Upgrade of Research Equipment were not accepted. These normally form a large part of the IF program portfolio. Other types of proposals were accepted, including: Development of New Instrumentation, Analytical Techniques or Software, Support of National or Regional Multi-User Facilities, and Support for Early Career Investigators. Consequently, only 125 proposals were received in FY 2012.

[51] In recent years, there has been a steady decline in the proportion of reviewers from outside the United States. From FY 2010, the proportion of such reviewers varied as follows: FY 2010 – 15.6%; FY 2011 – 14.3%; FY 2012 – 12.7%; FY 2013 – 12.3%.

reporting these data, 5,183 (39%) indicated that they are members of a group under-represented in science and engineering. Specifically, of the reviewers who reported some demographic data, 4,312 (32.5%) reported being female, 1,331 (10%) reported being from an under-represented race or ethnic minority, and 214 (1.6%) reported a disability. Of the 1,331 reviewers that reported they are from an under-represented race or ethnic group, 775 (58%) reported Hispanic or Latino, 507 (38%) reported Black or African American, 59 (4.4%) reported American Indian or Alaskan Native, and 10 (0.8%) reported Hawaiian or Pacific Islander. (Some individuals indicated that they belonged to more than one under-represented demographic group.) By regulation, the provision of demographic data is voluntary and the low response rate remains a challenge. Many more panelists than ad hoc reviewers provide this information.

The NSF library continually updates its resources to help NSF staff identify reviewers. This includes the collection and sharing of potential reviewer data from associations that work with under-represented groups in science and engineering. Frequent tutorials on finding reviewers are available for program officers.

Reviewers are also identified through literature searches and professional activities such as workshops and conferences. Some NSF divisions actively solicit new reviewers through their web-pages and outreach activities. To promote transparency, Chapter III.B of the *Grant Proposal Guide* describes how reviewers are selected by NSF program officers.

Participation in the peer review process is voluntary. It brings with it increased familiarity with NSF programs, knowledge of the state of research and education nationally, and increased awareness of the elements of a competitive proposal. Panelists are reimbursed for expenses, but mail reviewers receive no financial compensation. For proposals received in FY 2013, NSF requested 74,178 mail reviews, of which there were 48,976 positive responses.[52] This 66% response rate in FY 2013 is similar to FY 2012's 67% rate. The response rate varies by program.

H. Reviewer Proposal Ratings and the Impact of Budget Constraints

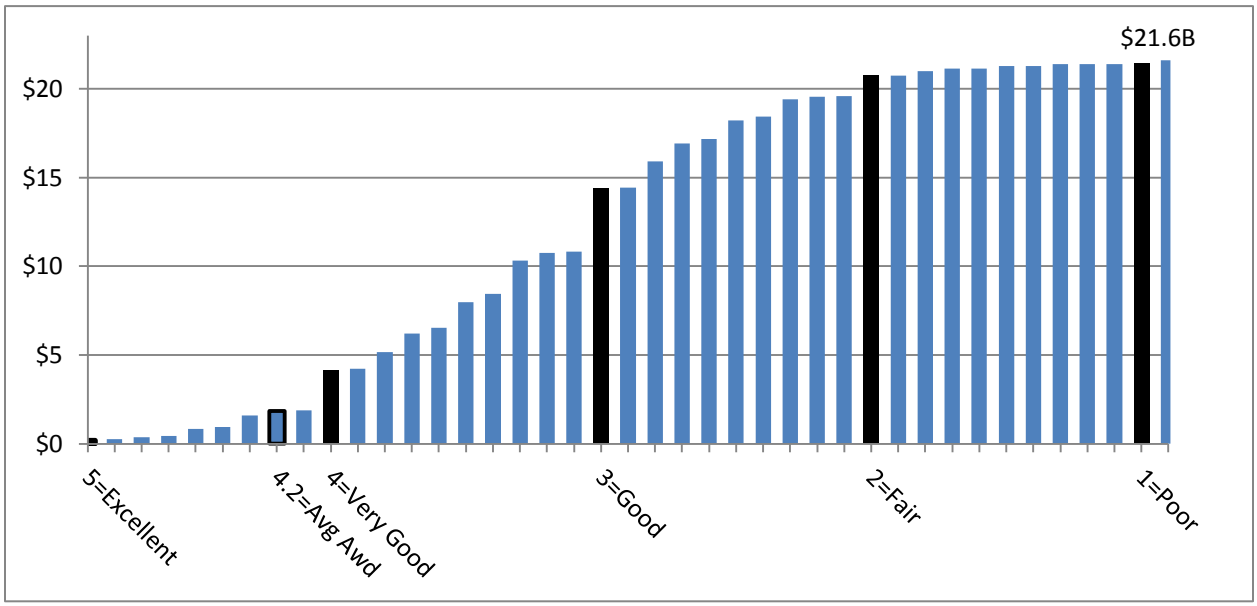
All funded proposals are determined to be highly meritorious based on a combination of individual reviews, panel deliberations and program officer evaluations. On average, NSF proposals are reviewed by 3-5 reviewers, depending on the type of review mechanism used, although there is variation between programs. Each of the reviewers is chosen for specific types of expertise and adds different points of view to the decision-making process. The reviewers provide written reviews that describe the strengths and weaknesses of proposals in the context of the NSB merit review criteria. As explained in the previous section, many proposals are reviewed by a panel of experts. The panel ranks proposals into groups based on a discussion of the proposals. These in-depth discussions can uncover weaknesses that might not have been reflected in the initial reviews or identify strengths in proposals that might not have been rated highly by the initial reviewers.

[52] This number tracks requests that are recorded in the Proposal and Reviewer System (PARS). For example, when potential reviewers are sent a formal invitation via eCorrespondence, the reviewer is entered in PARS. Some potential reviewers are first invited informally by email or telephone. If they decline this initial invitation, there is usually no follow-up in eCorrespondence. Numbers given here reflect the rate of positive responses to formal invitations and overestimate the practical positive response rate.

The expertise of the NSF program officer making the final recommendation is an important voice in the process. Reviewers' numeric ratings of proposals, while a useful indicator, are not, by themselves, a robust metric of the relative merits of proposals. Program officers look not only at the ratings provided by reviewers but also weigh the *comments* that reviewers provide on the intrinsic merits of proposals. Program officers also take into consideration other factors that might not have been considered by expert reviewers. For example, proposals for innovative new ideas often use methods or techniques that might be considered risky by reviewers and panelists. Such "risky" proposals may result in transformative research that accelerates the pace of discovery. Although program officers consider concerns about risk expressed by panels, they also see the value of funding potentially transformative research. Even if the program officer decides not to fully fund the proposal, proposals that do not review well at panel due to methods that are unproven or risky, can be given small awards to allow enough work for a "proof of concept." Program officers will also consider broader impacts that might not be obvious to reviewers, such as an infrastructure need that will serve a large number of people. There are many dimensions of portfolio balance that may influence the final recommendation. Program officers strive to fund proposals from diverse institution types across all 50 states, from both young and experienced investigators.

A large number of potentially fundable proposals are declined each year. As shown in **Figure 26**, approximately $1.84 billion was requested for declined proposals that had received ratings at least as high as the average rating (4.2 out of 5.0) for all awarded proposals. In FY 2003, the ratio of awards to such highly rated declines was 6.1:1; in FY 2013, that ratio was 4.0:1. Approximately $4.15 billion was requested for declined proposals that were rated Very Good or higher in the merit review process. These declined proposals represent a rich portfolio of unfunded opportunities, proposals that, if funded, may have produced substantial research and education benefits.

Figure 26 - Cumulative Requested Amounts for Declined Proposals by Average Reviewer Rating for FY 2013 (dollars in billions)



Source: NSF Enterprise Information System, 10/01/13

I. Program Officer Characteristics and Workload

The number of program officers decreased from 503 in FY 2012 to 490 in FY 2013, a 2.6% decrease.[53] Program officers can be permanent NSF employees or non-permanent employees. As shown in **Table 17**, 54.5% are permanent program officers and 45.5% are temporary. Some non-permanent program officers are "on loan" as "Visiting Scientists, Engineers, and Educators" (VSEEs) for up to three years from their host institutions. Others are supported through grants to their home institutions under the terms of the Intergovernmental Personnel Act (IPA). In FY 2013, the number of permanent program officers increased by 5 relative to FY 2012 while the number of IPAs decreased by 11. Whether they are hired as temporary or permanent, incoming NSF program officers receive training in the merit review process.

In comparison to FY 2012, the number of male program officers decreased by 2% and the number of female program officers decreased by 3.4%. The number of program officers who are White, Non-Hispanic decreased by 1.6% and the number that are from other racial or ethnic groups decreased by 5.5%. As a result of these changes, at the end of FY 2013, approximately 40.6% of the program officers were female and approximately 24.5% were from a racial or ethnic minority.

Table 17 - Distribution of NSF Program Officers by Characteristics

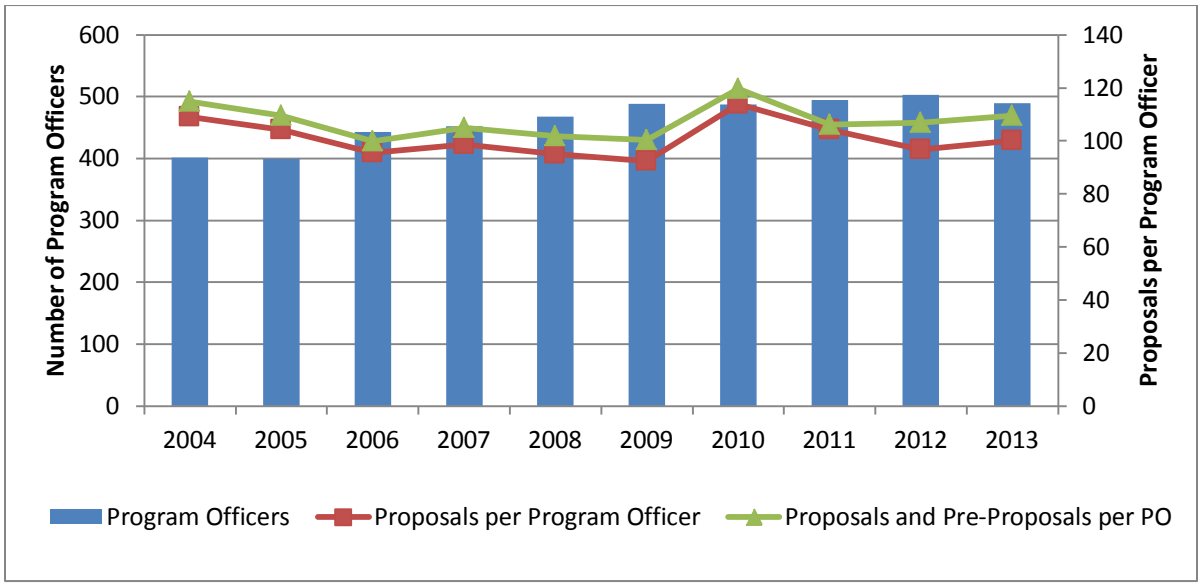
Program Officers	**Total**	**Percent**
Total	**490**	**100%**
Gender		
Male	291	59%
Female	199	41%
Race		
Other than White, Non-Hispanic	120	24%
White, Non-Hispanic	370	76%
Employment		
Permanent	267	54%
Visiting Scientists, Engineers & Educators (VSEE)	34	7%
Temporary	37	8%
Intergovernmental Personnel Act (IPA)	152	31%

Source: NSF Division of Human Resource Management 10/25/13.

The annual fluctuations in the ratio of proposals to program officers are shown in **Figure 27.**

[53] The Division of Human Resource Management revised its methodology for counting program officers. The revised counts for FY 2012 are: Total = 503; Female = 206; Male = 297; White, Non-Hispanic = 376; Permanent = 262; VSEE = 39; Temporary = 39; IPA = 163.

Figure 27 - Proposals per Program Officer



Source: NSF Division of Human Resource Management 10/25/13.

There was a decrease in the number of program officers in FY 2013 and a small increase from FY 2012 in the number of full proposals that were submitted. This resulted in a 3.5% increase in proposals processed per program officer. If preliminary proposals are included in the workload, then the workload per program officer increased by 2.5% from FY 2012 to FY 2013.

Not all individuals listed as program officers in **Table 17** process proposals, so the average proposal workload shown in **Figure 27** is an underestimate. The growing emphasis on interdisciplinary and cross-directorate programs, together with innovative approaches to encouraging transformative research proposals, has led to a growth in coordination activities. Program officers are also tasked with an increasing number of programmatic activities, e.g., increased program accountability, training, outreach, and mentoring new staff.

In recent years, NSF has revitalized its professional development opportunities for program staff, offering in-house courses in project management, leadership, and communication through the NSF Academy. Effective August 1, 2013 (OD 13-15 Merit Review Training Requirements for New Program Officers) NSF policy requires that all new NSF program officers take Merit Review Basics Sessions I and II within 90 days of beginning work at NSF and encourages them to take the other elements of program management training, including the Program Management Seminar, within the first six months to one year. These provide an orientation to NSF and training in the merit review process.

Appendices

Appendix 1 - Proposals, Awards and Funding Rates, by Directorate or Office

		Fiscal Year									
		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
NSF[54]	Proposals	43,851	41,722	42,352	44,577	44,428	45,181	55,542	51,562	48,613	48,999
	Awards	10,380	9,757	10,425	11,463	11,149	14,595	12,996	11,192	11,524	10,829
	Omnibus						*9,975*	*12,547*			
	ARRA						*4,620*	*449*			
	Funding Rate	24%	23%	25%	26%	25%	32%	23%	22%	24%	22%
BIO	Proposals	6,063	6,475	6,617	6,728	6,598	6,578	8,059	7,439	5,269	5,934
	Awards	1,432	1,355	1,202	1,303	1,291	1,823	1,556	1,310	1,293	1,250
	Omnibus						*1,261*	*1,476*			
	ARRA						*562*	*80*			
	Funding Rate	24%	21%	18%	19%	20%	28%	19%	18%	25%	21%
CISE	Proposals	6,496	5,354	4,973	6,048	6,067	6,001	7,317	6,702	7,703	7,821
	Awards	1,064	1,163	1,322	1,699	1,449	1,926	1,755	1,527	1,749	1,616
	Omnibus						*1,452*	*1,723*			
	ARRA						*474*	*32*			
	Funding Rate	16%	22%	27%	28%	24%	32%	24%	23%	23%	21%
EHR	Proposals	4,644	3,699	3,254	4,248	3,887	3,699	5,055	4,660	4,281	4,501
	Awards	925	736	824	903	1,111	1,009	930	807	889	793
	Omnibus						*919*	*908*			
	ARRA						*90*	*22*			
	Funding Rate	20%	20%	25%	21%	29%	27%	18%	17%	21%	18%
ENG	Proposals	8,994	8,692	9,423	9,574	9,643	10,611	13,226	12,314	11,338	10,738
	Awards	1,753	1,493	1,730	1,955	1,966	2,688	2,375	2,064	2,065	2,212
	Omnibus						*1,771*	*2,321*			
	ARRA						*917*	*54*			
	Funding Rate	19%	17%	18%	20%	20%	25%	18%	17%	18%	21%
GEO	Proposals	4,956	5,492	5,378	5,567	5,101	4,991	5,614	5,187	5,243	6,087
	Awards	1,687	1,596	1,656	1,711	1,563	2,226	1,970	1,705	1,637	1,565
	Omnibus						*1,152*	*1,917*			
	ARRA						*1,074*	*53*			
	Funding Rate	34%	29%	31%	31%	31%	45%	35%	31%	31%	26%

[54] Several organizational changes occurred over the decade. Data from prior years have been realigned with the organizational structure in effect for FY 2013 in order to show historical trends. The Office of Cyberinfrastructure (OCI) was created in July 2005 from what had previously been the Division of Shared Cyberinfrastructure (SCI) in CISE. In FY 2007, management of the EPSCoR program was transferred from EHR to OIA. A realignment was implemented in FY 2013 that moved the Office of Polar Programs (OPP) and OCI from the Office of the Director to GEO and CISE, respectively, preserving their identity as separate divisions. Additionally, the Office of International Science & Engineering (OISE) and Office of Integrative Activities (OIA) became the Office of International and Integrative Activities (IIA). See **Appendix 19**.

		Fiscal Year									
		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
IIA	Proposals	895	838	721	803	931	890	1,242	1,352	995	582
	Awards	405	339	326	379	374	464	484	429	347	272
	Omnibus						*360*	*424*			
	ARRA						*104*	*60*			
	Funding Rate	45%	40%	45%	47%	40%	52%	39%	31%	35%	47%
MPS	Proposals	7,184	7,083	7,466	7,315	7,837	7,883	9,411	8,796	9,006	8,903
	Awards	2,175	2,071	2,221	2,360	2,269	3,122	2,669	2,352	2,523	2,201
	Omnibus						*2,004*	*2,529*			
	ARRA						*1,118*	*140*			
	Funding Rate	30%	29%	30%	32%	29%	40%	28%	27%	28%	25%
SBE	Proposals	4,619	4,089	4,520	4,284	4,364	4,525	5,618	5,112	4,776	4,433
	Awards	939	1,004	1,144	1,143	1,126	1,337	1,257	998	1,019	920
	Omnibus						*1,056*	*1,249*			
	ARRA						*281*	*8*			
	Funding Rate	20%	25%	25%	27%	26%	30%	22%	20%	21%	21%
Other[55]	Proposals				10		3			2	
	Awards				10		0			2	
	Omnibus										
	ARRA										
	Funding Rate				100%		0%			100%	

Source: NSF Enterprise Information System 10/01/13.

[55] The 'Other' category includes, for example, non-contract awards made on behalf of the Office of the Inspector-General. The following are not included in the FY 2013 statistics: 5,984 Continuing Grant Increments, 3,101 Supplements, and 536 Contracts.

Appendix 2 - Preliminary Proposals

Several NSF programs utilize preliminary proposals in an effort to limit the workload of PIs and to increase the quality of full proposals. The annual number of preliminary proposals varies considerably as a result of competitions being held in a given year. For some programs, preliminary proposals are externally reviewed; other programs provide internal review only.

Decisions regarding preliminary proposals may be non-binding or binding. Non-binding decisions regarding preliminary proposals are recommendations; a PI may choose to submit a full proposal even if it has been discouraged. Binding decisions, however, are restrictive in that full proposals are only accepted from PIs that are invited to submit them. In general, programs obtain advice from external peer reviewers before making binding decisions about preliminary proposals.

Number of Preliminary Proposals and Subsequent Actions

Fiscal Year	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Total # Preliminary Proposals	2,310	2,120	1,874	2,842	3,203	3,856	2,883	965	5,135	4,691
Non-Binding (NB) Total*	1,412	1,302	1,279	1,540	669	1,140	1,384	357	459	457
NB Encouraged	544	512	509	662	333	519	636	128	222	296
NB Discouraged	868	790	770	878	336	621	748	229	237	161
Binding Total*	892	816	594	1,301	2,534	2,500	1,273	572	4,484	4,087
Binding Invite	221	246	136	252	572	685	372	245	1,236	942
Binding Non-invite	671	570	458	1,049	1,962	1,815	901	327	3,248	3,145

Source: NSF Enterprise Information System 10/01/13.

In FY 2012, the Directorate for Biological Sciences instituted a new requirement that PIs who wished to submit full proposals to the Divisions of Environmental Biology and Integrative Organismal Systems, in response to core program solicitations, the Research at Undergraduate Institutions (RUI) solicitation, or the Long-term Research in Environmental Biology (LTREB) solicitation, must first submit a preliminary proposal.

* Non-binding and binding totals do not include preliminary proposals that have been withdrawn or returned without review.

Appendix 3 – Proposals, Awards and Success Rates, by PI Demographics*

Table 3.1 - FY2013 Competitive Proposals, Awards and Success Rates, by PI Gender

Directorate		Total	Female	Male	Unknown
NSF	Proposals	48,999	11,152	32,866	4,981
	% of Total		23%	67%	10%
	Awards	10,829	2,556	7,316	957
	Funding Rate	22%	23%	22%	19%
BIO	Proposals	5,934	1,683	3,803	448
	% of Total		28%	64%	8%
	Awards	1,250	390	799	61
	Funding Rate	21%	23%	21%	14%
CSE	Proposals	7,821	1,429	5,659	733
	% of Total		18%	72%	9%
	Awards	1,616	278	1,180	158
	Funding Rate	21%	19%	21%	22%
EHR	Proposals	4,501	1,620	2,235	646
	% of Total		36%	50%	14%
	Awards	793	317	389	87
	Funding Rate	18%	20%	17%	13%
ENG	Proposals	10,738	1,743	7,896	1,099
	% of Total		16%	74%	10%
	Awards	2,212	386	1,599	227
	Funding Rate	21%	22%	20%	21%
GEO	Proposals	6,087	1,529	4,134	424
	% of Total		25%	68%	7%
	Awards	1,565	391	1,077	97
	Funding Rate	26%	26%	26%	23%
IIA	Proposals	582	165	319	98
	% of Total		28%	55%	17%
	Awards	272	91	125	56
	Funding Rate	47%	55%	39%	57%
MPS	Proposals	8,903	1,552	6,531	820
	% of Total		17%	73%	9%
	Awards	2,201	392	1,635	174
	Funding Rate	25%	25%	25%	21%
SBE	Proposals	4,433	1,431	2,289	713
	% of Total		32%	52%	16%
	Awards	920	311	512	97
	Funding Rate	21%	22%	22%	14%

Source: NSF Enterprise Information System 10/1/13.

*Demographic data are voluntarily self-reported by the PI. In FY2013, approximately 88% of PIs provided gender information and approximately 87% provided information on ethnicity or race.

Table 3.2 – FY 2013 Competitive Proposals, Awards and Success Rates, by PI Race and Ethnicity

		Total*	Hispanic	American Indian/ Alaskan	Asian	Black/ African-American	Multi-Racial	Native Hawaiian/ Pac Island	White	Unknown
NSF	Proposals	48,999	1,956	113	10,511	1,124	439	32	30,766	6,014
	% of Total		4%	0%	21%	2%	1%	0%	63%	12%
	Awards	10,829	401	28	1,887	203	110	5	7,372	1,224
	Funding Rate	22%	21%	25%	18%	18%	25%	16%	24%	20%
BIO	Proposals	5,934	305	16	711	82	64	3	4,491	567
	% of Total		5%	0%	12%	1%	1%	0%	76%	10%
	Awards	1,250	66	†	105	13	14	†	1,017	95
	Funding Rate	21%	22%	†	15%	16%	22%	†	23%	17%
CSE	Proposals	7,821	230	6	2,700	165	67	1	3,889	993
	% of Total		3%	0%	35%	2%	1%	0%	50%	13%
	Awards	1,616	44	†	464	29	19	†	890	212
	Funding Rate	21%	19%	†	17%	18%	28%	†	23%	21%
EHR	Proposals	4,501	188	28	562	291	46	6	2,866	702
	% of Total		4%	1%	12%	6%	1%	0%	64%	16%
	Awards	793	31	†	100	49	10	†	519	107
	Funding Rate	18%	16%	†	18%	17%	22%	†	18%	15%
ENG	Proposals	10,738	476	21	3,599	252	83	8	5,450	1,325
	% of Total		4%	0%	34%	2%	1%	0%	51%	12%
	Awards	2,212	91	†	634	32	25	†	1,231	288
	Funding Rate	21%	19%	†	18%	13%	30%	†	23%	22%
GEO	Proposals	6,087	194	8	634	49	52	6	4,803	535
	% of Total		3%	0%	10%	1%	1%	0%	79%	9%
	Awards	1,565	40	†	124	18	13	†	1,285	120
	Funding Rate	26%	21%	†	20%	37%	25%	†	27%	22%
IIA	Proposals	582	29	1	63	26	12	3	377	100
	% of Total		5%	0%	11%	4%	2%	1%	65%	17%
	Awards	272	13	†	24	6	8	†	180	52
	Funding Rate	47%	45%	†	38%	23%	67%	†	48%	52%
MPS	Proposals	8,903	344	16	1,835	158	69	3	5,841	981
	% of Total		4%	0%	21%	2%	1%	0%	66%	11%
	Awards	2,201	86	†	364	37	15	†	1,561	220
	Funding Rate	25%	25%	†	20%	23%	22%	†	27%	22%
SBE	Proposals	4,433	190	17	407	101	46	2	3,049	811
	% of Total		4%	0%	9%	2%	1%	0%	69%	18%
	Awards	920	30	†	72	19	6	†	689	130
	Funding Rate	21%	16%	†	18%	19%	13%	†	23%	16%

Source: NSF Enterprise Information System 10/1/13. * "Total" is count of unique proposals. Columns are counts of proposals from PIs in the corresponding category. Hispanic individuals are also included in one of the racial categories. † indicates that data are omitted to reduce the likelihood of identifying individual investigators.

Table 3.3 - FY2013 Research Proposals, Awards and Success Rates, by PI Gender

Directorate		Female	Male	Unknown	Total
NSF	Proposals	8,706	26,996	3,547	39,249
	% of Total	22%	69%	9%	
	Awards	1,703	5,352	597	7,652
	Funding Rate	20%	20%	17%	19%
BIO	Proposals	1,332	3,152	365	4,849
	% of Total	27%	65%	8%	
	Awards	278	557	42	877
	Funding Rate	21%	18%	12%	18%
CSE	Proposals	1,367	5,403	714	7,484
	% of Total	18%	72%	10%	
	Awards	229	1000	144	1,373
	Funding Rate	17%	19%	20%	18%
EHR	Proposals	818	805	277	1,900
	% of Total	43%	42%	15%	
	Awards	104	90	31	225
	Funding Rate	13%	11%	11%	12%
ENG	Proposals	1,430	6,345	595	8,370
	% of Total	17%	76%	7%	
	Awards	277	1141	86	1,504
	Funding Rate	19%	18%	14%	18%
GEO	Proposals	1,400	3,834	380	5,614
	% of Total	25%	68%	7%	
	Awards	326	930	79	1,335
	Funding Rate	23%	24%	21%	24%
IIA	Proposals	90	216	50	356
	% of Total	25%	61%	14%	
	Awards	19	33	8	60
	Funding Rate	21%	15%	16%	17%
MPS	Proposals	1,339	5,740	706	7,785
	% of Total	17%	74%	9%	
	Awards	305	1296	147	1,748
	Funding Rate	23%	23%	21%	22%
SBE	Proposals	930	1501	460	2,891
	% of Total	32%	52%	16%	
	Awards	165	305	60	530
	Funding Rate	18%	20%	13%	18%

Source: NSF Enterprise Information System 10/1/13.

Table 3.4 – FY 2013 Research Proposals, Awards and Success Rates, by PI Race and Ethnicity

		Total*	Hispanic	American Indian/ Alaskan	Asian	Black/ African-American	Multi-Racial	Native Hawaiian/ Pac Island	Unknown	White
NSF	Proposals	39,249	1552	74	9126	791	338	26	4448	24446
	% of Total		4%	0%	23%	2%	1%	0%	11%	62%
	Awards	7,652	283	18	1460	100	68	3	806	5197
	Funding Rate	19%	18%	24%	16%	13%	20%	12%	18%	21%
BIO	Proposals	4,849	229	12	649	61	47	2	463	3615
	% of Total		5%	0%	13%	1%	1%	0%	10%	75%
	Awards	877	40	†	81	9	7	†	72	704
	Funding Rate	18%	17%	†	12%	15%	15%	†	16%	19%
CSE	Proposals	7,484	221	6	2607	152	63	1	969	3686
	% of Total		3%	0%	35%	2%	1%	0%	13%	49%
	Awards	1,373	38	†	402	19	16	†	189	745
	Funding Rate	18%	17%	†	15%	13%	25%	†	20%	20%
EHR	Proposals	1,900	79	9	164	131	25	4	292	1275
	% of Total		4%	0%	9%	7%	1%	0%	15%	67%
	Awards	225	11	†	11	13	4	†	38	157
	Funding Rate	12%	14%	†	7%	10%	16%	†	13%	12%
ENG	Proposals	8,370	392	14	3046	195	64	6	818	4227
	% of Total		5%	0%	36%	2%	1%	0%	10%	51%
	Awards	1,504	68	†	494	16	18	†	142	833
	Funding Rate	18%	17%	†	16%	8%	28%	†	17%	20%
GEO	Proposals	5,614	177	7	594	37	46	6	485	4439
	% of Total		3%	0%	11%	1%	1%	0%	9%	79%
	Awards	1,335	33	†	103	11	10	†	104	1103
	Funding Rate	24%	19%	†	17%	30%	22%	†	21%	25%
IIA	Proposals	356	21	1	49	22	4	2	55	223
	% of Total		6%	0%	14%	6%	1%	1%	15%	63%
	Awards	60	6	†	10	2	0	†	7	40
	Funding Rate	17%	29%	†	20%	9%	0%	†	13%	18%
MPS	Proposals	7,785	294	14	1686	121	59	3	859	5043
	% of Total		4%	0%	22%	2%	1%	0%	11%	65%
	Awards	1,748	67	†	308	21	9	†	181	1226
	Funding Rate	22%	23%	†	18%	17%	15%	†	21%	24%
SBE	Proposals	2,891	139	11	331	72	30	2	507	1938
	% of Total		5%	0%	11%	2%	1%	0%	18%	67%
	Awards	530	20	†	51	9	4	†	73	389
	Funding Rate	18%	14%	†	15%	13%	13%	†	14%	20%

Source: NSF Enterprise Information System 10/1/13. * "Total" is count of unique proposals. Columns are counts of proposals from PIs in the corresponding category. Hispanic individuals are also included in one of the racial categories. † indicates that data are omitted to reduce the likelihood of identifying individual investigators.

Appendix 4 – Proposal Success Rates of New PIs and Prior PIs, by Directorate or Office

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
New PIs	BIO	18%	15%	14%	14%	15%	23%	14%	12%	18%	16%
Former	CISE	13%	15%	19%	22%	18%	25%	18%	18%	16%	15%
Definition	EHR	15%	16%	21%	17%	23%	21%	14%	13%	16%	13%
	ENG	15%	13%	15%	17%	16%	21%	14%	13%	13%	17%
	GEO	27%	24%	23%	23%	23%	33%	26%	24%	21%	20%
	IIA	35%	40%	43%	44%	36%	55%	38%	29%	34%	54%
	MPS	21%	20%	19%	20%	19%	29%	17%	17%	17%	15%
	SBE	15%	18%	18%	20%	20%	21%	16%	14%	16%	15%
New PIs	BIO	17%	15%	14%	14%	15%	23%	14%	12%	18%	16%
Revised	CISE	13%	16%	18%	21%	18%	26%	19%	18%	17%	16%
Definition[*]	EHR	14%	15%	20%	16%	22%	20%	13%	12%	16%	12%
	ENG	15%	14%	15%	17%	16%	21%	13%	13%	14%	18%
	GEO	27%	22%	23%	22%	22%	32%	26%	25%	20%	21%
	IIA	36%	40%	43%	44%	35%	55%	38%	29%	34%	56%
	MPS	21%	20%	19%	20%	19%	29%	18%	17%	18%	16%
	SBE	15%	18%	18%	21%	20%	22%	17%	14%	16%	16%
Prior PIs	BIO	28%	25%	21%	24%	23%	32%	23%	21%	29%	25%
Former	CISE	19%	26%	32%	32%	27%	35%	27%	25%	26%	23%
Definition	EHR	23%	24%	29%	25%	35%	34%	23%	22%	26%	22%
	ENG	23%	20%	21%	23%	24%	29%	22%	20%	22%	23%
	GEO	36%	31%	34%	34%	34%	49%	39%	37%	36%	28%
	IIA	55%	47%	52%	56%	57%	47%	42%	39%	37%	32%
	MPS	36%	35%	37%	40%	35%	47%	36%	33%	35%	32%
	SBE	26%	32%	32%	35%	32%	39%	30%	26%	27%	27%
Prior PIs	BIO	28%	25%	21%	23%	23%	31%	23%	21%	28%	24%
Revised	CISE	18%	25%	31%	31%	26%	34%	26%	24%	25%	22%
Definition[*]	EHR	23%	24%	28%	24%	34%	33%	22%	21%	24%	21%
	ENG	23%	19%	21%	23%	23%	28%	21%	19%	21%	23%
	GEO	36%	31%	33%	33%	33%	49%	38%	35%	35%	27%
	IIA	54%	44%	52%	54%	57%	48%	41%	38%	35%	31%
	MPS	35%	34%	36%	39%	34%	46%	35%	32%	33%	29%
	SBE	25%	32%	32%	33%	32%	38%	29%	25%	28%	27%

Source: NSF Enterprise Information System 10/01/13.

[*] In FY 2009, in conjunction with NSF's implementation of the American Recovery and Reinvestment Act, NSF revised its definition of a new PI to, "A new PI is an individual who has not served as the PI or Co-PI on any award from NSF (with the exception of doctoral dissertation awards, graduate or postdoctoral fellowships, research planning grants, or conferences, symposia and workshop grants.)" Previously, a new PI was considered to be any individual who had not previously been a PI on any NSF award.

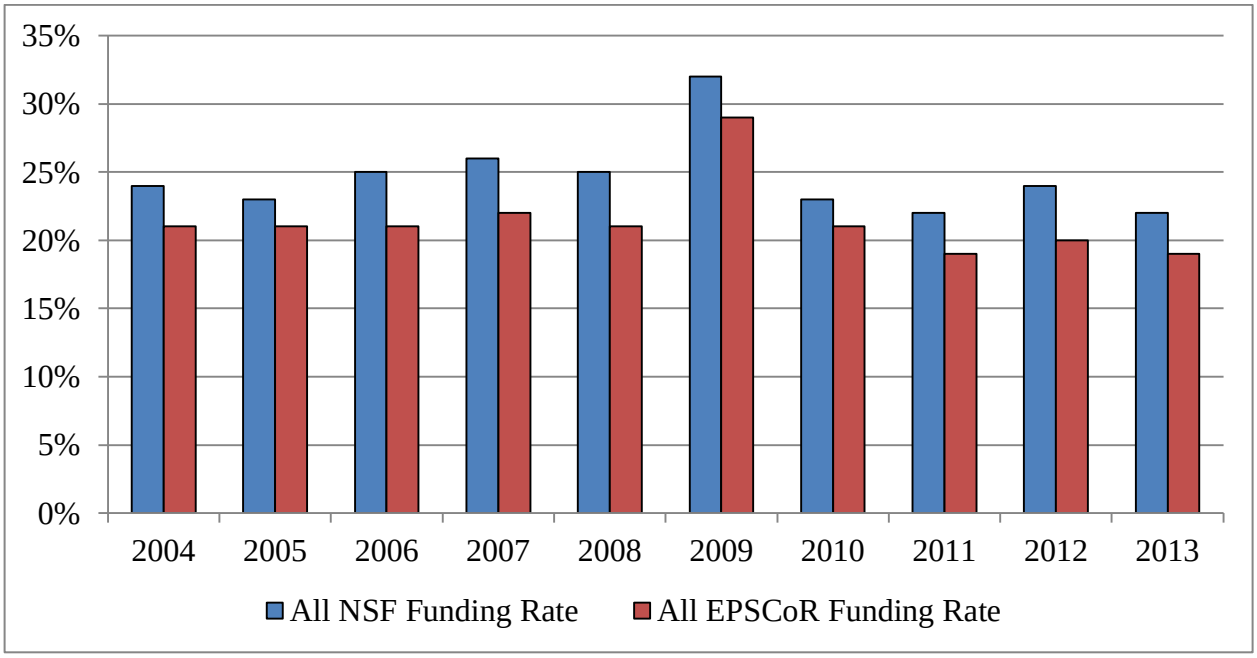
Appendix 5 - EPSCoR: Jurisdictions, Proposal, Award, and Funding Data

Twenty-eight states, the Commonwealth of Puerto Rico, Guam and the U.S. Virgin Islands were eligible to participate in aspects of the NSF Experimental Program to Stimulate Competitive Research (EPSCoR) program in FY 2013. The states are: Alabama, Alaska, Arkansas, Delaware, Hawaii, Idaho, Iowa, Kansas, Kentucky, Louisiana, Maine, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, West Virginia, and Wyoming. For three of the 28 states, Iowa, Tennessee, and Utah, the prior 3-year rolling average of NSF research funds received was over 0.75% of NSF's Research and Related Activities budget and these jurisdictions were not eligible to participate in new Research Infrastructure Improvement initiatives in FY 2013.

In FY 2013, the NSF EPSCoR program invested $30 million[56] in co-funding 212 NSF awards. This investment was leveraged with $49 million from NSF Directorates and other Offices for a total investment of $79 million. Since 1998, when the co-funding initiative was formally established, approximately 3760 co-funded awards were made. The latter represent a total NSF investment of about $1.4 billion of which $544 million was co-funding provided by the EPSCoR program.

Figure 5.1 shows the change over time for the proposal success rate of EPSCoR jurisdictions relative to the overall proposal success rate for all of the United States.

Figure 5.1 - Overall Proposal Success Rates for EPSCoR Jurisdictions and Overall NSF Proposal Success Rates



Source: EPSCoR Office 2/21/14.

[56] Numbers in millions are rounded to the nearest million.

Table 5.2 shows the number of proposals, awards, and proposal success rates for EPSCoR jurisdictions. Below the name of the EPSCoR jurisdiction is the year in which the jurisdiction joined EPSCoR.

Table 5.2 – Proposal Success Rates, by EPSCoR Jurisdiction
(Date under the state name is year state joined EPSCoR)

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
All NSF	Awards	10,367	9,772	10,450	11,484	11,162	14,641	12,996	11,192	11,524	10,829
	Proposals	43,816	41,723	42,374	44,593	44,438	45,181	55,542	51,562	48,613	48,999
	Funding Rate	24%	23%	25%	26%	25%	32%	23%	22%	24%	22%
All EPSCoR Jurisdictions	Awards	1,454	1,433	1,489	1,653	1,564	2,474	2,181	1,846	1,960	1,893
	Proposals	6,815	6,802	7,037	7,392	7,349	8,476	10,513	9,640	9,680	9,769
	Funding Rate	21%	21%	21%	22%	21%	29%	21%	19%	20%	19%
Alabama	Awards	99	78	84	86	85	148	119	98	110	95
-1985	Proposals	488	483	530	508	489	606	708	614	669	648
	Funding Rate	20%	16%	16%	17%	17%	24%	17%	16%	16%	15%
Alaska	Awards	63	52	63	75	52	77	65	71	65	60
-2000	Proposals	211	203	209	246	204	186	235	213	199	221
	Funding Rate	30%	26%	30%	30%	25%	41%	28%	33%	33%	27%
Arkansas	Awards	45	29	47	58	36	41	60	40	33	46
-1980	Proposals	236	191	209	244	197	194	276	246	229	260
	Funding Rate	19%	15%	22%	24%	18%	21%	22%	16%	14%	18%
Delaware	Awards	50	54	50	67	68	77	80	70	79	70
-2003	Proposals	266	254	247	283	283	244	295	292	278	287
	Funding Rate	19%	21%	20%	24%	24%	32%	27%	24%	28%	24%
Guam	Awards	N/A	N/A	1	0	2	0	2	2	2	1
-2012	Proposals	N/A	N/A	1	2	5	3	7	5	8	7
	Funding Rate	N/A	N/A	100%	0%	40%	0%	29%	40%	25%	14%
Hawaii	Awards	66	89	77	74	73	109	99	80	60	54
-2001	Proposals	252	265	240	276	276	277	379	285	281	282
	Funding Rate	26%	34%	32%	27%	26%	39%	26%	28%	21%	19%
Idaho	Awards	24	31	29	34	44	44	35	37	47	41
-1987	Proposals	148	140	148	161	201	168	199	202	185	214
	Funding Rate	16%	22%	20%	21%	22%	26%	18%	18%	25%	19%
Iowa	Awards	118	106	109	99	132	142	136	114	116	113
-2009	Proposals	545	501	524	491	524	564	661	613	558	566
	Funding Rate	22%	21%	21%	20%	25%	25%	21%	19%	21%	20%

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Kansas	Awards	70	88	76	78	82	88	92	88	91	65
-1992	Proposals	388	367	393	404	387	399	464	423	402	393
	Funding Rate	18%	24%	19%	19%	21%	22%	20%	21%	23%	17%
Kentucky	Awards	72	62	52	60	62	78	81	64	63	54
-1985	Proposals	337	307	293	330	300	356	429	437	434	387
	Funding Rate	21%	20%	18%	18%	21%	22%	17%	15%	15%	14%
Louisiana	Awards	107	100	117	96	98	132	149	102	88	91
-1987	Proposals	517	514	548	495	471	583	715	621	484	463
	Funding Rate	21%	19%	21%	19%	21%	27%	21%	16%	18%	20%
Maine	Awards	41	50	36	58	65	60	58	42	46	52
-1980	Proposals	197	192	181	200	199	172	190	209	182	211
	Funding Rate	21%	26%	20%	29%	33%	35%	31%	20%	25%	25%
Mississippi	Awards	43	32	48	40	34	76	72	42	43	28
-1987	Proposals	238	226	293	251	271	301	358	287	264	262
	Funding Rate	18%	14%	16%	16%	13%	25%	20%	15%	16%	11%
Missouri	Awards	166	137	150	146	160	180	144	135	136	139
-2012	Proposals	760	702	693	742	699	713	795	727	715	716
	Funding Rate	22%	20%	22%	20%	23%	25%	18%	19%	19%	19%
Montana	Awards	54	43	52	61	57	78	51	35	50	50
-1980	Proposals	194	193	242	238	232	207	251	222	204	214
	Funding Rate	28%	22%	21%	26%	25%	38%	20%	16%	25%	23%
Nebraska	Awards	52	41	59	51	54	64	56	60	40	59
-1992	Proposals	242	226	238	250	255	248	324	309	258	305
	Funding Rate	21%	18%	25%	50%	21%	26%	17%	19%	16%	19%
Nevada	Awards	31	40	42	50	43	61	39	37	29	33
-1985	Proposals	159	203	200	231	261	232	295	263	236	217
	Funding Rate	19%	20%	21%	22%	16%	26%	13%	14%	12%	15%
New Hampshire	Awards	53	64	53	60	58	108	76	61	75	64
-2004	Proposals	232	280	243	240	230	251	311	282	280	273
	Funding Rate	23%	23%	22%	25%	25%	43%	24%	22%	27%	23%
New Mexico	Awards	90	80	91	104	102	115	105	91	69	81
-2001	Proposals	378	352	348	401	444	389	506	416	399	404
	Funding Rate	24%	23%	26%	26%	23%	30%	21%	22%	17%	20%
North Dakota	Awards	20	19	22	15	19	31	35	23	18	21
-1985	Proposals	140	154	170	139	158	141	171	161	161	179
	Funding Rate	14%	12%	13%	11%	12%	22%	20%	14%	11%	12%

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Oklahoma	Awards	65	55	74	66	67	112	74	79	68	59
-1985	Proposals	338	327	342	338	378	420	457	460	384	393
	Funding Rate	19%	17%	22%	20%	18%	27%	16%	17%	18%	15%
Puerto Rico	Awards	20	16	19	32	24	37	34	19	9	8
-1985	Proposals	106	119	140	153	148	183	203	163	153	105
	Funding Rate	19%	13%	14%	21%	16%	20%	17%	12%	6%	8%
Rhode Island	Awards	128	117	140	127	129	176	148	131	146	127
-2004	Proposals	340	334	353	390	357	350	442	400	393	399
	Funding Rate	38%	35%	40%	33%	36%	50%	33%	33%	37%	32%
South Carolina	Awards	80	90	86	122	87	152	136	108	117	115
-1980	Proposals	452	453	464	523	470	527	671	650	562	594
	Funding Rate	18%	20%	19%	23%	19%	29%	20%	17%	21%	19%
South Dakota	Awards	12	21	14	21	20	31	33	24	20	28
-1987	Proposals	93	101	97	97	116	132	184	162	150	164
	Funding Rate	13%	21%	14%	22%	17%	23%	18%	15%	13%	17%
Tennessee	Awards	102	113	99	145	124	183	133	138	144	144
-2004	Proposals	540	585	564	642	633	608	759	709	687	667
	Funding Rate	19%	19%	18%	23%	20%	30%	18%	19%	21%	22%
U.S. Virgin Islands	Awards	2	2	1	0	2	0	1	3	2	0
	Proposals	6	5	6	4	5	1	3	11	5	8
-2002	Funding Rate	33%	40%	17%	0%	40%	10%	33%	27%	40%	0%
Utah	Awards	105	106	94	95	111	135	129	115	118	134
-2009	Proposals	444	474	466	449	492	464	595	596	532	568
	Funding Rate	24%	22%	20%	21%	23%	29%	22%	19%	21%	24%
Vermont	Awards	21	22	16	26	27	42	23	22	24	21
-1985	Proposals	111	129	119	129	144	120	126	121	90	89
	Funding Rate	19%	17%	13%	20%	19%	35%	18%	18%	27%	24%
West Virginia	Awards	17	16	19	21	25	33	27	21	32	22
-1980	Proposals	105	100	121	128	119	130	160	151	163	158
	Funding Rate	16%	16%	16%	16%	21%	25%	17%	14%	20%	14%
Wyoming	Awards	27	29	23	26	27	44	35	31	20	18
-1985	Proposals	101	99	99	91	121	123	146	122	105	115
	Funding Rate	27%	29%	23%	29%	22%	36%	24%	25%	19%	16%

Source: NSF Enterprise Information System, 10/1/13.

Appendix 6 - Median and Mean Award Amounts for Research Grants, by Directorate or Office (Dollars in Thousands)*

		Fiscal Year									
		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
NSF	Median	$102	$104	$102	$110	$110	$120	$124	$120	$125	$130
	Mean	$140	$144	$135	$146	$143	$162	$167	$159	$166	$169
BIO	Median	$133	$140	$140	$142	$150	$161	$171	$178	$177	$182
	Mean	$171	$184	$191	$182	$180	$200	$222	$226	$214	$228
CSE	Median	$95	$88	$90	$92	$94	$110	$118	$141	$150	$161
	Mean	$135	$120	$114	$120	$131	$169	$172	$174	$206	$204
ENG	Median	$97	$97	$90	$100	$100	$100	$100	$100	$107	$103
	Mean	$120	$117	$110	$116	$112	$120	$122	$119	$125	$122
GEO	Median	$88	$90	$87	$93	$89	$101	$100	$116	$125	$141
	Mean	$126	$126	$113	$137	$122	$153	$134	$162	$170	$193
IIA	Median	$7	$14	$24	$37	$25	$20	$50	$45	$47	$58
	Mean	$16	$85	$71	$135	$30	$46	$272	$71	$190	$135
MPS	Median	$100	$100	$100	$106	$105	$113	$115	$111	$117	$116
	Mean	$130	$135	$120	$130	$133	$138	$150	$141	$143	$130
SBE	Median	$78	$84	$85	$94	$100	$101	$100	$98	$98	$101
	Mean	$90	$110	$103	$115	$116	$114	$116	$113	$120	$139

Source: NSF Enterprise Information System 10/1/13.

*EHR is not included in this appendix since the number of awards included in the "research grant" category is small relative to the number of education awards managed by that directorate.

Appendix 7 - Number of People Involved in NSF-funded Activities[57]

In FY2013, approximately 299,000 senior researchers, post-doctoral associates, teachers and students across all levels were directly involved in NSF research and education programs and activities.

	FY 2013
Senior Researchers	44,000
Other Professionals	14,000
Post-doctoral Associates	6,000
Graduate Students	42,000
Undergraduate Students	29,000
K-12 Students	124,000
K-12 Teachers	40,000
Total Number of People	**299,000**

Source: NSF FY2013 Agency Financial Report, Chapter 2, p. II-43.

In addition, NSF programs indirectly impact many millions of people. These programs reach K-12 students, K-12 teachers, the general public, and researchers. Outreach activities include workshops, activities at museums, television, educational videos, journal articles, and the dissemination of improved curricula and teaching methods.

[57] These data are estimates based on the budget details of awards active in the year indicated, with modifications made, as appropriate, based on additional information provided by the managing directorates or offices. The numbers for senior researchers, other professionals, post-doctoral associates, and graduate students are more directly informed by data from award budgets than the other three categories.

Appendix 8 - Mean Number of Months of Salary Support for Single- and Multi-PI Research Grants, by Directorate or Office

Directorate or Office	Type of Award	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
NSF	Single PI Grants	1.5	1.4	1.5	1.4	1.3	1.2	1.1	1.0	0.9	0.8
	Multi-PI Grants	1.4	1.4	1.3	1.3	1.1	1.1	1.0	0.9	0.9	0.8
	NSF Average	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.0	0.9	0.8
BIO	Single PI Grants	1.8	1.9	1.6	2.0	1.8	1.3	1.2	1.3	1.1	1.0
	Multi-PI Grants	1.7	2.3	2.0	2.0	1.7	1.6	1.2	1.1	1.1	1.3
	BIO Average	1.7	2.0	1.7	2.0	1.8	1.4	1.2	1.2	1.1	1.1
CSE	Single PI Grants	1.0	1.0	1.1	0.9	0.7	0.8	0.8	0.9	0.7	0.7
	Multi-PI Grants	0.9	0.8	0.6	0.7	0.5	0.6	0.6	0.8	0.7	0.6
	CSE Average	1.0	0.9	0.9	0.8	0.6	0.7	0.7	0.9	0.7	0.6
EHR	Single PI Grants	3.0	2.0	1.5	1.6	2.0	1.6	1.9	1.7	1.4	1.4
	Multi-PI Grants	1.9	2.0	1.8	1.5	1.2	1.6	1.8	2.2	1.7	1.0
	EHR Average	2.2	2.0	1.7	1.5	1.5	1.6	1.8	2.1	1.6	1.1
ENG	Single PI Grants	1.1	1.0	1.2	1.2	0.9	0.9	0.4	0.4	0.6	0.4
	Multi-PI Grants	0.9	0.9	0.7	0.8	0.7	0.7	0.4	0.3	0.3	0.3
	ENG Average	1.0	1.0	1.0	1.0	0.8	0.8	0.4	0.4	0.5	0.4
GEO	Single PI Grants	1.6	1.4	1.4	1.3	1.1	1.0	1.1	1.0	1.0	0.9
	Multi-PI Grants	1.5	1.6	1.5	1.3	1.2	1.1	1.1	1.0	1.3	1.3
	GEO Average	1.6	1.4	1.4	1.3	1.1	1.1	1.1	1.0	1.1	1.0
IIA	Single PI Grants	0.8	2.4	1.9	2.5	3.3	0.6	1.5	1.8	0.4	1.0
	Multi-PI Grants	3.1	1.0	1.5	1.0	1.0	1.0	1.1	0.5	0.7	0.9
	IIA Average	1.6	1.2	1.8	1.2	2.2	0.9	1.2	1.0	0.6	1.0
MPS	Single PI Grants	1.4	1.4	1.4	1.3	1.3	1.5	1.3	1.3	1.1	1.0
	Multi-PI Grants	2.0	1.4	1.5	1.5	1.4	1.5	1.2	1.2	0.9	0.9
	MPS Average	1.6	1.4	1.4	1.3	1.4	1.5	1.3	1.3	1.0	1.0
SBE	Single PI Grants	1.7	1.7	1.9	1.6	2.0	1.5	1.7	1.2	1.2	1.1
	Multi-PI Grants	1.1	1.3	1.4	1.4	1.1	1.0	1.3	0.9	0.9	1.2
	SBE Average	1.5	1.6	1.7	1.5	1.7	1.4	1.6	1.1	1.1	1.1

Source: NSF Enterprise Information System 11/27/13.

Appendix 9 - Mean Number of Research Proposals per PI before Receiving One Award, by Directorate or Office, by Fiscal Year Triads.

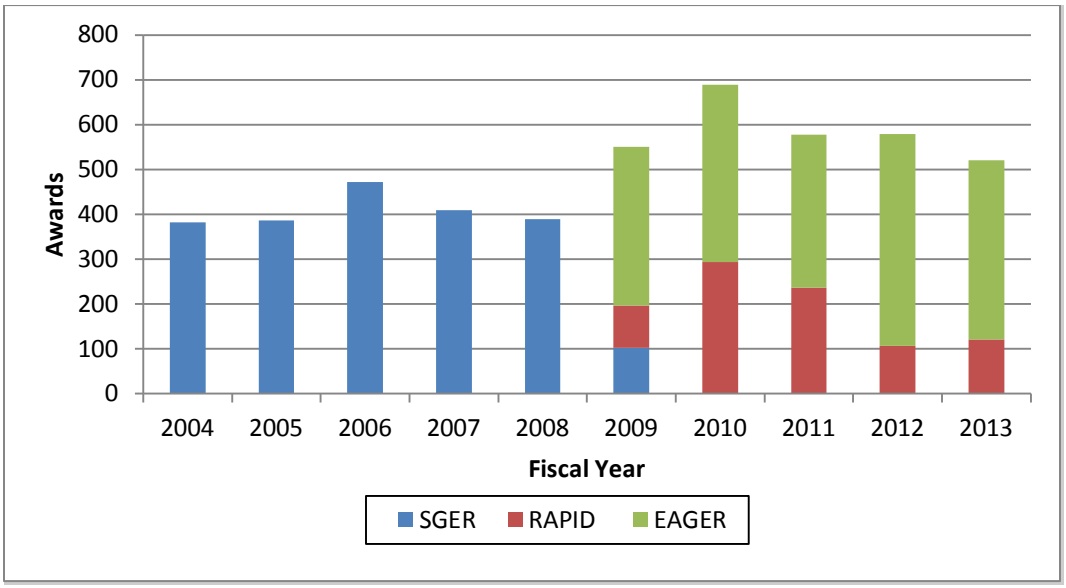
	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
NSF	**2.1**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.3**	**2.3**	**2.4**	**2.4**
BIO	1.8	2.0	2.0	2.2	2.2	2.1	2.1	2.1	2.1	1.9
CISE	2.5	2.6	2.6	2.4	2.4	2.4	2.6	2.5	2.6	2.6
EHR	1.2	1.3	1.3	1.4	1.3	1.4	1.4	1.4	1.5	1.7
ENG	2.2	2.3	2.4	2.6	2.5	2.5	2.6	2.7	2.8	2.6
GEO	2.1	2.2	2.2	2.3	2.2	2.1	2.0	2.0	2.1	2.2
MPS	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
O/D	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1
SBE	1.6	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.7	1.6

Source: NSF Enterprise Information System 12/27/13.

Appendix 10 - Small Grants for Exploratory Research (SGER), Early-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID)

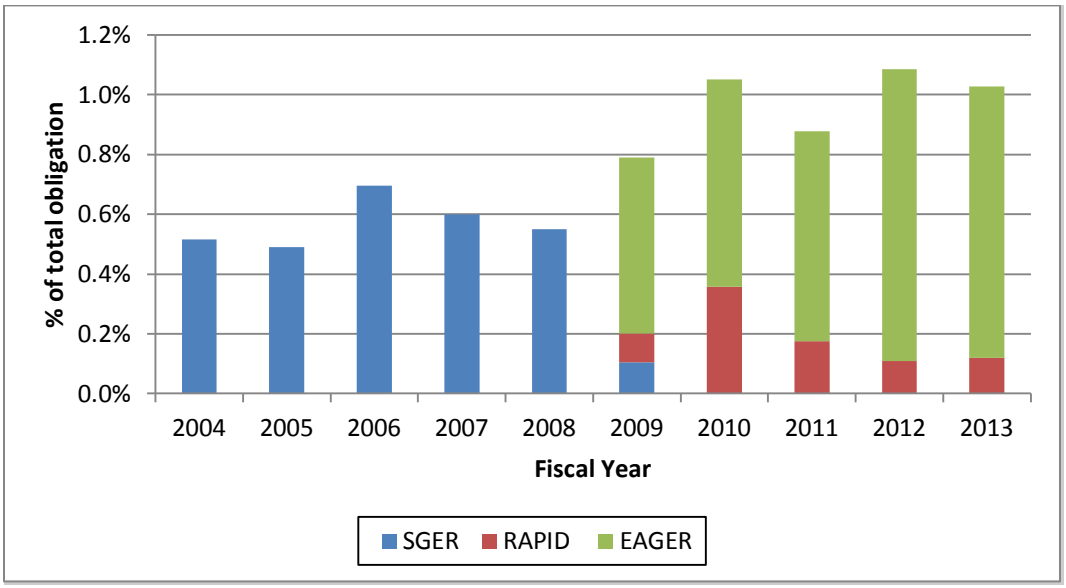
Figures 10.1, 10.2 and Table 10.1 provide funding trends for EAGERs, RAPIDs, and SGERs. Effective January 2009, the SGER funding mechanism was replaced by two separate funding mechanisms EAGER and RAPID so FY 2009 included all three types of awards.

Figure 10.1 – Numbers of SGER, EAGER and RAPID Awards



Source: NSF Enterprise Information System 12/4/13.

Figure 10.2 – Investments in SGER, EAGER and RAPID Awards



Source: NSF Enterprise Information System 12/4/13.

Table 10.1 - Early-concept Grants for Exploratory Research (EAGER) and Grants for Rapid Response Research (RAPID): Funding Trends, by Directorate or Office

		2010		2011		2012		2013	
		RAPID	EAGER	RAPID	EAGER	RAPID	EAGER	RAPID	EAGER
NSF	Proposals	341	440	237	360	114	519	123	441
	Awards	294	395	190	341	107	472	121	399
	Funding Rate	86%	90%	80%	95%	94%	91%	98%	90%
	Total $ (Millions)	$27.4	$53.2	$12.3	$49.3	$7.9	$70.3	8	64
	% of Obligations	0.4%	0.7%	0.2%	0.7%	0.1%	1.0%	0.1%	0.9%
	Average $ (Thousands)	$93	$135	$65	$145	$74	$149	$70	$161
BIO	Proposals	52	45	10	34	14	54	13	32
	Awards	41	41	8	27	13	50	12	25
	Funding Rate	79%	91%	80%	79%	93%	93%	92%	78%
	Total $ (Millions)	$5.1	$8.3	$0.9	$5.8	$1.2	$9.0	$1.5	$6.1
	% of Obligations	0.7%	1.1%	0.1%	0.8%	0.1%	1.2%	0.2%	0.8%
	Average $ (Thousands)	$124	$202	$107	$214	$89	$181	$124	$243
CSE	Proposals	13	197	28	148	11	173	2	171
	Awards	12	172	24	145	10	166	2	165
	Funding Rate	92%	87%	86%	98%	91%	96%	100%	96%
	Total $ (Millions)	$1.4	$23.1	$1.5	$22.6	$1.2	$28.1	$0.1	$27.6
	% of Obligations	0.2%	2.7%	0.2%	2.4%	0.1%	3.0%	0.0%	3.0%
	Average $ (Thousands)	$115	$134	$61	$156	$116	$169	$45	$168
EHR	Proposals	13	2	9	4	5	48	5	33
	Awards	12	0	8	4	5	25	5	19
	Funding Rate	92%	0%	89%	100%	100%	52%	100%	58%
	Total $ (Millions)	$1.9	$0.2	$1.5	$1.2	$0.7	$6.3	$0.8	$4.9
	% of Obligations	0.2%	0.0%	0.2%	0.1%	0.1%	0.6%	0.1%	0.5%
	Average $ (Thousands)	$162	N/A	$184	$303	$146	$252	$153	$258
ENG	Proposals	95	96	62	92	12	109	38	134
	Awards	66	92	35	88	10	107	38	125
	Funding Rate	69%	96%	56%	96%	83%	98%	100%	93%
	Total $ (Millions)	$5.0	$9.1	$1.9	$8.9	$0.4	$12.7	$1.8	$16.4
	% of Obligations	0.6%	1.1%	0.2%	1.1%	0.1%	1.5%	0.2%	2.0%
	Average $ (Thousands)	$76	$99	$53	$101	$42	$119	$49	$131
GEO	Proposals	119	49	99	60	63	93	47	51
	Awards	118	48	93	57	61	89	47	49
	Funding Rate	99%	98%	94%	95%	97%	96%	100%	96%
	Total $ (Millions)	$10.3	$4.8	$5.2	$6.8	$3.8	$8.2	$3.1	$5.0
	% of Obligations	0.7%	0.3%	0.4%	0.5%	0.3%	0.6%	0.2%	0.4%
	Average $ (Thousands)	$87	$99	$56	$120	$62	$92	$66	$103
MPS	Proposals	19	41	2	14	2	29	2	9
	Awards	16	34	2	12	1	24	2	6
	Funding Rate	84%	83%	100%	86%	50%	83%	100%	67%
	Total $ (Millions)	$1.6	$6.7	$0.2	$2.2	$0.0	$4.3	$0.3	$2.3
	% of Obligations	0.1%	0.4%	0.0%	0.2%	0.0%	0.3%	0.0%	0.2%
	Average $ (Thousands)	$98	$197	$125	$183	$23	$181	$163	$386

		2010		2011		2012		2013	
		RAPID	**EAGER**	**RAPID**	**EAGER**	**RAPID**	**EAGER**	**RAPID**	**EAGER**
SBE	Proposals	30	5	26	6	7	11	16	11
	Awards	29	4	19	6	7	9	15	10
	Funding Rate	97%	80%	73%	100%	100%	82%	94%	91%
	Total $ (Millions)	$1.6	$0.6	$0.9	$1.0	$0.6	$1.2	$0.6	$1.3
	% of Obligations	0.6%	0.2%	0.4%	0.4%	0.2%	0.5%	0.2%	0.5%
	Average $ (Thousands)	$56	$139	$50	$172	$80	$130	$40	$132
IIA	Proposals	0	5	1	2	0	2	0	0
	Awards	0	4	1	2	0	2	0	0
	Funding Rate	N/A	80%	100%	100%	N/A	100%	N/A	N/A
	Total $ (Millions)	$0.7	$0.6	$0.3	$0.8	$0.1	$0.4	$0.2	$0.5
	% of Obligations	0.2%	0.1%	0.1%	0.4%	0.0%	0.2%	0.1%	0.1%
	Average $ (Thousands)	N/A	$150	$261	$376	N/A	$196	N/A	N/A

Source: NSF Enterprise Information System 12/4/13. No distinction is made between funds obligated by a directorate to awards managed by that directorate and funds obligated by a directorate as co-funding for awards managed by other directorates. IIA totals include co-funding by its EPSCoR and International Science and Engineering sections.

Appendix 11 – Description of Merit Review Principles and Criteria.[58]

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These broader impacts may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the activities that the PI intends to do, and [to have] a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through [the] use of two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.(i) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.(i), prior to the review of a proposal.

[58] From NSF *Grant Proposal Guide*, http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_index.jsp (GPG). Effective from January 14th, 2013.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge;

and

- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or organization to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Appendix 12 - Oversight and Advisory Mechanisms

- **Committees of Visitors.**
  To ensure the highest quality in processing and recommending proposals for awards, NSF convenes external groups of experts, called Committees of Visitors (COVs), to review each major program approximately every three to five years. This includes disciplinary programs in the various directorates and offices, and the cross-disciplinary programs managed across directorates. The COVs (comprised of scientists, engineers and educators from academia, industry, and government) convene at NSF for a two to three-day assessment. These experts evaluate the integrity and efficiency of the processes used for proposal review and program decision-making. In addition, the COVs examine program management and portfolio balance. The COV reports, written as answers and commentary to specific questions, are reviewed by Advisory Committees and then submitted to the directorates and the NSF Director. Questions include aspects of the program portfolio, such as the balance of high-risk, multidisciplinary, and innovative projects. The recommendations of COVs are reviewed by management and taken into consideration by NSF when evaluating existing programs and future directions for the Foundation.[59]

- **Advisory Committee Reporting on Directorate/Office Performance.**
  Advisory Committees regularly provide community perspectives to the research and education directorates as well as on cross-cutting NSF topics such as cyberinfrastructure, international science and engineering, environmental research and education, business and operations, and equal opportunities in science and engineering. They are typically composed of 15-25 experts who have experience relevant to the programs or topics and are broadly drawn from academia, industry, and government. Advisory Committees, as part of their mission, review COV reports and staff responses.

[59] The COV reports and directorate responses are available electronically at http://www.nsf.gov/od/iia/activities/cov/covs.jsp.

Appendix 13 - Requests for Formal Reconsideration of Declined Proposals

		Fiscal Year									
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
First Level Reviews (Assistant Directors):											
BIO	Request	3	2	4	2	5	3	1	4	2	2
	- Upheld	3	2	4	2	5	3	1	3	0	2
	- Reversed	0	0	0	0	0	0	0	1	2	0
CISE	Request	2	3	1	1	0	0	2	3	5	1
	- Upheld	2	3	1	1	0	0	2	3	5	1
	- Reversed	0	0	0	0	0	0	0	0	0	0
EHR	Request	2	7	4	6	7	2	2	2	3	4
	- Upheld	2	7	4	6	7	2	2	2	3	4
	- Reversed	0	0	0	0	0	0	0	0	0	0
ENG	Request	3	3	6	3	3	3	11	8	5	7**
	- Upheld	3	3	6	3	3	3	9	7	5	5
	- Reversed	0	0	0	0	0	0	2	1	0	1
GEO	Request	4	0	0	2	0	2	3	2	2	1
	- Upheld	4	0	0	2	0	1	3	2	2	1
	- Reversed	0	0	0	0	0	1	0	0	0	0
MPS	Request	24	15	16	16	14	9	14^	11	22	12
	- Upheld	24	15	15	15	14	7	12	11	21	11
	- Reversed	0	0	1	1	0	2	0	0	1	1
SBE	Request	3	3	4	0	2	1	1	0	0	0
	- Upheld	3	3	4	0	2	1	1	0	0	0
	- Reversed	0	0	0	0	0	0	0	0	0	0
Other*	Request	0	0	0	3	0	1	0	0	1	0
	- Upheld	0	0	0	3	0	0	0	0	1	0
	- Reversed	0	0	0	0	0	1	0	0	0	0
Second Level Reviews (Deputy Director):											
O/DD	Request	7	2	0	1	3	2	3	3	6	1
	- Upheld	7	2	0	1	3	2	3	1	6	1
	- Reversed	0	0	0	0	0	0	0	2	0	0
Total Reviews First & Second Level											
NSF	Request	48	35	35	34	34	23	37^	33	46	28
	- Upheld	48	35	34	33	34	19	33	29	43	25
	- Reversed	0	0	1	1	0	4	2	4	3	2

Source: Office of the Director.

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* From 2005 to 2012, the "Other" category includes OCI, OIA, OPP, and OISE. For FY 2013, it includes IIA.
^ The number of decisions (upheld or reversed) may not equal the number of requests in each year due to carryover of a pending reconsideration request.
** One reconsideration request was returned to the PI for failure to follow the procedure described in the Grant Proposal Guide.

Appendix 14 - Mean Number of Reviews per Proposal, by Method and Directorate or Office, FY 2013

		Methods of Review						
		All Methods	Mail + Panel	Mail-Only	Panel-Only	Not Reviewed	Returned without Review	Withdrawn Proposals
NSF	Reviews	187,512	65,006	11,184	111,322			
	Proposals	46,918	13,394	2,814	30,710	2,081	35	283
	Rev/Prop	4.0	4.9	4.0	3.6			
BIO	Reviews	24,147	14,908	229	9,010			
	Proposals	5,791	2,986	53	2,752	143	5	25
	Rev/Prop	4.2	5.0	4.3	3.3			
CSE	Reviews	29,828	4,902	561	24,365			
	Proposals	7,431	981	148	6,302	387	5	49
	Rev/Prop	4.0	5.0	3.8	3.9			
EHR	Reviews	19,682	950	388	18,344			
	Proposals	4,432	197	104	4,131	69	4	9
	Rev/Prop	4.4	4.8	3.7	4.4			
ENG	Reviews	37,230	1,985	324	34,921			
	Proposals	10,401	428	98	9,875	337	7	25
	Rev/Prop	3.6	4.6	3.3	3.5			
GEO	Reviews	26,865	22,009	3,258	1,598			
	Proposals	5,842	4,554	790	498	245	4	52
	Rev/Prop	4.6	4.8	4.1	3.2			
IIA	Reviews	1,307	187	347	773			
	Proposals	310	34	97	179	275	1	3
	Rev/Prop	4.2	5.5	3.6	4.3			
MPS	Reviews	29,483	7,234	5,034	17,215			
	Proposals	8,346	1,697	1,240	5,409	557	5	105
	Rev/Prop	3.5	4.3	4.1	3.2			
SBE	Reviews	18,970	12,831	1,043	5,096			
	Proposals	4,365	2,517	284	1,564	68	4	15
	Rev/Prop	4.3	5.1	3.7	3.3			

Source: NSF Enterprise Information System 10/01/13.

The proposals totals shown in the “All Methods” category do not include the proposals shown in the “Not Reviewed” category. Proposals which are not reviewed include RAPIDs, EAGERs, INSPIRE Track 1s, and small grants for travel and symposia.

The “Not Reviewed” category includes award and decline actions for proposals that were not reviewed, while the “Returned without Review” and “Withdrawn Proposal” categories reflect proposals which were neither awarded nor declined.

The counts of panel reviews do not include panel summaries. There were 45,604 panel summaries in FY 2013.

Withdrawn proposals include only those that underwent merit review.

Appendix 15 - Methods of NSF Proposal Review

	Total	Mail + Panel		Mail Only		Panel Only*		Not Externally Reviewed	
FY	**Proposals**	**Proposals**	**Percent**	**Proposals**	**Percent**	**Proposals**	**Percent**	**Proposals**	**Percent**
2013	48,999	13,394	27%	2,814	6%	30,710	63%	2,081	4%
2012	48,613	12,851	26%	2,639	5%	30,700	63%	2,423	5%
2011	51,562	14,594	28%	3,352	7%	31,878	62%	1,738	3%
2010	55,542	16,483	30%	3,853	7%	32,859	59%	2,347	4%
2009	45,181	14,262	32%	3,370	7%	25,835	57%	1,714	4%
2008	44,428	14,355	32%	3,662	8%	24,966	56%	1,445	3%
2007	44,577	14,292	32%	3,737	8%	25,135	56%	1,413	3%
2006	42,352	14,349	34%	3,895	9%	22,384	53%	1,724	4%
2005	41,722	13,919	33%	3,656	9%	22,735	54%	1,412	3%
2004	43,851	13,345	30%	4,496	10%	24,553	56%	1,457	3%
2003	40,075	12,683	32%	4,579	11%	21,391	53%	1,388	3%
2002	35,164	11,346	32%	4,838	14%	17,616	50%	1,364	4%

Source: NSF Enterprise Information System 10/01/13.

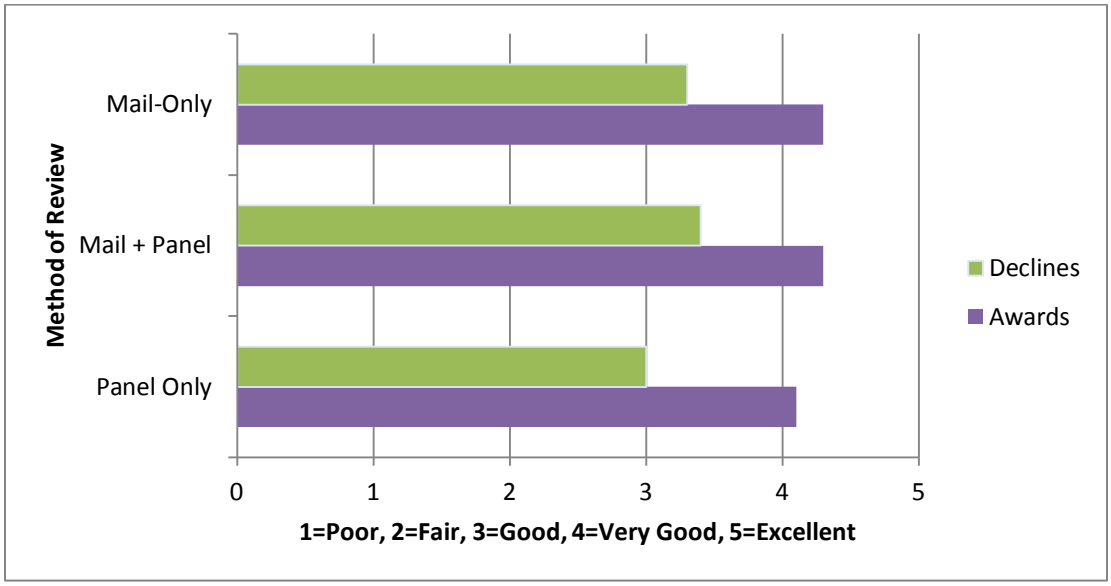
* "Panel Only" includes cases where panel members were given access to proposals for review prior to panel.

Appendix 16 - Methods of NSF Proposal Review, by Directorate or Office – FY 2013

Directorate	Total Proposals	Mail + Panel		Mail-Only		Panel-Only		Not Reviewed	
		Proposals	Percent	Proposals	Percent	Proposals	Percent	Proposals	Percent
NSF	**48,999**	**13,394**	**27%**	**2,814**	**6%**	**30,710**	**63%**	**2,081**	**4%**
BIO	5,934	2,986	50%	53	1%	2,752	46%	143	2%
CSE	7,818	981	13%	148	2%	6,302	81%	387	5%
EHR	4,501	197	4%	104	2%	4,131	92%	69	2%
ENG	10,738	428	4%	98	1%	9,875	92%	337	3%
GEO	6,087	4,554	75%	790	13%	498	8%	245	4%
MPS	8,903	1,697	19%	1,240	14%	5,409	61%	557	6%
SBE	4,433	2,517	57%	284	6%	1,564	35%	68	2%
IIA	585	34	6%	97	17%	179	31%	275	47%

Source: NSF Enterprise Information System 10/01/13.

Appendix 17 - Mean Reviewer Ratings, by Method of Review - FY 2013



Source: NSF Enterprise Information System 10/01/13.

Appendix 18 - Accomplishment-Based Renewals and Creativity Extensions

Accomplishment-Based Renewals

In an accomplishment-based renewal, the project description is replaced by copies of no more than six reprints of publications resulting from the research supported by NSF (or research supported by other sources that is closely related to the NSF-supported research) during the preceding three-to-five year period. In addition, a brief (not to exceed four pages) summary of plans for the proposed support period must be submitted, together with information on human resources development at the post-doctoral, graduate and undergraduate levels. All other information required for NSF proposal submission remains the same. The proposals undergo merit review in the tradition of the specific program. In FY 2013, there were 71 requests for accomplishment-based renewals, 19 of which were awarded. **Table 18.1** shows the number of accomplishment-based renewals by directorate or office.

Creativity Extensions

A program officer may recommend the extension of funding for certain research grants beyond the initial period for which the grant was awarded, for a period of up to two years. The objective is to offer the most creative investigators an extension to address opportunities in the same general research area, but not necessarily within the scope covered by the original/current proposal. Awards eligible for such an extension are generally three-year continuing grants. Special Creativity Extensions are usually initiated by the NSF program officer based on progress during the first two years of a three-year grant. In FY 2013, there were 30 Special Creativity Extensions awarded.

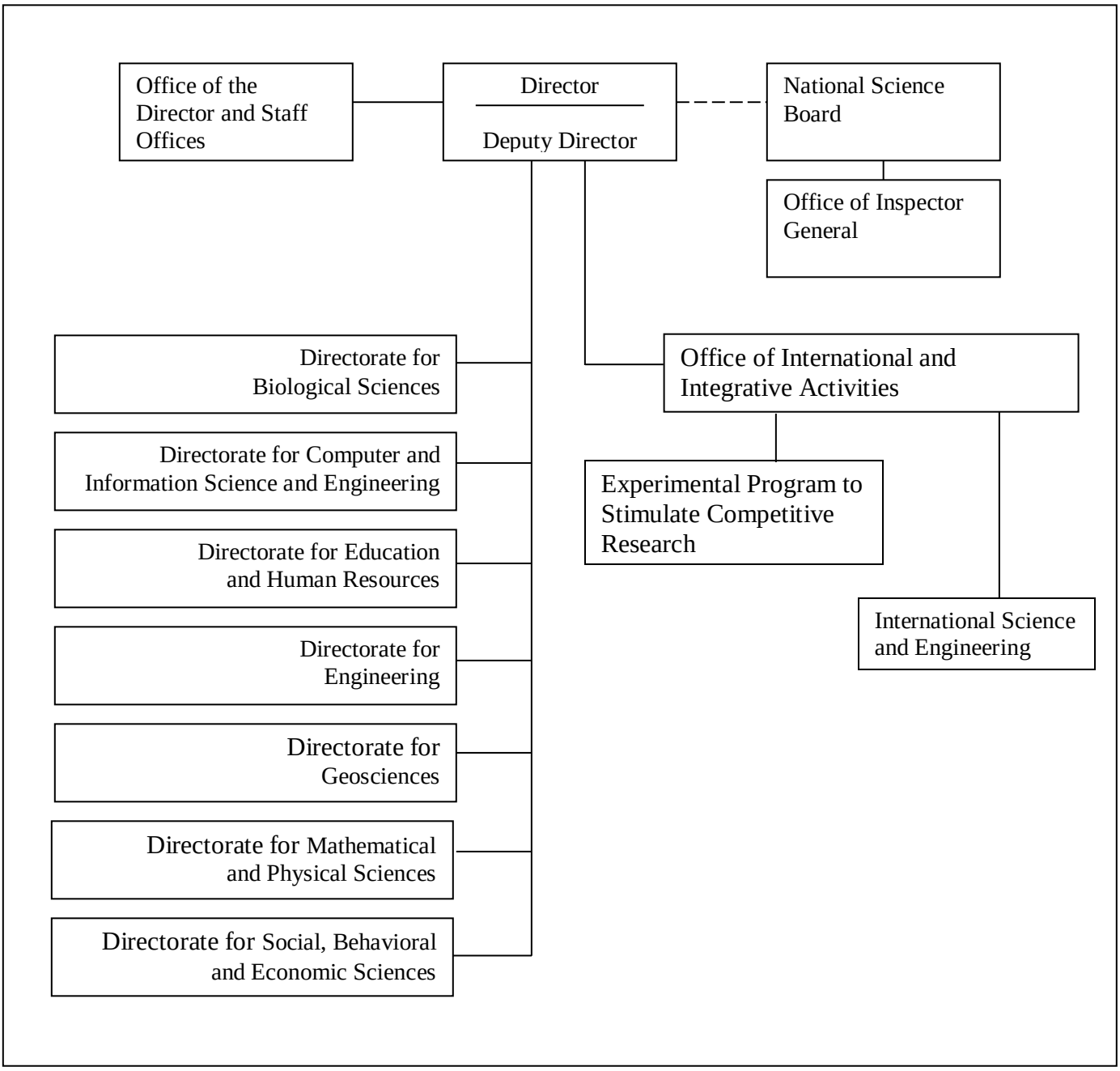
Table 18.1 - Accomplishment-Based Renewals, by Directorate or Office

Directorate or Office	Award vs. Decline	2006	2007	2008	2009	2010	2011	2012	2013
NSF	Award	32	27	28	40	34	19	30	19
	Decline	70	70	51	54	52	43	41	52
	Mean Annual Award	$106,188	$146,658	$164,211	$225,438	$150,171	$253,026	$255,959	$414,467
BIO	Award	5	4	3	5	8	3	2	4
	Decline	20	25	13	16	11	6	3	6
	Mean Annual Award	$109,684	$82,697	$62,444	$123,533	$151,999	$344,742	$78,815	$835,142
CISE	Award	1	1	1	2	1	0	0	2
	Decline	2	3	1	0	2	2	2	1
	Mean Annual Award	$62,500	$37,500	$60,010	$267,851	$272,833	N/A	N/A	$819,996
EHR	Award	2	2	2	3	3	1	2	0
	Decline	14	6	3	7	6	5	4	4
	Mean Annual Award	$154,495	$117,877	$390,611	$361,873	$304,579	$33,352	$530,633	N/A
ENG	Award	3	2	1	1	1	2	4	3
	Decline	14	13	6	13	7	5	7	10
	Mean Annual Award	$49,997	$83,542	$54,117	$124,977	$152,483	$121,725	$194,881	$207,017
GEO	Award	8	8	8	10	8	4	12	5
	Decline	3	4	3	3	8	4	3	6
	Mean Annual Award	$134,802	$74,091	$113,891	$343,864	$144,094	$143,699	$234,306	$222,092
MPS	Award	7	10	12	16	11	8	10	5
	Decline	13	16	19	12	13	15	18	21
	Mean Annual Award	$126,032	$253,195	$219,868	$188,219	$115,657	$354,936	$297,020	$155,611
SBE	Award	6	0	1	3	1	1	0	0
	Decline	4	3	6	3	3	5	4	4
	Mean Annual Award	$52,954	N/A	$76,993	$67,808	$75,789	$82,187	N/A	N/A
IIA	Award					1	0		
	Decline					2	1		
	Mean Annual Award					$50,000	N/A		

Source: NSF Enterprise Information System 10/01/13. "N/A" = No accomplishment-based renewals awarded.

Mean annual award size is based on the annualized award size of each award. The latter is the total awarded, including supplements, divided by the award duration, including extensions. Since supplements and extensions occur post-award, the mean annual award amount for each directorate in prior years may change with time.

Appendix 19 - National Science Foundation Organization Chart*



*In September 2012, the Director announced a realignment of program offices that reported directly to the Office of the Director. The figure shows the new organizational structure.

Appendix 20 - Acronyms

Acronym	Definition
ACI	Division of Advanced Cyberinfrastructure
ARRA	American Recovery and Reinvestment Act
BFA	Office of Budget, Finance and Award Management
BIO	Directorate for Biological Sciences
CGI	Continuing Grant Increment
CISE	Directorate for Computer and Information Science and Engineering
COV	Committee of Visitors
EAGER	Early-concept Grants for Exploratory Research
EHR	Directorate for Education and Human Resources
ENG	Directorate for Engineering
EPSCoR	Experimental Program to Stimulate Competitive Research
FY	Fiscal Year (October 1 – September 30)
GEO	Directorate for Geosciences
IIA	Office of International and Integrative Activities
IPAs	Temporary employees hired through the Intergovernmental Personnel Act
IPS	Interactive Panel System
MPS	Directorate for Mathematical and Physical Sciences
MRI	Major Research Instrumentation
MSI	Minority-Serving Institution
NSB	National Science Board
NSF	National Science Foundation
OCI	Office of Cyberinfrastructure
OD	Office of the Director
ODD	Office of the Deputy Director
OIA	Office of Integrative Activities
OISE	Office of International Science & Engineering
OPP	Office of Polar Programs
PARS	Proposal, PI and Reviewer System
PI	Principal Investigator
RAPID	Grants for Rapid Response Research
SBE	Directorate for Social, Behavioral and Economic Sciences
SGER	Small Grants for Exploratory Research
VSEE	Visiting Scientists, Engineers and Educators