



December 2, 2004 –
Final FY 2005 NSF Appropriations

NSF Budget Falls in 2005

Highlights

- **The National Science Foundation (NSF) budget falls in FY 2005 down to \$5.5 billion, \$105 million or 1.9 percent less than last year and \$272 million less than the request (see Table). Most research directorates see their budgets fall between 1.5 and 2.0 percent.**

- The NSF budget of \$5.5 billion would be far short of the \$7.4 billion FY 2005 authorization signed into law 19 months ago as part of a plan to double the NSF budget in the five years to FY 2007, and could permanently end any hopes of achieving the doubling.

- **NSF's R&D funding totals \$4.1 billion in FY 2005, a cut of 0.3 percent (see Table).**

- Major Research Equipment and Facilities Construction (MREFC) is the only account to enjoy a sizeable increase, going from \$155 million to \$174 million for five large projects.

- Congress moved funding for the **Math and Science Partnerships** back to its traditional home in Education and Human Resources (E.H.R) instead of the NSF proposal to move it to the Research and Related Activities (R&RA) account, but cut its funding from \$140 million down to \$80 million.

- **The cuts to the research directorates would cut deeply into NSF funding of competitively awarded research grants.** The total number of NSF research grants would fall, and the competition for them would get more difficult. In its budget request, NSF already expected to make awards to less than one in four applications this year, and the final appropriation would result in even tougher odds.

NSF R&D in FY 2005 Final Appropriations

On November 20, Congress came to an agreement on an FY 2005 omnibus appropriations bill (HR 4818), which incorporates the final version of the FY 2005 VA-HUD appropriations bill. The House is expected to give final approval on December 6, and President Bush is expected to sign the bill into law on December 8. The omnibus bill keeps funding for domestic programs flat in FY 2005; the National Science Foundation (NSF) budget is caught in the squeeze, especially after factoring in a 0.80 percent across-the-board cut for most domestic programs. (All figures in this analysis reflect the across-the-board cut.) The omnibus provides NSF with a total budget of \$5.5 billion in FY 2005, \$105 million or 1.9 percent below FY 2004. An NSF authorization bill calling for a doubling of the NSF budget between FY 2002 and FY 2007 was signed into law in December 2003, but the final FY 2005 budget falls almost \$2 billion short of the \$7.4 billion authorized funding level for FY 2005, putting the NSF doubling goal well out of reach in these tough budgetary times. (For details of R&D in the FY 2005 request, please see Chapter 7 of *AAAS Report XXIX: R&D FY 2005* or the February 26 AAAS R&D Funding Update.)

NSF's R&D funding, which excludes NSF's education and training activities and overhead costs, totals \$4.1 billion in FY 2005, a cut of 0.3 percent or \$14 million (see Table). It is the first cut to NSF's R&D programs since FY 1996.

Congress decided to cut the **Research and Related Activities (R&RA)** account, which funds most of NSF's R&D. R&RA funding falls \$31 million or 0.7 percent down to \$4.2 billion, \$152 million short of

the modest requested increase. **The budgets of the research directorates fall between 1.5 and 2.0 percent**, except for Social, Behavioral, and Economic (SBE) Sciences with a 6.2 percent increase and Polar Programs, which Congress directs to receive \$347 million, an increase of 1.4 percent (see Table).

Congress rejects the Administration proposal to transfer the Math and Science Partnerships (MSP) from Education and Human Resources (E.H.R.) to the Integrative Activities (IA) account. Congress keeps the Partnerships in E.H.R. at a level of \$80 million, down substantially from \$139 million this year but the same as the request. The MSP program, run jointly by NSF and the Department of Education (ED), encourages academic institutions and schools to work together to improve math and science education. In the omnibus bill, Congress agrees with the Bush Administration's desire to shift the emphasis of the program toward ED, even as it keeps the NSF share in E.H.R. The FY 2005 omnibus provides \$180 million for the Department of Education's share of the program, up from \$149 million this year. Combined, the MSP programs receive \$260 million in FY 2005, down from \$288 million last year.

NSF's **Education and Human Resources (EHR)** programs receive \$841 million, down more than 10 percent from last year. Most of the decline is due to the shift in MSP funding to the Department of Education. The final FY 2005 appropriation contains \$94 million for the Experimental Program to Stimulate Competitive Research (EPSCoR), the same level as last year. EPSCoR assists research institutions and states that have traditionally been underrepresented in federal R&D funding to build research capacity. The program is currently open to 25 states, Puerto Rico, and the U.S. Virgin Islands.

The one increase in the final FY 2005 NSF budget goes to NSF's support of R&D facilities. NSF receives \$174 million for the **Major Research Equipment and Facilities Construction (MREFC)** account, up from \$155 million this year though well short of the \$213 million request. Congress agreed to two of the three proposed starts (the Scientific Ocean Drilling Vessel and Rare Symmetry Violating Processes (RSVP)), with the other proposed start (the National Ecological Observatory Network (NEON)) a casualty of tight budget constraints. Congress keeps planning and design for NEON alive in the R&RA account at \$6 million in anticipation of future MREFC funding. Congress boosts funding for the IceCube Neutrino Detector Observatory from \$42 million this year to \$48 million in FY 2005 in order to accelerate the timetable for this project at the South Pole. EarthScope (\$47 million) and the Atacama Large Millimeter Array (\$49 million) are the other two projects to receive MREFC funds in FY 2005.

NSF Funding Mechanisms

The approved cuts to most of the research directorates would seriously squeeze NSF funding of competitively awarded research grants. Even with the requested increase for NSF proposed by the Bush Administration in February, NSF estimated that the success rate for research grant applications would dip to 23 percent in FY 2005, down one percentage point from the past few years. Among some directorates, the odds of success would be even lower. The Engineering directorate (ENG) expected to fund only 15 percent of its research grant applications, while Biological Sciences (BIO) would fund less than one in five (19 percent), both down one percentage point from this year. The final FY 2005 appropriation would almost certainly lead to far lower success rates in FY 2005 grant competitions.

Although the number of research grants awarded has been on a steady upward trend in recent years, **NSF expected in its request to fund only 6,145 research grants in FY 2005, down by 72 from this year's expected total; NSF research grants could dip below 6,000 in the final FY 2005 budget.** Even with the requested increase, BIO and ENG expected large declines, and Mathematical and Physical Sciences (MPS) a small decline. The congressional appropriation would also jeopardize NSF plans to increase the average duration of a research grant from 2.9 years to 3.0 years.

Outlook and Historical Trends

NSF has enjoyed mostly steady budget growth over the past 15 years, as shown in Figure 1. After declines in the mid-1990s in the push toward a balanced budget, growth resumed after FY 1998 and momentum began to build to double the NSF budget over five years, culminating in the NSF authorization bill of

December 2002. But NSF budget growth slowed down to just ahead of the inflation rate in FY 2004, and reverses in the final FY 2005 budget. Recent budgets have put NSF further and further behind the authorized doubling path and have created downward pressures on NSF grant sizes and success rates.

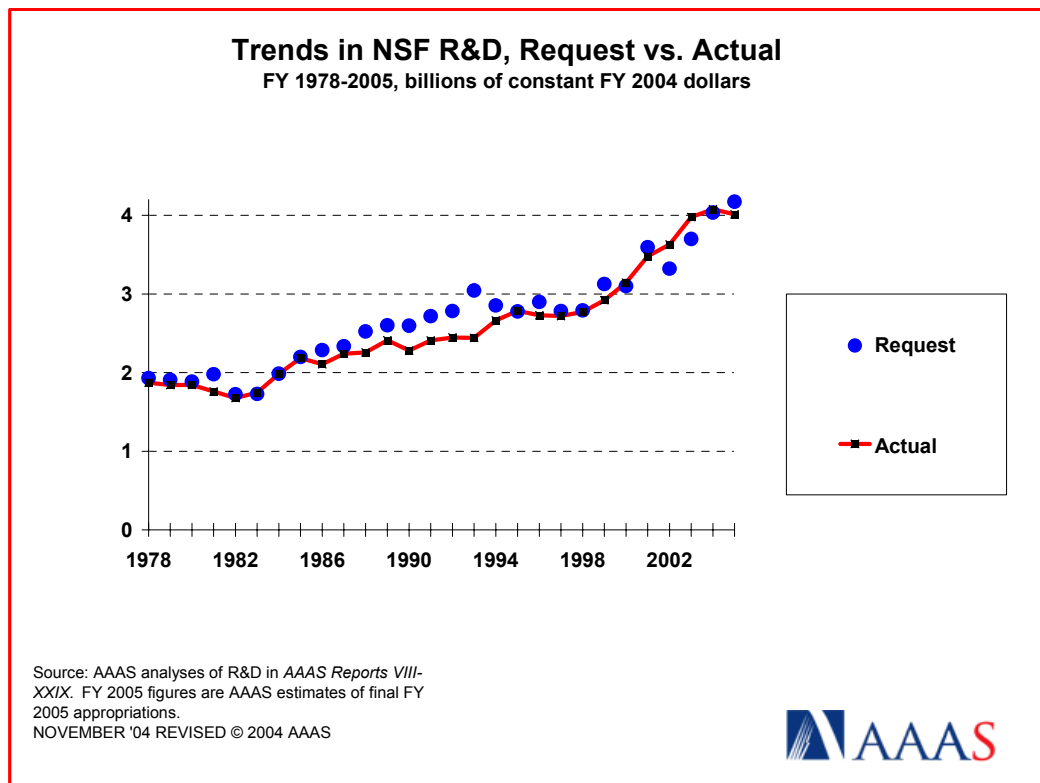


Figure 1. (click on the image for PDF)

Impacts of the NSF R&D Portfolio

NSF is the only federal agency with responsibility for research in all major science and engineering fields. As shown in Figure 2, NSF has historically had a **balanced research portfolio** covering the breadth of science and engineering. In most fields, NSF is the largest or second-largest source of federal funding. In the past, NSF has distributed its increases unevenly depending on then-current research priorities, as shown in Figure 2. In particular, NSF support for computer sciences research has increased dramatically over the past decade, as fundamental IT research has grown as a national priority. NSF support of engineering research has also grown substantially over the last decade, boosted even more in recent years with growth in nanotechnology support. But in many disciplines, NSF support is only now recovering from the lean years of the mid-1990s when NSF support for the physical sciences, environmental sciences, the non-medical life sciences, and mathematics actually fell. The FY 2005 budget could see support fall for all disciplines except the social sciences.

NSF's longstanding leadership role in federal support of basic research continues to have a big impact on the nation's **colleges and universities**. NSF sends 80 percent of its R&D money to colleges and universities, by far the highest ratio of any R&D funding agency. NSF is the second-largest federal supporter of academic R&D, behind the NIH, and dominates federal support in most non-biomedical fields. NSF operates no laboratories of its own, but spends 8 percent of its R&D budget at federally funded R&D centers (FFRDCs), government-owned but contractor-operated laboratories including the National Corporation for Atmospheric Research (NCAR) and the National Radio Astronomy Observatory (NRAO).

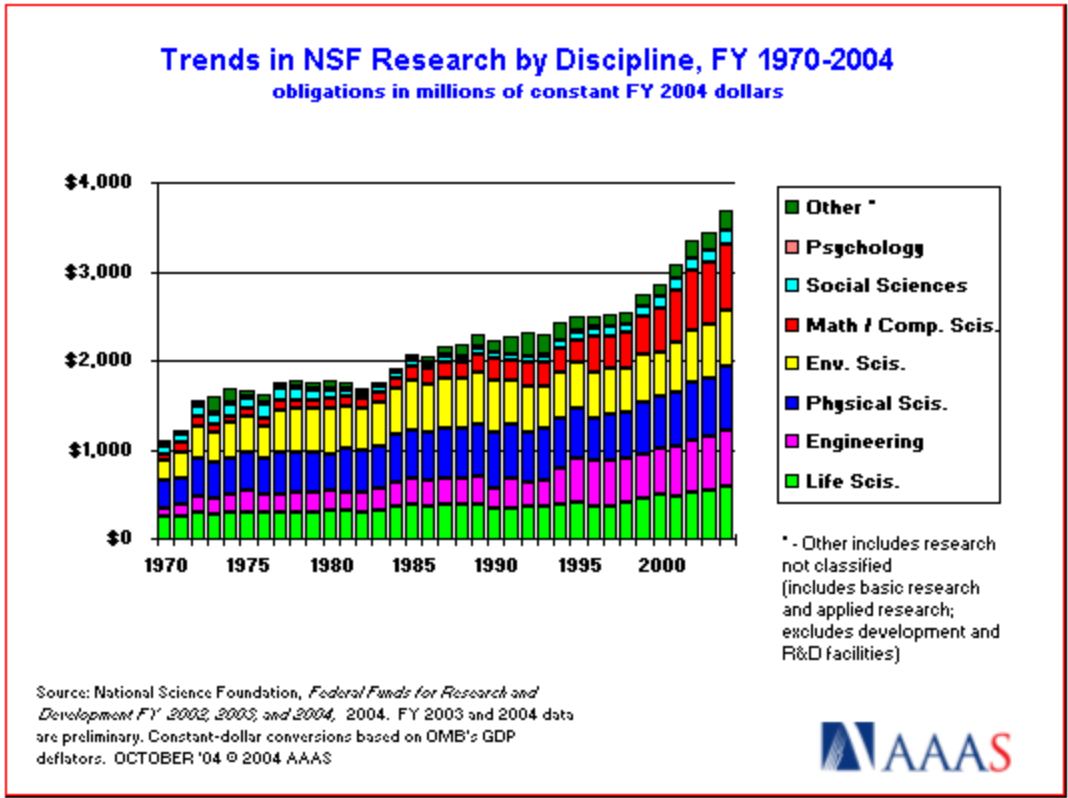


Figure 2. (click on the image for PDF)

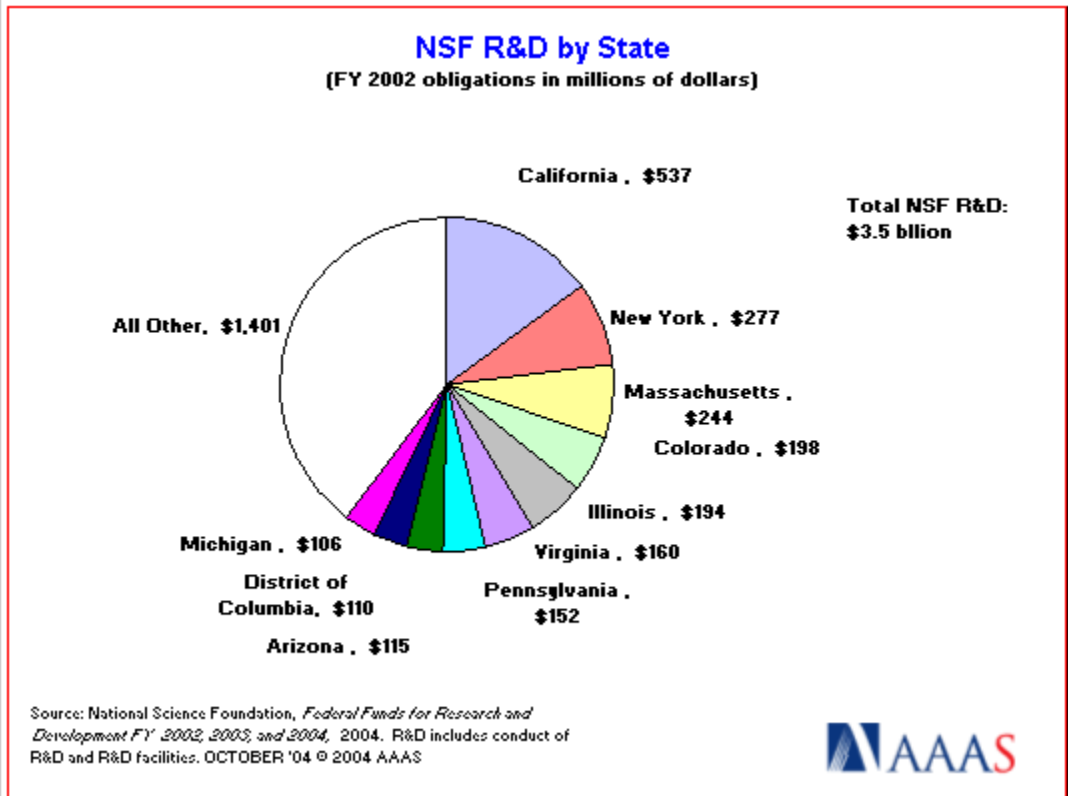


Figure 3. (click on the image for PDF)

Because of the concentration of research-intensive universities that win large numbers of competitive research grants in only a few states, NSF spending is highly concentrated (see Figure 3). Seven states collectively win a majority of NSF's R&D funds. The NSF EPSCoR program aims to help states that have traditionally received fewer NSF funds to become more competitive in grant and center competitions. Collectively, the 25 NSF EPSCoR states (and Puerto Rico) received 11.5 percent of NSF's R&D portfolio in FY 2002, far less than California alone.

Outlook

The omnibus bill's cuts to the NSF budget are likely to be signed into law the week of December 6, bringing to a close a disappointing budget season for NSF.

(This analysis is one of a series of AAAS R&D Funding Updates on the FY 2005 congressional appropriations process. This analysis includes information on R&D in final FY 2005 appropriations for the National Science Foundation. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D by agency in FY 2005 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/rd>) in the "FY 2005 R&D" or the "What's New" sections.)

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Table. NSF R&D in FY 2005 Final Appropriations

**Table. National Science Foundation
Final Congressional Action on R&D in the FY 2005 Budget
(budget authority in millions of dollars)**

	FY 2004 Estimate	FY 2005 Request	FY 2005 Approved	House-Senate Conference		Chg. from FY 2004 Amount	Chg. from FY 2004 Percent
				Chg. from Request Amount	Chg. from Request Percent		
Research and Related Activities ¹ :							
Mathematical and Physical Sciences	1,092	1,116	1,074	-41	-3.7%	-17	-1.6%
Engineering	565	576	555	-21	-3.7%	-11	-1.9%
Biological Sciences	587	600	578	-22	-3.7%	-9	-1.6%
Geosciences	713	729	702	-27	-3.7%	-12	-1.6%
Computer and Info. Science and Eng.	605	618	595	-23	-3.7%	-9	-1.6%
Social, Behavioral and Econ. Scis.	204	225	216	-8	-3.7%	13	6.2%
US Polar Programs	342	350	347	-3	-0.8%	5	1.4%
Integrative Activities ²	144	160	154	-6	-3.7%	10	6.9%
Total Research and Related Activities ¹	4,251	4,372	4,221	-152	-3.5%	-31	-0.7%
Major Research Equipment	155	213	174	-40	-18.6%	19	12.1%
Education and Human Resources R&D	137	132	130	-2	-1.2%	-7	-5.4%
Less Non-R&D in R&RA ¹	-467	-491	-461	31	-6.2%	6	-1.3%
TOTAL NSF R&D	4,077	4,226	4,063	-162	-3.8%	-14	-0.3%
Non-R&D Programs and Activities:							
Non-R&D in R&RA ¹	467	491	461	-31	-6.2%	-6	-1.3%
Other Education and Human Res. ²	802	720	711	-8	-1.2%	-90	-11.3%
(Total E.H.R. Budget) ²	939	851	841	-10	-1.2%	-98	-10.4%
Salaries and Expenses	219	294	223	-71	-24.1%	5	2.1%
National Science Board	4	4	4	0	0.5%	0	2.3%
Inspector General	10	10	10	0	-0.8%	0	0.9%
Total NSF Non-R&D Activities	1,501	1,519	1,409	-110	-7.2%	-91	-6.1%
Total NSF Budget	5,578	5,745	5,473	-272	-4.7%	-105	-1.9%

AAAS estimates based on FY 2005 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2004 and FY 2005 request figures based on OMB R&D data and supplemental agency budget data.

Figures are rounded to the nearest million. Changes calculated from unrounded figures.

1 R&RA funds are not appropriated by directorate. The FY 2005 Approved directorate figures are AAAS estimates based on report language in the FY 2005 omnibus appropriations bill.

2 The FY 2005 request proposes to move funding for the Math and Science Partnerships from E.H.R. to Integrative Activities in R&RA; the FY 2005 omnibus bill rejects the proposal.
The table keeps funding in E.H.R. for all years for comparability.

FY 2005 Approved figures adjusted to reflect across-the-board reductions in the FY 2005 omnibus bill.

November 24, 2004 - AAAS estimates of final FY 2005 appropriations bills.