

NSF: FY 2006 Overview

Thomas N. Cooley, CFO and Director,
Office of Budget, Finance and Award
Management

November 9, 2005

Hosted by: Seton Hall University

Ask Us Early, Ask Us Often!!

✦ **Tom Cooley**

- Chief Financial Officer & Director,
Office of Budget, Finance & Award
Management
- tcooley@nsf.gov
- (703) 292-8200

Main Topics

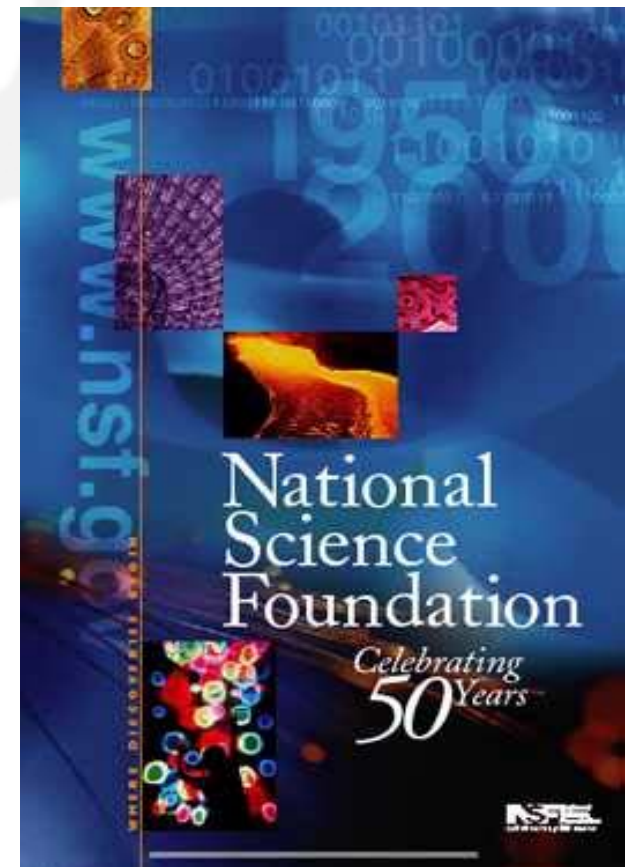
- Origins of NSF
- NSF in a Nutshell
- Congress and the Budget
- The NSF FY 2006 Budget Request
 - Priority Areas
- Current Proposal, Award and Funding Trends
- Challenges, Opportunities and the Long Hard Road Ahead
 - Administrative requirements issues



Origins of NSF

Origins of NSF

- “The Government should accept new responsibilities for promoting the flow of scientific knowledge and the development of scientific talent in our youth.”
 - Science, The Endless Frontier, 1945
- 1947: Congress Approves, Truman Vetoes: Agencies created in the meantime
- 1950: Compromise Bill Approved & Signed by Truman



NSF Act of 1950

- “To promote the progress of science...”
- NSB (24) and 1 Director, appointed by the President
- Encourage & develop a national policy for the promotion of basic research and education in the math, physical, medical, biological, engineering and other sciences
- Initiate & support basic scientific research in the sciences
- Evaluate the science research programs undertaken by agencies of the Federal government
- Provide information for S&E policy formation

NSF Vision

*Enabling the nation's future
through discovery, learning
and innovation.*

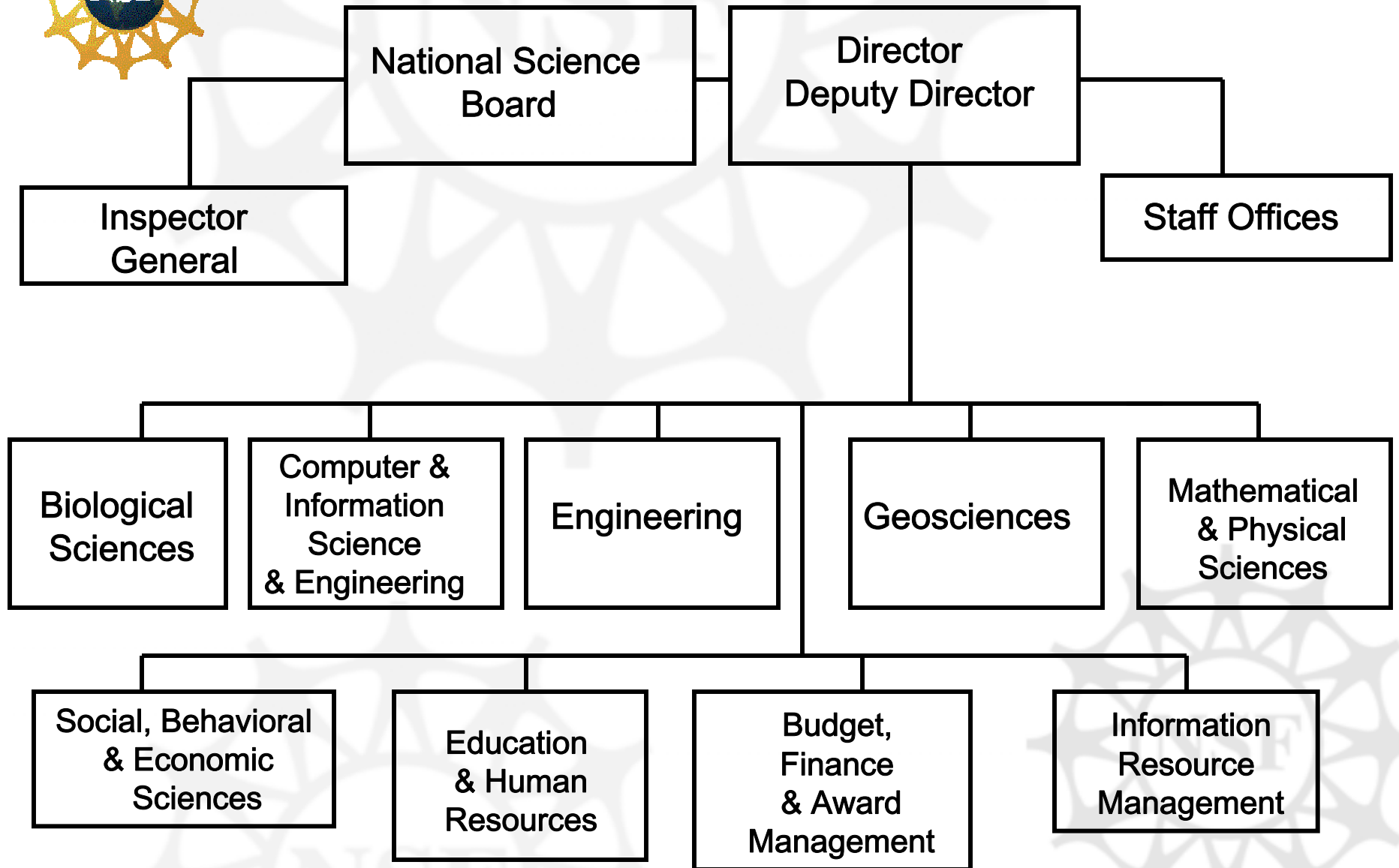


NSF in a Nutshell

- Independent Agency
- Supports basic research & education
- Uses grant mechanism
- Low overhead; highly automated
- Discipline-based structure
- Cross-disciplinary mechanisms
- Use of Rotators/IPAs
- National Science Board



National Science Foundation



NSF: Recent Personnel Changes

- Joseph Bordogna resigned as Deputy Director in June 2005 after nine years in the position
- Kathie Olson nominated as Deputy Director and confirmed by the Senate
- Dr. Richard Buckius, Division Director of the Chemical and Transport Systems, serving as Acting Assistant Director for the Engineering Directorate
- David Lightfoot named Assistant Director of Social, Behavioral and Economic Sciences (SBE)
- James Collins of Arizona State University named Assistant Director of Biological Sciences (BIO)
- Office of Cyberinfrastructure, formerly known as the Division of Shared Cyberinfrastructure, is now in the NSF Office of the Director
- Search for new EHR Assistant Director ongoing



Congress and the Budget:

**The Future is Dimly Lit
and**

For R&D the Future May be Dim

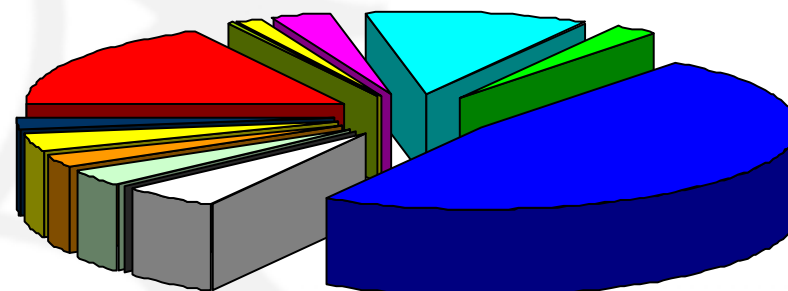


NSF's Key Congressional Players

- House and Senate Budget Committees
- Authorization Committees
 - House Science Committee/Sub-committees
 - Senate Health, Education, Labor & Pensions Committee
 - Senate Commerce, Science & Transportation Committee
- Appropriations Committees
 - New committee structure: House and Senate – new staff

Role of Appropriations Subcommittees

- In FY 2005, they dispersed > \$820 billion of discretionary funds.
- Work with Congressional leadership and members to address priorities of budget resolution.

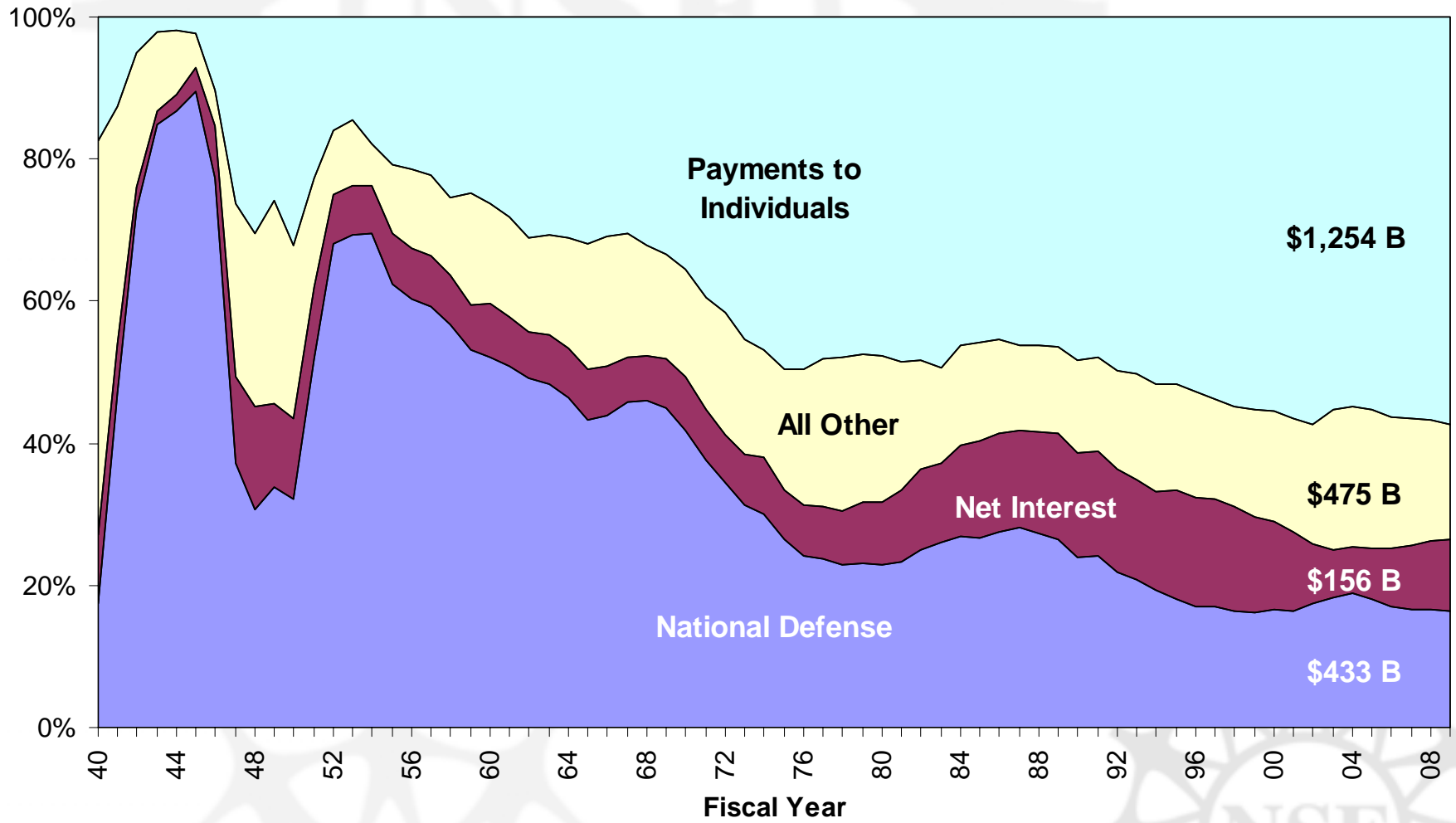


Subcommittee Changes for FY 2006

New Subcommittees for NSF

- Both the House and Senate reorganized their Appropriations Subcommittee structures.
- The House reduced its number of subcommittees from 13 to 10. As a result, NSF is now under the purview of the Science, State, Justice and Commerce Subcommittee.
- The Senate reduced its number of subcommittees from 13 to 12; NSF is now under the purview of the new Commerce-Justice-Science Subcommittee.
- The Subcommittees are distributing ~\$840 billion for FY 2006.

Percentage Composition of Federal Government Outlays



Total Outlays for FY 2004 = \$ 2,318 Billion

FY 2005 and 2006 R&D Budget Highlights

FY 2005

- DHS: 20 % over 2004
- Agriculture: 7.8 % over 2004
- Defense: 7.9 % over 2004
- NASA: 2.0 % over 2004
- NIH: 2.6 % over 2004
- Commerce: 4.6 % over 2004
- Energy: \$3.3 B in 2005
- USGS: 0.3 % under 2004
- EPA: 2.8 % under 2004

FY 2006*

- DHS: 23.8 % over 2005
- Agriculture: 15.6 % under 2005
- Defense: 0.6 % over 2005
- NASA: 4.9 % over 2005
- NIH: 0.5 % over 2005
- Commerce: \$565 M - NOAA
- Energy: \$3.0 B in 2006
- USGS: 4.6 % under 2005
- EPA: Decrease to \$569 M

* Impact of appropriations not yet known

R&D Budget

Budget Authority (dollar amounts in millions)	2006 Proposed*	Percent Change
Defense	70,839	1%
Health and Human Services	28,807	0%
NASA	11,527	5%
Energy	8,528	-1%
National Science Foundation	4,194	3%
Agriculture/USDA	2,039	-16%
Veterans Affairs	786	0%
Commerce	1,013	-11%
Homeland Security	1,467	24%
Transportation	808	8%
Interior	582	-5%
Environmental Protection Agency	569	-1%
Other	1,145	-8%
TOTAL	132,304	1%

* Impact of appropriations not yet known

The background features a large, faint watermark of the NSF logo, which consists of a gear-like circular pattern with the letters 'NSF' in the center.

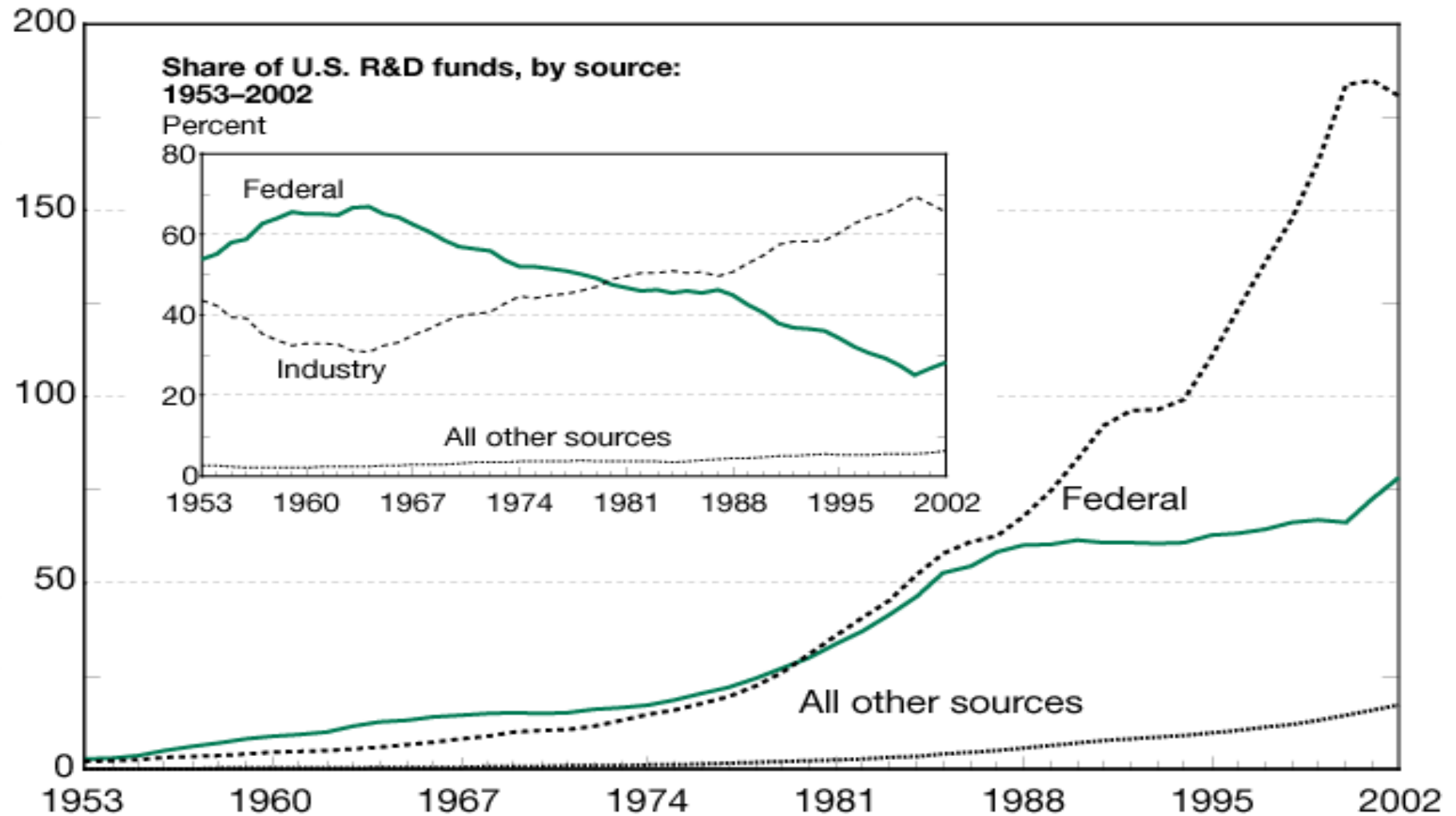
FY 2006 Federal Budget

**NSF (and other agencies) currently under
a Continuing Resolution until...**

A faint NSF logo watermark is visible in the bottom left corner of the slide.A faint NSF logo watermark is visible in the bottom right corner of the slide.

U.S. R&D, by source of funds: 1953–2002

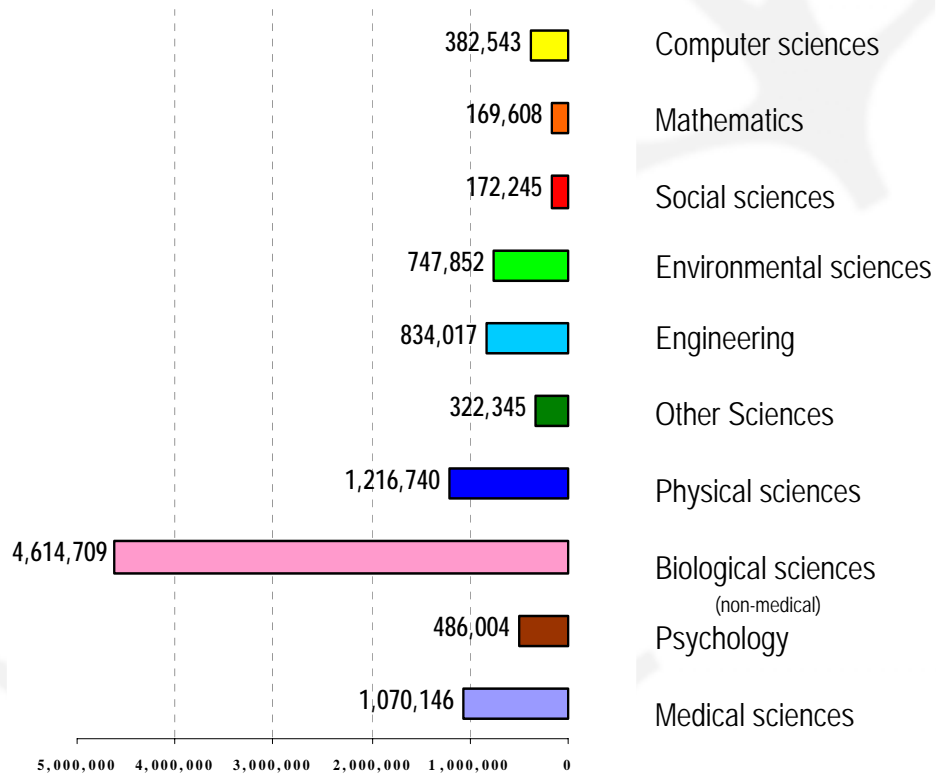
Billions of dollars



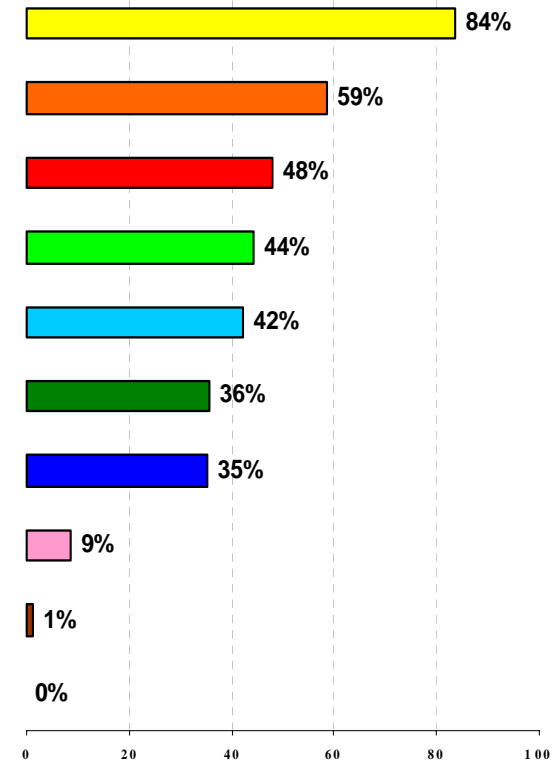
NOTE: Other sources include nonprofit, academic, and non-Federal government.

Federal Obligations for Basic Research at Academic Institutions, FY 2002

Total Federal Distribution (\$000)



NSF Share of Total Federal



NSF FY 2006 Request by Account (Dollars in Millions)

	FY 2005 Current	FY 2006 Request	Amount Change	Percent Change
Research & Related Activities	\$4,220.55	\$4,333.49	\$112.94	2.7%
Major Research	173.65	250.01	76.36	44.0%
Equipment & Facilities Construction				
Education & Human Resources	841.42	737	-104.42	-12.4%
Salaries & Expenses	223.20	269.00	45.8	20.5%
National Science Board	3.97	4	0.03	0.8%
Office of Inspector General	10.03	11.5	1.47	14.7%
Total, NSF	\$5,472.82	\$5,605.00	\$132.18	2.4%

NSF FY 2006 Research & Related Activities Request by Directorates (Dollars in Millions)

	FY 2005 Current	FY 2006 Request	Amount Change	Percent Change
Biological Sciences	\$576.61	\$581.79	\$5.18	0.9%
Computer & Information Science & Engineering	613.72	620.56	6.84	1.1%
Engineering	561.3	580.68	19.38	3.5%
Geosciences	694.16	709.1	14.94	2.2%
Mathematical & Physical Sciences	1,069.86	1086.23	16.37	1.5%
Social, Behavioral & Economic Sciences	196.9	198.79	1.89	1.0%
Office of International Science & Engineering	33.73	34.51	0.78	2.3%
U.S. Polar Research Programs	276.84	319.41	42.57	15.4%
U.S. Antarctic Logistical Support Activities	67.52	67.52	0	0.0%
Integrative Activities	129.91	134.9	4.99	3.8%
Total, R&RA	\$4,220.55	\$4,333.49	\$112.94	2.7%

NSF FY 2006 Budget Appropriations: House and Senate Marks

(Dollars in Millions)

Activity/Program	FY 2005 Current Plan	FY 2006 Budget Request	FY 2006 House Mark	FY 2006 Senate Mark
Research and Related	\$4,220.55	\$4,333.49	\$4,377.52	\$4,345.21
BIO	\$576.61	\$581.79		
CISE	\$613.72	\$620.56		
ENG	\$561.30	\$580.68		
GEO	\$694.16	\$709.10		
MPS	\$1,069.86	\$1,086.23		
SBE	\$196.90	\$198.79		
OISE	\$33.73	\$34.51		\$34.51
OPP	\$344.36	\$386.93		\$386.93
IA	\$129.91	\$134.90		
MREFC	\$173.65	\$250.01	\$193.35	\$193.35
Education & Human Resources	\$841.42	\$737.00	\$807.00	\$747.00
Salaries & Expenses	\$223.20	\$269.00	\$250.00	\$229.90
Office of Inspector General	\$10.03	\$11.50	\$11.50	\$11.50
National Science Board	\$3.97	\$4.00	\$4.00	\$4.00
NSF TOTAL	\$5,472.82	\$5,605.00	\$5,643.37	\$5,530.96

NSF FY 2006 Budget Appropriations: House Language

R&RA *"The recommendation does not include specific funding allocations for each directorate or for individual programs and activities."*

EHR: *"...disappointed by the reductions proposed in the budget in this account."*

- Specific EHR Division allocations incl. MSP at Request/Adds \$70M to Request
- Recognizes the value of informal education
- Encourages NSF to allocate funds to: Noyce, ATE, HBCU-UP, but no specific amounts & no other programs mentioned

NSF FY 2006 Budget Appropriations: Senate Language

R&RA: Request level for OPP/OISE, no other directorate

- Plant Genome \$100M
- Recommends Request for Nano
- NRAO \$51.4M

EHR: *"...urges NSF to work towards increasing the number of women, minorities, and other underrepresented groups to the greatest extent possible.."*

- Funds the Request: HBCU-UP, LSAMP, THRUST
- Recommends the Request: TCUP
- EPSCoR \$100M w/ \$65M for RII
- MSP + \$4M over Request (rejects MSP only at Education)



NSF Priority Areas



Biocomplexity in the Environment

http://www.nsf.gov/news/priority_areas/biocomplexity/index.jsp

◆ Fiscal year 2006 Areas of Emphasis:

- Earth Systems, Cycles and Pathways;
- Dynamics of Coupled Natural and Human Systems;
- Materials Use: Science, Engineering and Society;
- Microbial Genome Sequencing; and
- Ecology of Infectious Diseases.

◆ Two Solicitations will be posted by the end of 2005

- Carbon & Water in the Earth's System
- MUSES – Materials Uses: Science, Engineering & Society

Cyberinfrastructure

http://www.nsf.gov/news/priority_areas/cyberinfrastructure/index.jsp

◆ FY 2006 Areas of Emphasis:

- NSF's current cyberinfrastructure investments are guided by three principles:
 - Science and engineering opportunities must drive cyberinfrastructure investments;
 - Development of intellectual capital to develop, sustain and effectively utilize cyberinfrastructure is critical; and
 - Unwavering attention to interoperability and sustainability will provide economies of scale and scope as well as guard against the balkanization of science.

◆ HPC System Acquisition – NSF 05-625

- Proposal Deadline: February 10, 2006

Human & Social Dynamics

http://www.nsf.gov/news/priority_areas/humansocial/index.jsp

- Fiscal Year 2006 Areas of Emphasis:
 - **Agents of Change** – focuses on large-scale change in humanity and society (e.g., industrial globalization, disease epidemics and how we influence technological change);
 - **Dynamics of Human Behavior** – applies state-of-the-art methods and cross-disciplinary approaches to better understand the dynamics that influence human behavior and action; and
 - **Decision-Making, Risk and Uncertainty** – improve decision-making by studying risk perception and response to stimuli such as hazards and extreme events and the role of educational systems in that response.

- Next Solicitation: Spring 2006

Mathematical Sciences

http://www.nsf.gov/news/priority_areas/mathematics/index.jsp

- ◆ Fiscal Year 2006 Areas of Emphasis:
 - Fundamental Mathematical and Statistical Sciences;
 - Advancing Interdisciplinary Science and Engineering;
 - Mathematical and Statistical Challenges Posed by Large Data Sets;
 - Managing and Modeling Uncertainty;
 - Modeling Complex Nonlinear Systems; and
 - Advancing Mathematical Sciences Education.

- ◆ Innovations at the Interface with the Physical and Computer Sciences and Engineer – NSF 05-622
 - Proposal Deadline: December 20, 2005

Nanoscale Science & Engineering

http://www.nsf.gov/news/priority_areas/nano/index.jsp

➤ Fiscal Year 2006 Areas of Emphasis:

- Understanding and controlling the assembly of nanoscale materials;
- Research enabling nanoscale as the most efficient manufacturing domain, including fabrication of nanostructured materials and catalysts;
- Nanobiotechnology and nanobiomedicine;
- Innovative nanotechnology solutions for explosives detection and protection;
- Understanding and potential application of quantum effects and other nanoscale phenomena;
- Nanoelectronics beyond complementary metal-oxide superconductors and nanophotonics;
- New instrumentation and standards development; and
- Education and training regarding nanotechnology.

➤ [Active Nanostructures and Nanosystems \(ANN\) – NSF 05-610](#)

- Proposal Deadline: November 29, 2005

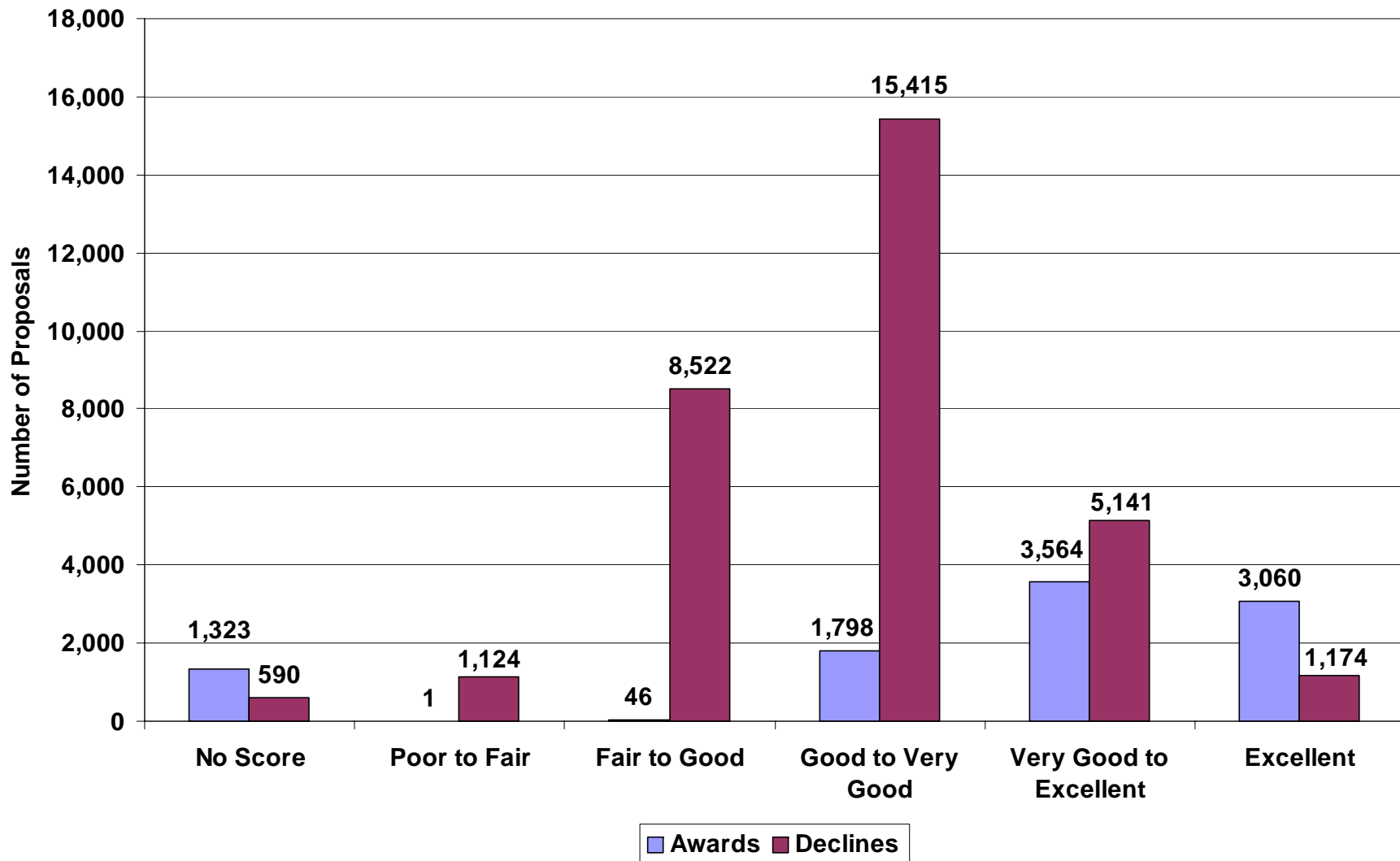


Current Proposal, Award and Funding Trends

NSF Recent Trends: FY 2001 to FY 2005

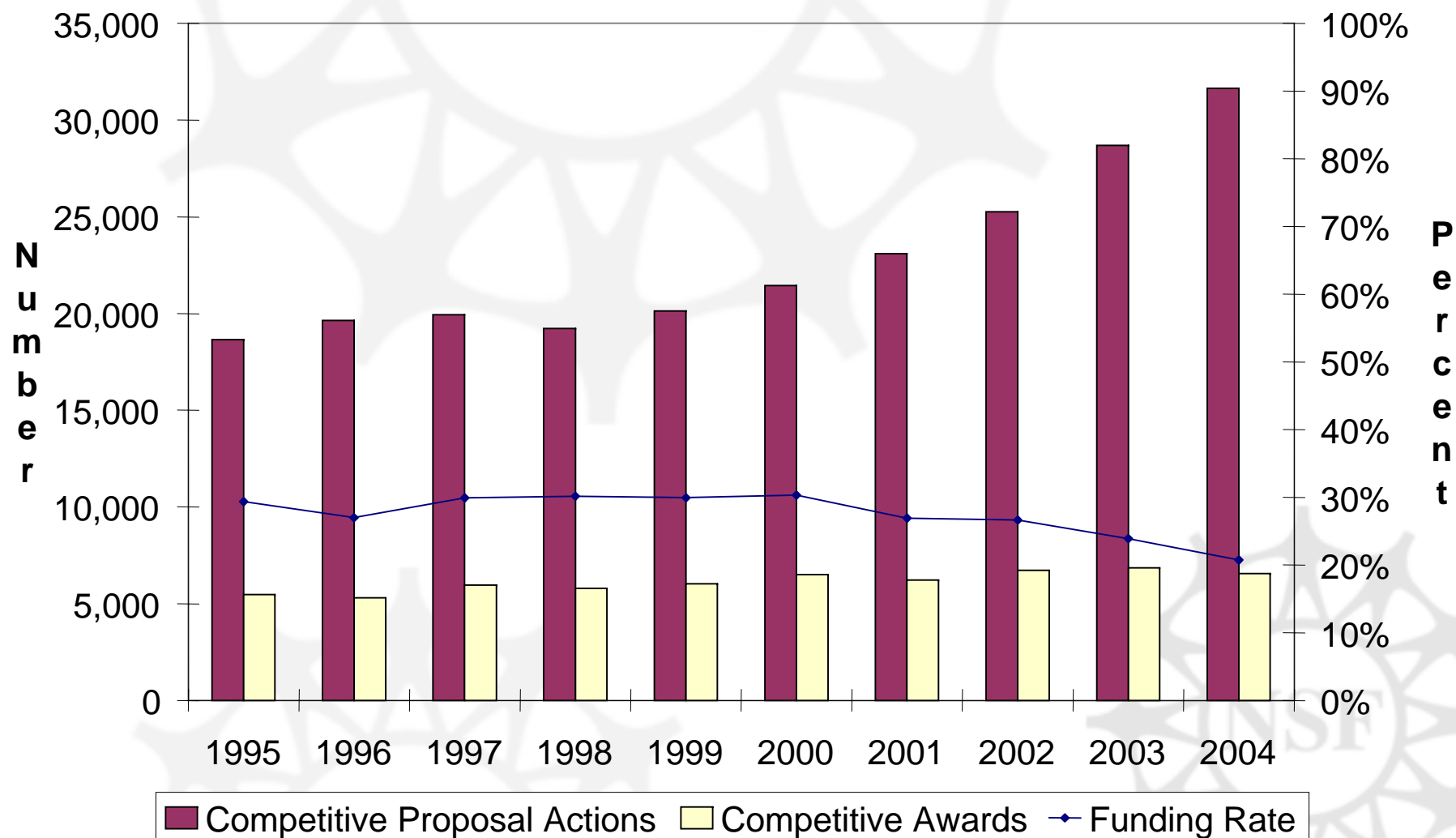
	FY01	FY02	FY03	FY04	FY05	Change from FY01 to FY05
Budget Obligations (Millions of Dollars)	\$4,532	\$4,774	\$5,369	\$5,656	N/A	N/A
Admin & Mgmt	\$214	\$231	\$251	\$291	N/A	N/A
# of Employees	1,220	1,242	1,244	1,301	N/A	N/A
# of Competitive Proposals	31,942	35,164	40,075	43,759	41,760	31%
# of Competitive Awards	9,925	10,406	10,844	10,380	9,794	-1%
Aver. Annual Res. Grant Size	\$113,601	\$115,666	\$135,609	\$139,000	\$143,669	26%
Aver. Research Grant Duration (years)	2.9	2.9	2.9	2.9	2.9	-

Distribution of Average Reviewer Ratings FY 2005

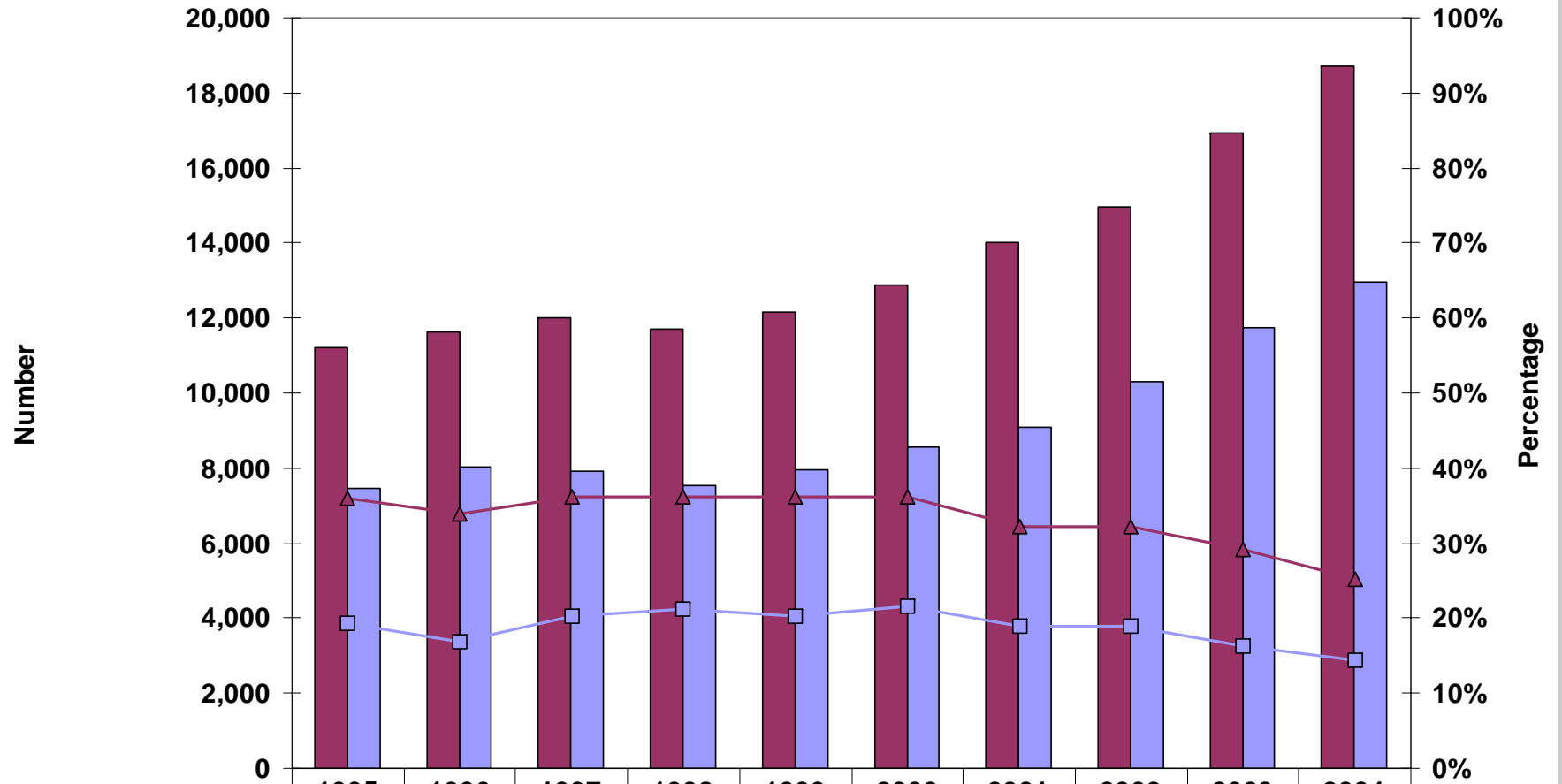


Number of Proposals: 31,966 Declines, 9,792 Awards

NSF Funding Rate for Competitive Awards - Competitive Research Grants

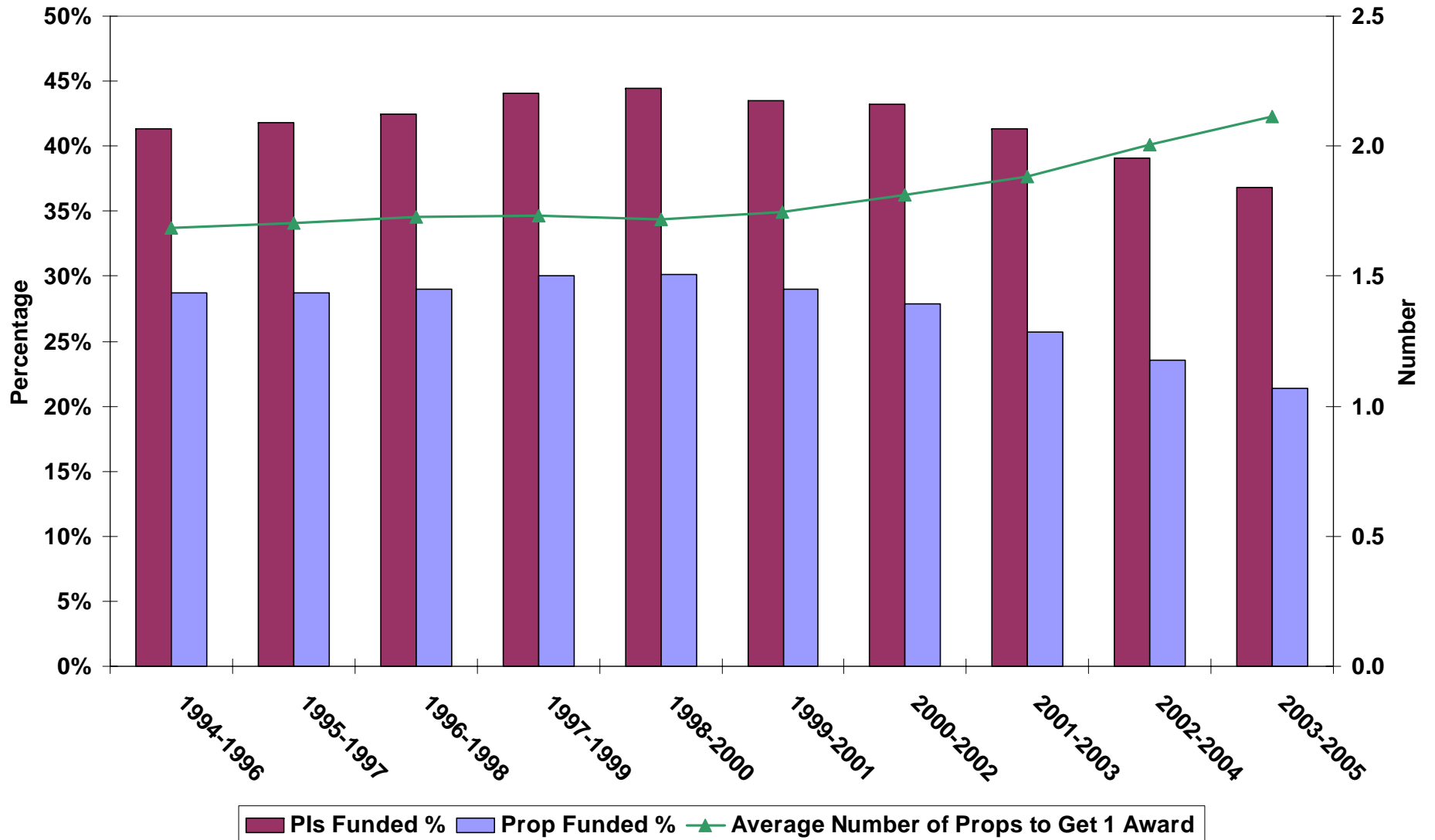


Research Grant Proposals by PI Type

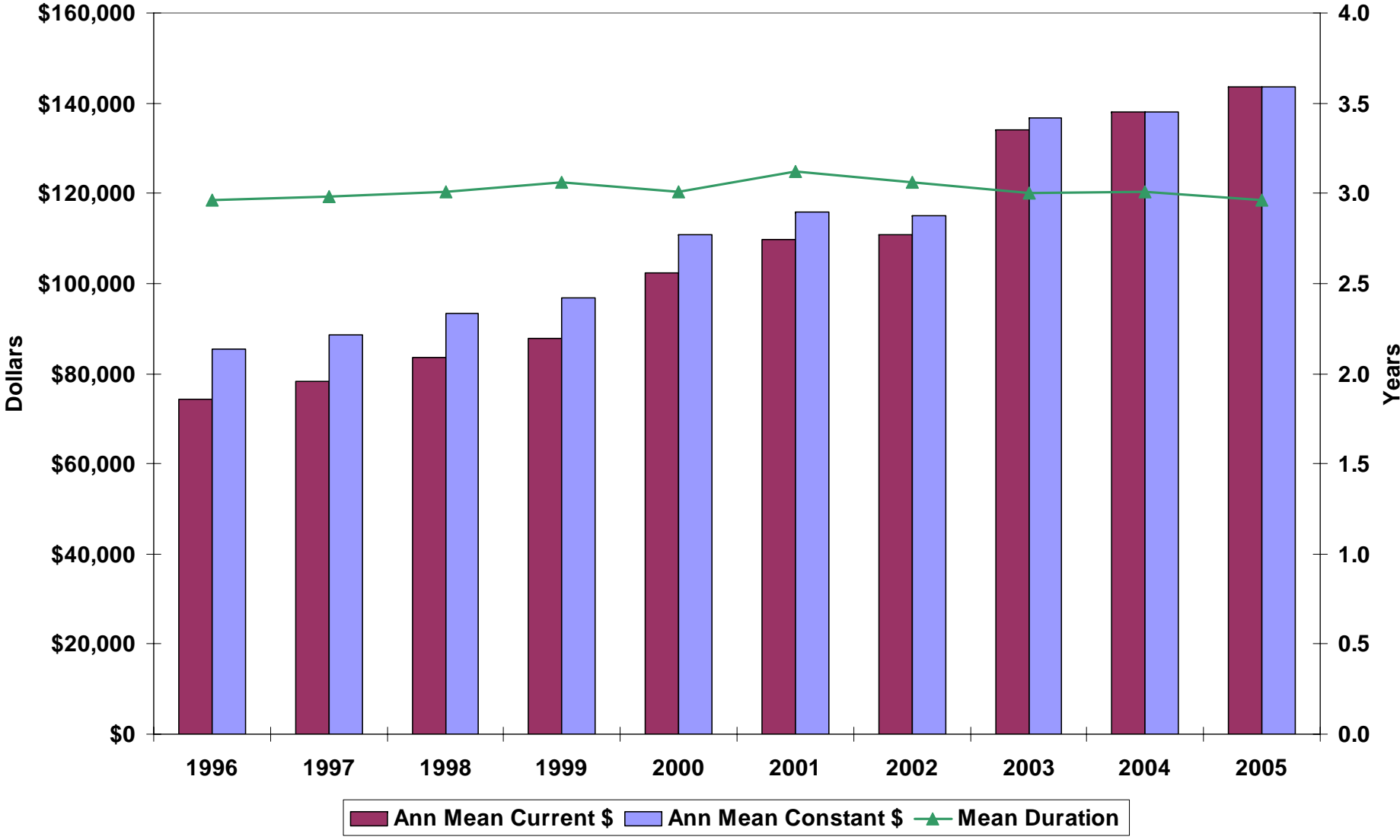


Proposals - Prior PI	11,203	11,635	12,026	11,693	12,172	12,885	14,013	14,965	16,944	18,700
Proposals - New PI	7,446	8,013	7,910	7,526	7,951	8,561	9,084	10,286	11,752	12,941
Funding Rate - Prior PI	36%	34%	36%	36%	36%	36%	32%	32%	29%	25%
Funding Rate - New PI	19%	17%	20%	21%	20%	22%	19%	19%	16%	14%

PI vs Proposal Funding Rate - Research Grants Based on 3 Year Intervals



NSF Competitive Award Size and Duration - Research Grants



*Based on estimated 2003-2004 Deflators

Key Documents

- FY 2006 NSF Budget Request
 - <http://www.nsf.gov/about/budget/fy2006/>
- Grant Proposal Guide (NSF 04-23)
 - http://www.nsf.gov/publications/pub_summ.jsp?ods_key=GPG
- Science and Engineering Indicators
 - <http://www.nsf.gov/sbe/srs/seind04/start.htm>
- When in doubt –
 - <http://www.nsf.gov/>



**Challenges, Opportunities
& the Long Hard Road
Ahead**

What's the latest on

- Challenges and Opportunities
 - Political Landscape/Deficit Reduction/Constrained Budgets
 - Continuing Management Challenges
 - Congress and the Budget
 - Research Business Models Subcommittee
 - Grants Policy Committee

Challenges

- Political Landscape/Deficit Reduction/Constrained Budgets
 - “War Time” Environment
 - Hurricane Katrina/Rita Relief
 - Economic/Job Uncertainty
 - Export Controls
- Continuing Management Challenges
 - Award Size, Duration and Success Rate
 - Financial Statement Audits (ours & yours)
 - Improper Payments

Hurricane Katrina Relief

- What is happening on the legislative front?
 - Two supplemental funding bills over \$60 billion.
 - A third supplemental is now at OMB for review – on the order of \$200 billion with a fourth supplemental probably early next year
- What is the higher education community in Washington doing?
 - Working with affected universities and host institutions
 - Working to enhance the Administration's third supplemental
- What is the focus of the efforts to help students and institutions?
 - Short-term needs of students and institutions
 - Financial Assistance to host institutions
 - Replacement of lost revenue to institutions
 - Assistance for rebuilding and revitalization
 - Incentives for students and faculty to return

Why do we . . . ?

➤ Several Reasons

- Congressional Intent (laws, regulations, authorizing language, etc.)
 - Example: Improper Payments Improvement Act of 2002
- Administration Practices or policies (OMB guidance, Administration's political platform, etc.)
 - Example: Nanotechnology Initiative
- Agency/Department Policy (grants policies, terms and conditions, operating guidance, etc.)
 - Example: NSF Cost sharing policy
- Community Drivers (NAS, FDP, COGR, AAU, NASCULGC, professional societies, etc.)
 - Example: Success rates, award size and duration

Award Size/Duration

- Surveys of PI's & Institutions in 2001
- Study Results Published July 2002
- New average grant size goal
 - From \$100K/3 years to \$250K/5 years
 - Over time: currently at \$138K/2.9 years
 - Declining success rates (33% → 25%)
- Trade-offs will have to be made

Financial Statement Audits

- Ours and Yours
 - Issue: Recording expenditures properly
- Federal Government
 - More scrutiny of FCTR's will require more documentation
 - Heightened scrutiny of A-133 reports
 - Site visits to high-risk awardees
- You Guys
 - Better accounting system; segregation of costs
 - Better documentation
 - Clean A-133 audits (OIG reviews/recommendations)

Improper Payments Information Act of 2002

➤ History

- The Federal Government makes more than \$45 billion in improper payments each year in programs that represent \$1 trillion in outlays
- IPIA requires agencies to report on programs or activities with estimated improper payments exceeding \$10 million and detail actions the agency is taking to reduce these improper payments
- OMB further expanded the definition: *An erroneous or improper payment includes any payment that was made to an ineligible recipient or for an ineligible service*
- NSF is the only research grant-making agency required to measure improper use of grant funds. All others are required to report entitlement or block grants programs

Improper Payments Information Act of 2002 (cont'd)

➤ Current Action

- NSF sampled improper payments on all site visits to high-risk grantees as identified in our Award Monitoring Program
- Continue innovative efforts for administering an improper payments program as part of a holistic grants monitoring approach, which assures accurate award institution identity and grant eligibility

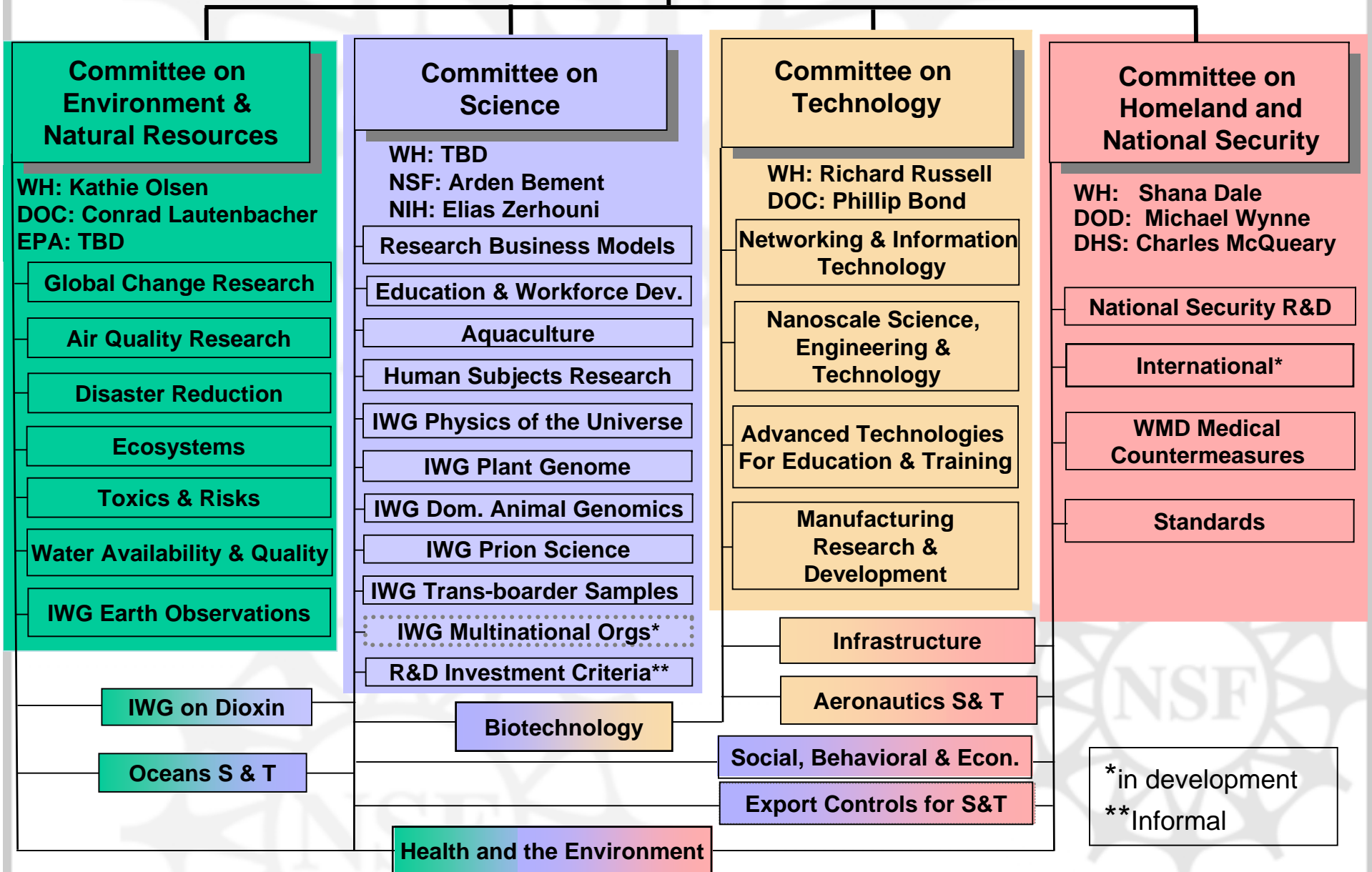
- ## ➤ Message: Federal Government following taxpayer funds down to the last dollar

Opportunities

- Research Business Models Subcommittee, Committee on Science, National Science and Technology Council
 - Coordinating across Federal agencies to address important policy implications arising from the changing nature of interdisciplinary and collaborative research, and
 - examining the effects of these changes on business models for the conduct of scientific research sponsored by the Federal government.
 - Working with the FDP, COGR, and others

Current NSTC Structure
April 2005

**NSTC
Director, OSTP**



*: in development
** Informal

Research Business Models (Cont')

SUCCESS!

- Three of Ten Initiatives Approved in January '05!
 - Dr. Marburger, Director, OSTP signed a memo to research agency heads to implement a policy to acknowledge multiple PIs
 - Dr. Kathie Olsen, Assoc. Dir. For Science, OSTP and the Controller, OMB signed a memo endorsing the FDP subagreement as an effective practice
 - FDP "research terms" were published in the Federal Register as a proposal to implement more broadly and routinely across all agencies (were due 2/29)
- See the RBM web site for the latest news
<http://rbm.nih.gov/>

Research Business Models (Cont')

CONTINUING PROGRESS!

Several Activities are in the Pipeline

- Streamlined and consistent progress report formats across agencies-
 - will be discussed at May FDP meeting
 - will also be published in the Federal Register for comments
- Enhanced A-133 compliance supplement on subrecipient monitoring
 - Describe risk management and streamlined review for "Prime" subrecipients with satisfactory audits
 - Possible implementation in the 2006 compliance supplement

Research Business Models (Cont')

Activities in the Pipeline (cont'd)

- Uniform Conflict of Interest policy
 - Request for Information may be published for comment this Spring, if it's not confused by NIH issues
 - When finalized, for assistance awards, it could be published in OMB Circular A-110
- Models of Support for Instrument Operations and Maintenance (O/M)
 - Will address a variety of effective practices in supporting O/M for mid-size instrumentation
 - May attempt to address both institutional and agency practices that enhance ability to deal with unanticipated future O/M requirements

Conflict of Interest

- New Intramural Policy at NIH
- Extramural policies in place at NIH and NSF
- Community seeking broader clarification, government-wide
- RBM attempting to provide such clarification

Federal Government Future Directions

➤ Consolidation:

- Started with payroll functions
- Spreading to include:
 - Financial accounting functions
 - Grants management functions
 - Procurement functions
 - Human resources functions

➤ Streamlining:

- Grants.gov: FIND and APPLY
- 424R&R dataset
- Terms and Conditions
- Project Reports

