

NSF and CAREER/Career Planning



**National Science Foundation
Directorate for Engineering**

**Acting Assistant Director for Engineering
Richard O. Buckius**

Outline

- **NSF overview**
- **CAREER program**
- **Career planning**



NSF Overview



NATIONAL SCIENCE FOUNDATION

Key NSF Personnel

→ **Arden L. Bement, Jr.** –
Confirmed NSF Director,
November 2004



→ **Kathie Olsen** – Confirmed
NSF Deputy Director, August
2005



NSF Recent Trends

FY 2001 – FY 2005

	FY01	FY02	FY03	FY04	FY05
Budget (\$ Millions) Obligations	\$4,532	\$4,774	\$5,369	\$5,652	\$5,472
# of Employees	1,220	1,242	1,244	1,301	N/A
# of Competitive Proposals	31,942	35,164	40,075	43,759	41,760
# of Competitive Awards	9,925	10,406	10,844	10,380	9,794
Avg. Size Annual Research Grant	\$109,486	\$110,618	\$133,948	\$138,101	\$143,679
Avg. Duration (Yrs) Research Grant	3.12	3.07	3.00	3.01	2.96



OSTP/OMB 2006 Research Priorities

- **Homeland Security**
 - ◆ Prevention, Detection, and Remediation of Nuclear, Chemical, and Biological Threats
 - ◆ Medical Countermeasures and Bio-surveillance Networks
- **Networking and Information Technology**
 - ◆ Supercomputing and Cyberinfrastructure
- **Nanotechnology via National Nanotechnology Initiative (NNI)**
- **Priorities of Physical Sciences**
 - ◆ Fundamental Understanding of Phenomena
 - ◆ Instruments and/or Facilities
- **Biology of Complex Systems**
- **Climate, Water, and Hydrogen Research and Development**



NSF Priority Areas

→ Biocomplexity in the Environment

- ◆ Biocomplexity in the Environment seeks a more complete understanding of the dynamic interactions among living things and physical processes in the environment.



→ Cyberinfrastructure

- ◆ Cyberinfrastructure contributes to the development of a widely accessible information technology (IT) backbone that will ultimately enable innovative science and engineering research and education as well as next-generation IT capabilities.



NSF Priority Areas (cont'd)

→ Human & Social Dynamics

- ◆ Human and Social Dynamics research fosters breakthroughs in understanding human action and development, as well as knowledge about organizational, cultural and societal adaptation and change.



→ Mathematical Sciences

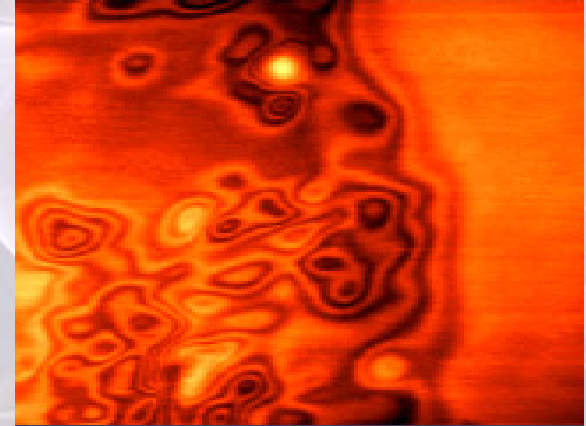
- ◆ Mathematical Sciences research enables progress across disciplines through advances in math and statistics research and supports the development of a mathematically literate workforce.



NSF Priority Areas (cont'd)

→ Nanoscale Science and Engineering

- ◆ Nanoscale Science and Engineering research promises a better understanding of nature, the development of novel products, improved efficiency in manufacturing, sustainable development, better healthcare and improved human performance.



NSF '06 Priority Areas

- **Biocomplexity and the Environment:** **\$84 million**
- **Nanoscale Science and Engineering:** **\$243 million**
- **Mathematical Sciences:** **\$89 million**
- **Human and Social Dynamics:** **\$29 million**



OSTP/OMB 2007 Research Priorities

- **Homeland Security**
- **High-End Computing and Networking R&D**
- **National Nanotechnology Initiative**
- **Priorities of Physical Sciences**
- **Understanding Complex Biological Systems**
- **Energy and Environment**



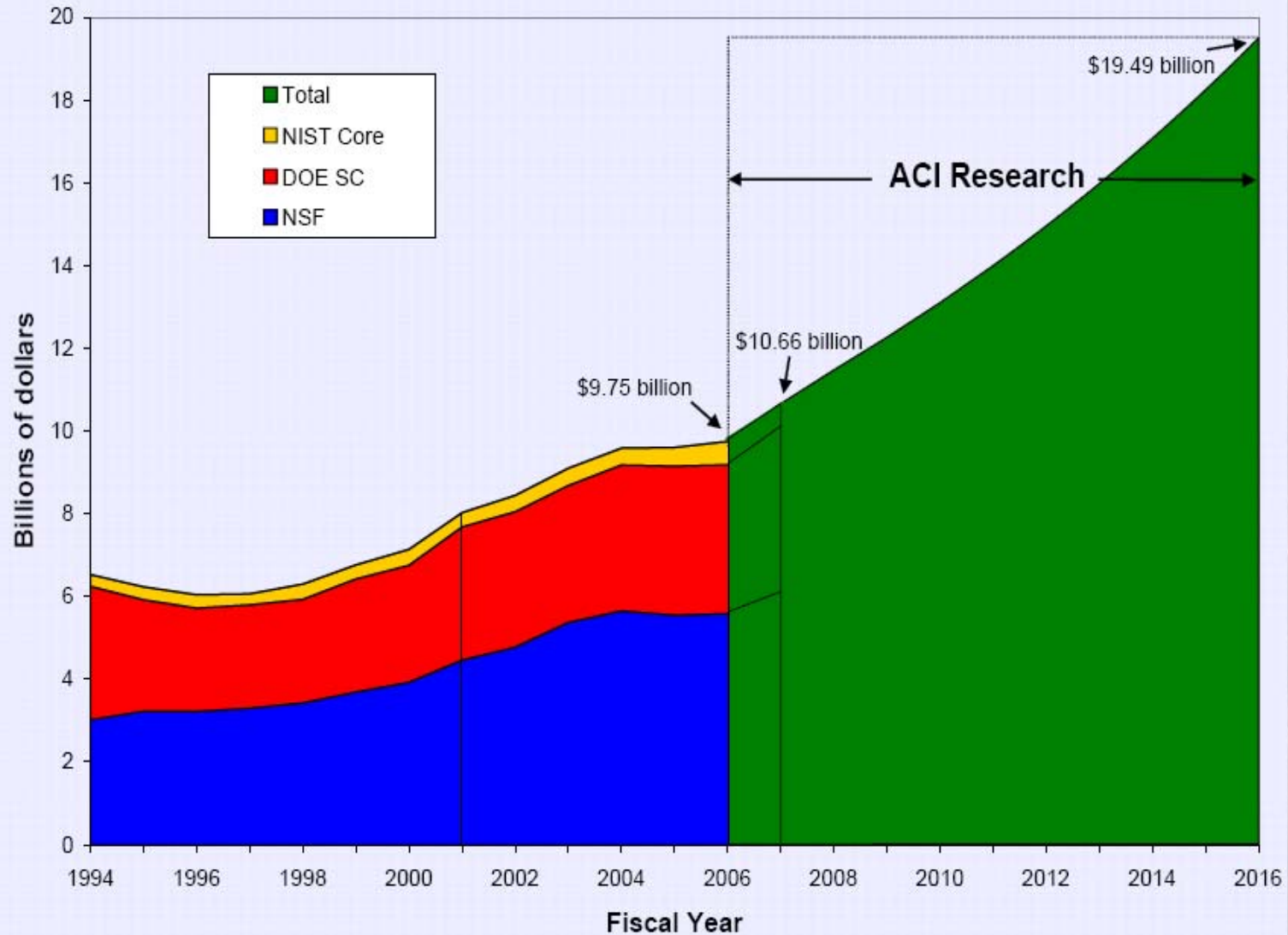
NSF FY07

- The centerpiece of the *American Competitiveness Initiative* (ACI - <http://www.whitehouse.gov/stateoftheunion/2006/aci/>) is the commitment to double investment over 10 years in key Federal agencies that support basic research programs in the physical sciences and engineering.
- Specifically, the ACI doubles, over 10 years, funding for innovation-enabling research at key Federal agencies that support high-leverage fields of physical science and engineering at NSF, DOE Office of Science, and NIST.
- The NSF funds “ ... potentially transformative basic research in areas such as nanotechnology, advanced networking and information technology, physics, chemistry, materials science, mathematics and engineering.”



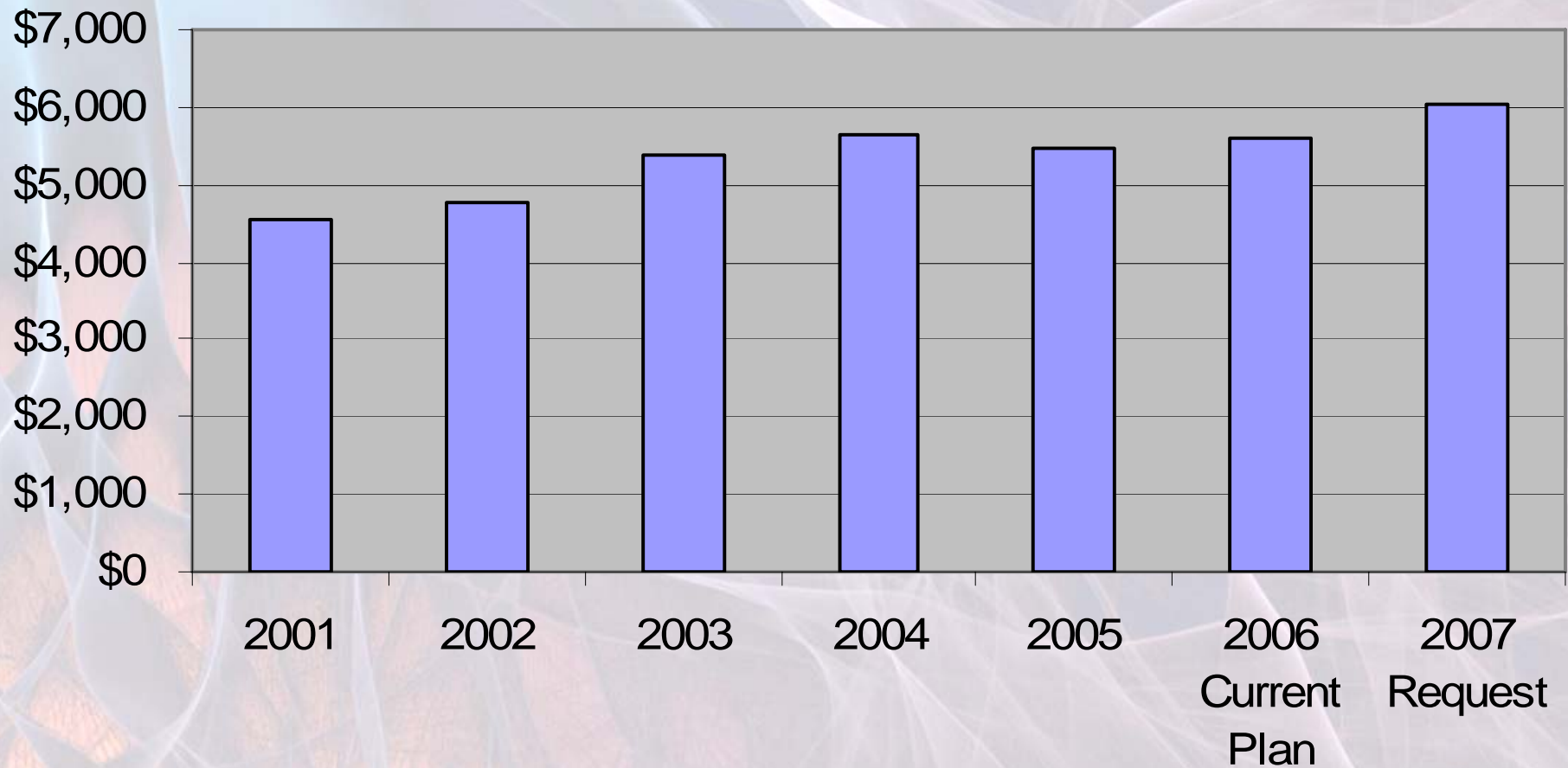
American Competitiveness Initiative

FY 2007 – FY 2016



NSF Budget 2001-2007

Dollars in Millions



NSF Research and Related Activities

FY 2007 Request by Directorate (Dollars in Millions)

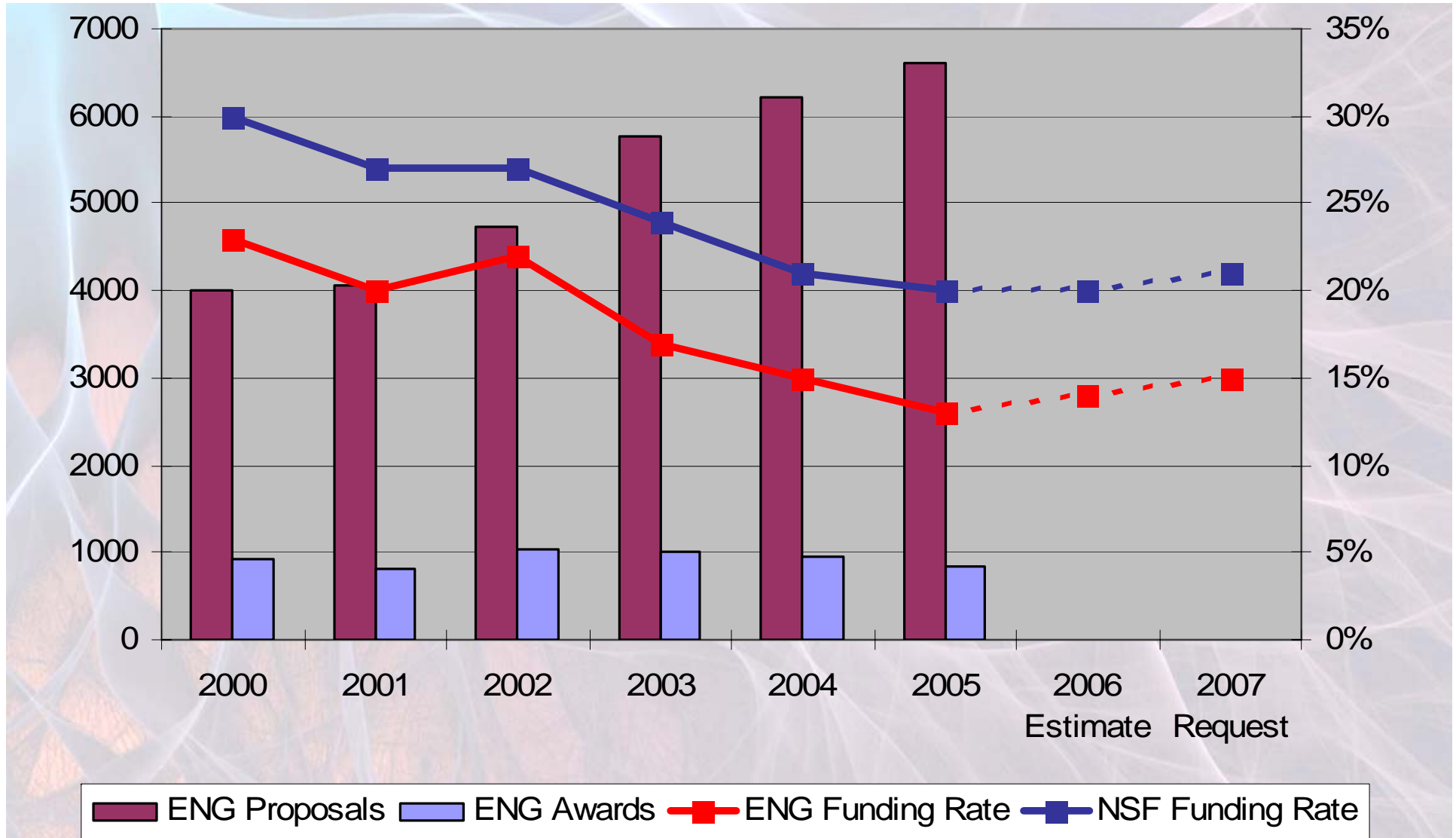
	FY 2006 Current Plan	FY 2007 Request	Amount Change	Percent Change
Biological Sciences	\$576.69	\$607.85	\$31.16	5.4%
Computer & Information Science & Engineering	496.41	526.69	30.28	6.1%
Engineering (includes SBIR/STTR)	580.92	628.55	47.63	8.2%
Geosciences	702.83	744.85	42.02	6.0%
Mathematical & Physical Sciences	1,085.45	1,150.30	64.85	6.0%
Social, Behavioral & Economic Sciences	199.91	213.76	13.85	6.9%
Office of Cyberinfrastructure	127.12	182.42	55.3	43.5%
Office of International Science and Engineering	34.52	40.61	6.09	17.6%
U.S. Polar Research Programs	322.68	370.58	47.9	14.8%
U.S. Antarctic Logistical Support Activities	66.66	67.52	0.86	1.3%
Integrative Activities	137.12	131.37	-5.75	-4.2%
Arctic Research Commission	1.17	1.45	0.28	23.9%
Total, R&RA	\$4,331.48	\$4,665.95	\$334.47	7.7%

Totals may not add due to rounding.



ENG and NSF Funding Rates

Research Grants



CAREER Program

Faculty Early Career Development Program



CAREER Overview

- **The Faculty Early Career Development (CAREER) Program is an NSF-wide activity.**
- **It is NSF's most prestigious awards in support of early career-development activities of teacher-scholars “who most effectively integrate research and education within the context of the mission of their organization.”**
- **Such activities should build a firm foundation for a lifetime of integrated contributions to research and education.**



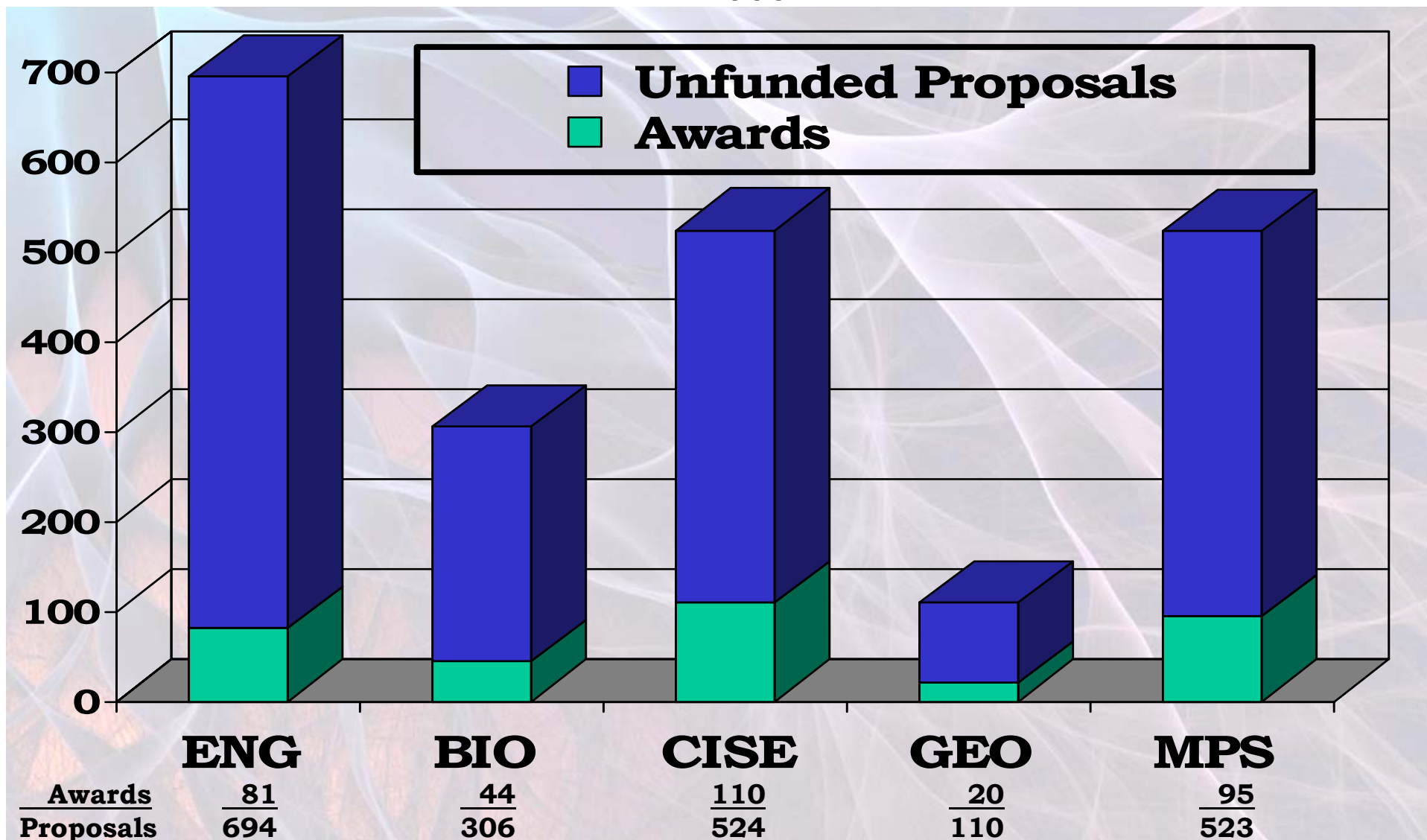
CAREER Overview

- CAREER are NSF's awards for new faculty members.
- The size and duration of CAREER awards are commensurate with PI's needs.
- Awardees are selected on the basis of their plans to develop highly interactive and effective research and education careers.
- Increased participation from those traditionally underrepresented in science and engineering needed.



CAREER Program Awards by Directorate

FY 2005



CAREER Summary

→ Critical Elements

- ◆ Research *AND* education
- ◆ Panel review – bring reviewers up to speed
- ◆ Read current announcement - rules change
- ◆ PI specifies program for initial assignment

→ Logistics

- ◆ Check converted version of proposal
- ◆ About 1 percent of proposals returned “unreviewed”



Career Planning



Career Planning

- **General Comments**
- **Teaching Career**
- **Research Career**
- **Professional Career**
- **Proposals**



Faculty Characteristics

(Boice 1991, extremes)

Quick Starters

- Seek social support/advice
- More time on scholarly work
- Exemplary teachers
 - ◆ positive attitude toward students
 - ◆ less time preparing for class
- Complain less

Unsuccessful

- Confused about expectations
- Feel socially isolated
- Scholarly work only verbal priority, low actual time
- Defensive teachers
 - ◆ lecture only
 - ◆ content focus
 - ◆ avoid bad evaluations



Research and Teaching

- **Must be multidimensional - research , teaching, and professional activities**
- **Teaching**
 - ◆ **A key element in any university**
 - ◆ **Significant portion of your effort and time is dedicated to teaching**
 - ◆ **Have a plan for your teaching career**
 - ◆ **Easy part of all the activities of a faculty member**
 - ◆ **Due to its regular and structured nature, it must be balanced with all the other activities**
 - ◆ **Think of teaching as a recruiting tool for future graduate students**



Research and Teaching

→ Research

- ◆ Direct your vision at the international research community, not the local university
- ◆ Must interact with community at all levels
- ◆ Have a plan for your research career, and it usually involves a number of different areas simultaneously
- ◆ Take advantage of your unique opportunities – scholarly, local, regional
- ◆ Must be a significant portion of your effort
- ◆ Must dedicate regular time to your scholarship

→ Professional Career

- ◆ Includes local, national and international activities
- ◆ Have a plan for your professional activities



Successful Proposals

- **Stress the novel aspects of your approach**
- **Differentiate your work from that done by others**
- **Respond to all aspects of the program description**
- **Support your ideas with references/preliminary results**
- **Describe applications that could result from the research**
- **Show where the research might lead**
- **Include figures and graphs to facilitate understanding**
– convince the reader of the importance and impact of the work



Finding an Appropriate Program

- Check list of currently funded programs
 - Use FastLane
 - Read titles and abstracts on the Website
- Find a fit
 - Contact program director
 - Prepare a one-page abstract
 - Specify appropriate program on cover sheet
- Consider initiatives and special programs
 - NSF initiatives
 - NSE initiative



NSF Merit Review Criteria

→ Intellectual merit

- Importance in advancing understanding in a field
- Creativity and novelty of approach
- Qualifications of investigators
- Completeness of research plan
- Access to resources

→ Broader impacts

(see <http://www.nsf.gov/pubs/2002/nsf022/bicexamples.pdf>)

- Promotion of teaching and training
- Inclusion of underrepresented minorities
- Enhancement of infrastructure and partnerships
- Dissemination of results
- Benefits to society



Project Summary

- **Most important section (initial impressions, often used for reviewer selection)**
- **Contains goals and scope of study, significance, brief description of methods, hypotheses and expected results**
- **Clear, concise, accurate, exciting**
- **Particularly important with panel reviews**
- **Conventions vary by field – seek samples**



Think Like a Reviewer

- **Make the reviewer want to read on**
- **Eliminate typographical errors**
- **Eliminate erroneous references**
- **Do not exceed page length guidelines**
- **Do not use too small font**
- **Don't be overly dramatic**



Additional Comments

- When you are writing, **WRITE!**
- Ask a colleague to review your proposal
- Respected researchers in your field will read your proposal – make a good impression
- Get help with ‘boilerplate’
- Respect intellectual property, give appropriate credit
- Don’t promise too much
- Volunteer to serve as review
- Federal fiscal year begins October 1



Thank you



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