University of Southern California

USC

USC Viterbi School of Engineering

Academic Career Workshop

Writing Research Proposals

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Professor, USC

Types of Proposals

- **Research**
  - **SIRP**
  - **Multi-investigator**
- **Research Infrastructure**
- **Education**
  - **Curriculum Development**
  - **Educational Innovation**
- **White Paper, Special Projects, RAPID, EAGER, Travel, Workshops, Postdoctoral Fellowships, Faculty Fellowships (industry or foundations), etc.**
- **Supplements – standard, REU, RET, ROA**
- **SBIR, STTR**

Adapted from Bryant York, PSU

Meta-Tips

- Know the agency's organizational structure
- Know your agency's programs
  - Solicited vs. unsolicited proposals
- Review the Summary of Awards
  - Past trajectory
- Know your program officer and division director
  - Current trajectory
- Participate in agency-sponsored workshops
  - Help set future trajectories
- Serve on review panels and as an ad hoc reviewer
  - Read lots of proposals
  - Practice good citizenship
- Develop good proposal-writing habits

Adapted from Bryant York, PSU

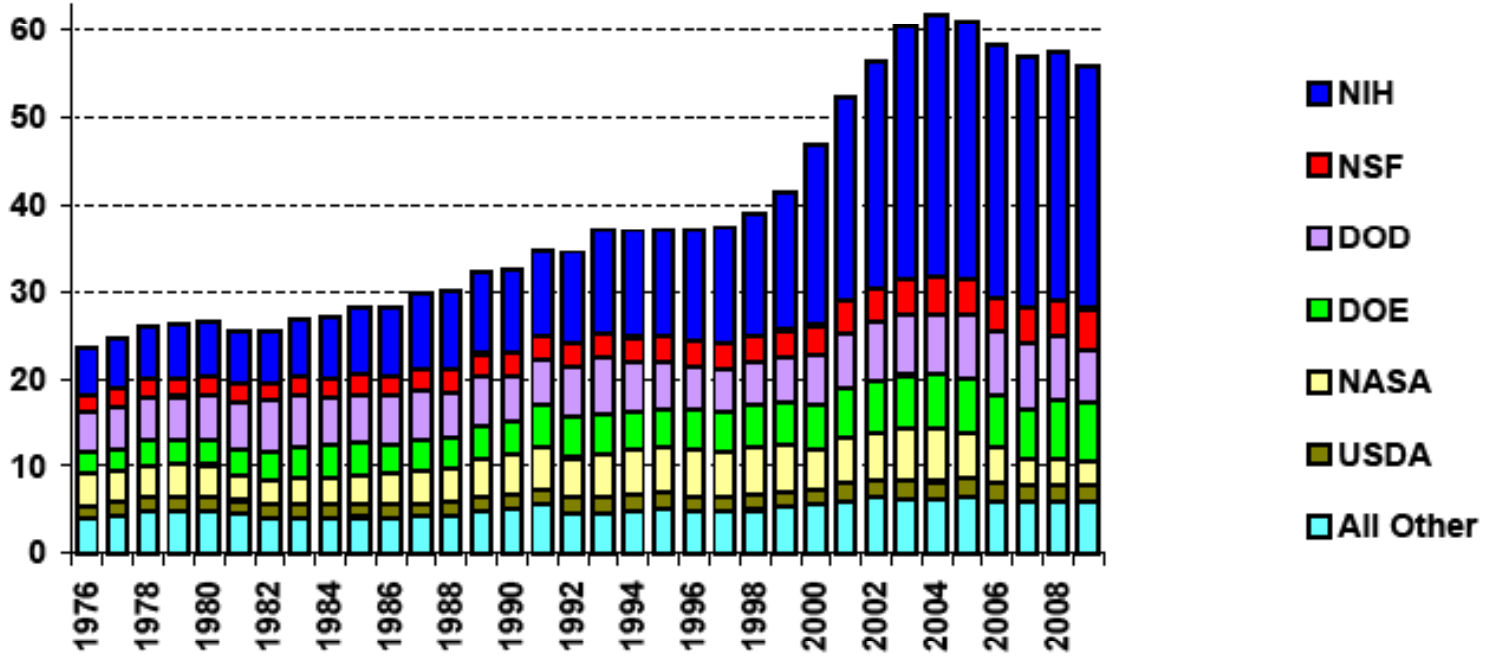
Outline

- ✓ Types of Proposals and Meta-Tips
- General Funding Agency Information
  - DOD
  - NSF
- Research Proposal Preparation
- Tips for Writing Successful Proposals
- Some Fatal Flaws in Proposal Writing

Trends in Research by Agency, FY 1976-2009 *

in billions of constant FY 2008 dollars

ACA and ARRA to grow NSF, DOE, NASA, NIST



2009 DOD does not show adds Congress will insert in the appropriations bill

Source: AAAS analyses of R&D in annual AAAS R&D reports.
* FY 2009 figures are latest AAAS estimates of FY 2009 request. Research includes basic research and applied research. 1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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AAAS

Principal DOD Basic Research Funding Offices

Service Research Offices (OXR's)	
Army Research Office (ARO)	www.aro.army.mil/
Air Force Office of Scientific Research (AFOSR)	www.afosr.af.mil/
Office of Naval Research (ONR)	www.onr.navy.mil/
Army Medical Research and Materiel Command	https://mrmc-www.army.mil
CDMRP (Congressional adds)	http://cdmrp.army.mil
TATRC (Congressional adds)	www.tatrc.org/
Army Research Inst for Behavioral & Social Sciences	www.hqda.army.mil/ari
DARPA Defense Science Office (DSO)	www.darpa.mil/dso/
Microsystems Technology Office (MTO)	www.darpa.mil/mto/
Information Processing Techniques Office (IPTO)	www.darpa.mil/ipto/
Defense Threat Reduction Agency (DTRA)	www.dtra.mil/

AMRMC	Army Medical Research and Material Command
DARPA	Defense Advanced Research Project Agency
DTRA	Defense Threat Reduction Agency
CDMRP	Congressionally Directed Medical Research Program
TATRC	Telemedicine and Advanced Technology Research Center

Source: Jim Murday, USC

Defense Research Sciences (DRS) Program

What: **Largest source of DOD funding for University research**

Majority invested in single investigator efforts (as opposed to URI)

OXR DRS Broad Area Announcements (BAA) are relatively generic

OXR Program Officer (PO) key to success (presuming convincing proposal)

Each PO has focused interests, coupling science with some military need

Each Service has specifically identified program interests (websites and BRP)

How Much: typically $100 – 200K/yr for three years (with continuation possible)

OXR programs typically have ~20% turn over each year

When: **Initial "white paper" useful (sometimes required)**

Proposals nominally anytime, but spring/early summer to be timely

Most funding decisions processed in fall, early winter – after appropriation bill

Where: **Mix of paper and electronic (grants.gov), see for instance**

http://www.onr.navy.mil/Contracts-Grants.aspx

	FY10
ARO	~$173M
AFOSR	~$321M
ONR	~$414M
DARPA	~$226M

BRP: Basic Research Plan

Source: Jim Murday, USC

Other DOD S&T Programs beyond DRS

CDMRP	Congressional Directed Medical Research Programs
DMRDP	Directed Medical Research and Development Program
MURI	Multidiscipline University Research Initiative
HEL MRI	High Energy Laser, Multidisciplinary Research Initiative
GICUR	Government-Industry Co-sponsorship of University Research
DURIP	Defense University Research Instrumentation Program
DTRA	Defense Threat Reduction Agency
CBDP	Chemical, Biological Defense Program
HPC	High Performance Computing
YIP	Young Investigator Program
PECASE	Presidential Early Career Award in Science and Engineering
NDSEG	National Defense Science and Engineering Graduate
NDEP	National Defense Education Program
STTR/SBIR	Small Business Technology Transfer / Small Business Innovative Research
DEPSCOR	Defense Experimental Program to Stimulate Competition

Source: Jim Murday, USC

Defense Advanced Research Projects Agency (DARPA)

www.darpa.mil

What: **Research and technology where risk and payoff are both very high, and success may provide dramatic advances for military roles and missions**

Defense Science Office (DSO)	Microsystems Technology Office (MTO)
Information Processing Technology Office (IPTO)	Strategic Technology Office (STO)
Transformational Convergence Technology (TCTO)	Tactical Technology Office (TTO)

- Larger programs available than at OXRs (some managed by OXR POs)
- Team with industrial partners
- First deliverable milestone in 12-18 months; "prototype" in 3-5 years

How much: $100K – $10M/yr in DSO, as an example

DARPA program managers often fund studies ("seedlings") as initial research to determine if a more formal program is appropriate.

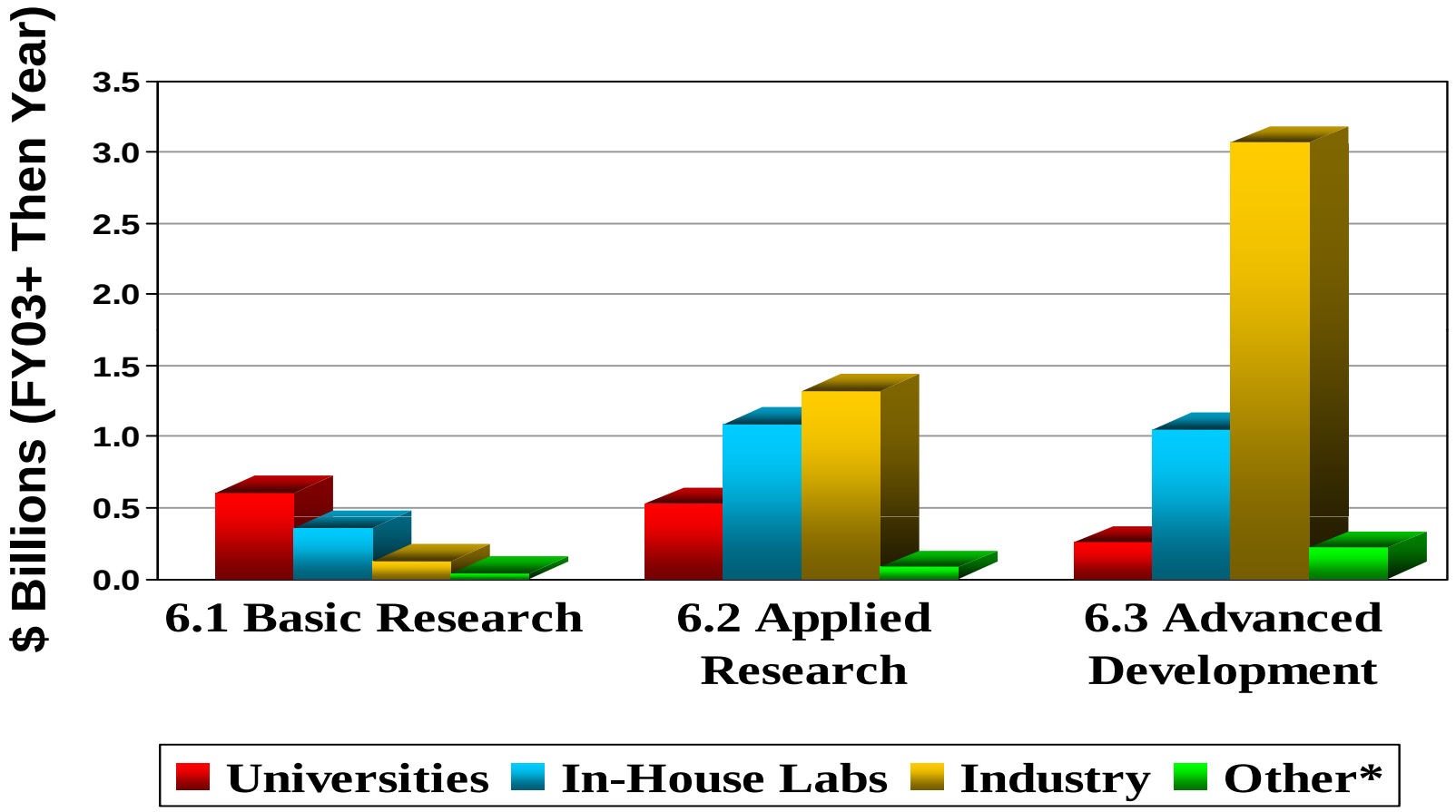
When: Variable—need to watch for program topic announcements
Involvement in topic-formative workshops very helpful

Where: www.darpa.mil/funding_opportunities.html
www.darpa.mil/index.html#tech

	FY10
6.1	~$226M
6.2	~$1,235M
6.3	~$1,640M

Source: Jim Murday, USC

Recipients of DOD S&T Funds

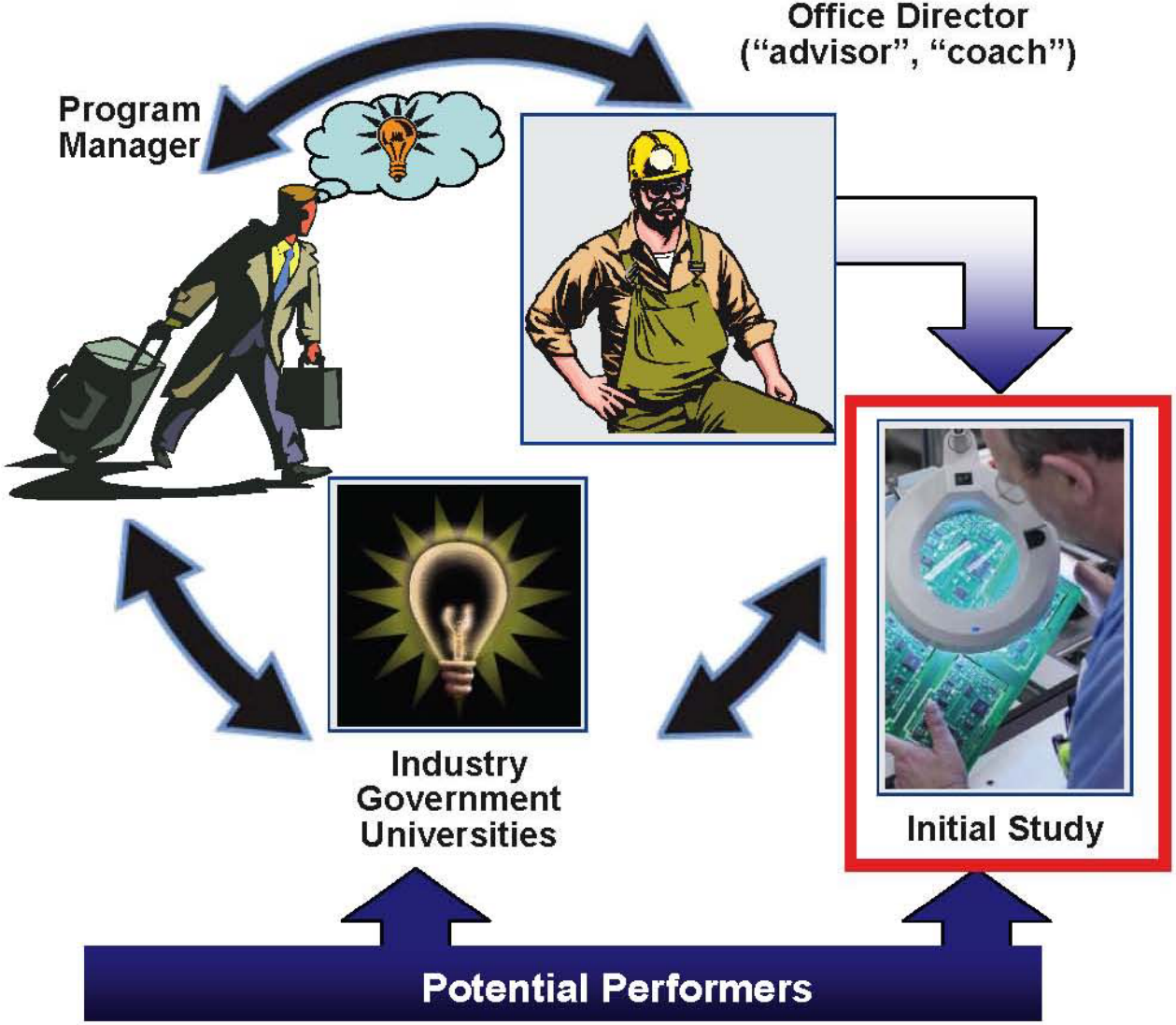


***Includes non-profit institutions, State & local govt., & foreign institutions**

Source: National Science Foundation Report, Volume 48 (FY 2003)

From OSD R&D Overview, Dr. Lewis Sloter

"Seedlings"



PMs Receive White Papers from all sources (academia, industry, national labs).

Some are passed to other PMs.

Some are read and discarded

Some are interesting to PMs

- Related to a possible future program
- Trigger interest in a future program
- Solve a key challenge emerging in an existing program

PM works with Office Director, Proposer, other PMs to refine interest, define a decisive short-term study, make funding decision

Key Step : Initial White Paper

http://www.darpa.mil/mto/programs/yfa2007/presentations/Seedlings_and_BAAs.pdf

White Paper for Seedling

Industry
Government
Universities

What is a White Paper?

The goal of a white paper is to capture the interest of a PM in your idea. Successful white papers are :

Short and Focused
Identify a Problem
Describe a Solution
Focus on Key Challenge and Effort Needed
Outline a Decisive Plan
Typical length ~ 1 year. Typical Budget ~$300K
Include some graphics, and possibly a Penta-Chart

http://www.darpa.mil/MTO/solicitations/baa09-36/files/attachment2.ppt

When to Send? Anytime. We receive white papers almost every day of the year.

http://www.darpa.mil/mto/programs/yfa2007/presentations/Seedlings_and_BAAs.pdf

DOD Young Investigator Programs (YIP)

What: Outstanding new faculty members at institutions of higher education, to support their defense-related research (of interest to funding agency), and encourage their teaching/research careers

- ARO, AFOSR, ONR: must be US citizen / permanent resident
- DTRA: has no citizenship or residency requirement
- DARPA: requires clearance eligibility
- Services/DTRA - received Ph.D. or equivalent degrees within the last five years
- DARPA – tenure track assistant/associate professors within 6 years of appointment

How Much: ARO - not to exceed $60K/yr for three years
AFOSR - $120K/yr for three years
ONR - up to $170K/yr for three years, additional support possible for capital equipment or collaborative research with a Navy laboratory
DTRA - $100K/yr for two years
DARPA - $300K for up to two years

When: Anytime for ARO
July 28, 2009 for the Air Force FY10 competition
January 12, 2009 for Naval FY09 competition
2 November 2009 for the DTRA period 4 competition
Feb 16, 2009 for for the DARPA FY09 competition

Where: See BAAs on OXR websites

Source: Jim Murday, USC

Presidential Early Career Award Science and Engineering (PECASE)

What: White House award to recognize some of the finest scientists and engineers who, while early in their research careers, show exceptional potential for leadership at the frontiers of scientific knowledge during the twenty-first century

- Candidates must hold tenure-track positions at U.S. Univ. or College
- Have received their Ph.D. degree within the preceding 5 years
- Typically 2 nominees per Service (and nominees from NSF)

How Much: ~$200K/yr for five years (cost borne by OXRs)

When: Submitted to White House in October

Where: OXRs submit nominees from their grantees – typically YIPs

Source: Jim Murday, USC

NSF's Origin, Mission & Goal

- **NSF's origins were influenced by Vannevar Bush's article *Science—The Endless Frontier*, 1945 (US Printing Office):**
  - **"The federal government should develop and promote a national policy for scientific research and scientific education,**
  - **support basic research in nonprofit organizations,**
  - **develop scientific talent in American youth by means of scholarships and fellowships, and**
  - **support long-range research on military matters."**
- **Established in 1950 by the NSF Act: NSF is only federal agency authorized to fund basic research across all S&E disciplines**
- **Mission: To promote progress of science and advance national health, prosperity & welfare by supporting research & education in S&E—*fund highly meritorious/impacting research***
- **Vision: To enable the nation's future through discovery, learning, and innovation (*2006 Strategic Plan: www.nsf.gov*)**

NSF Proposal Statistics (FY'06)

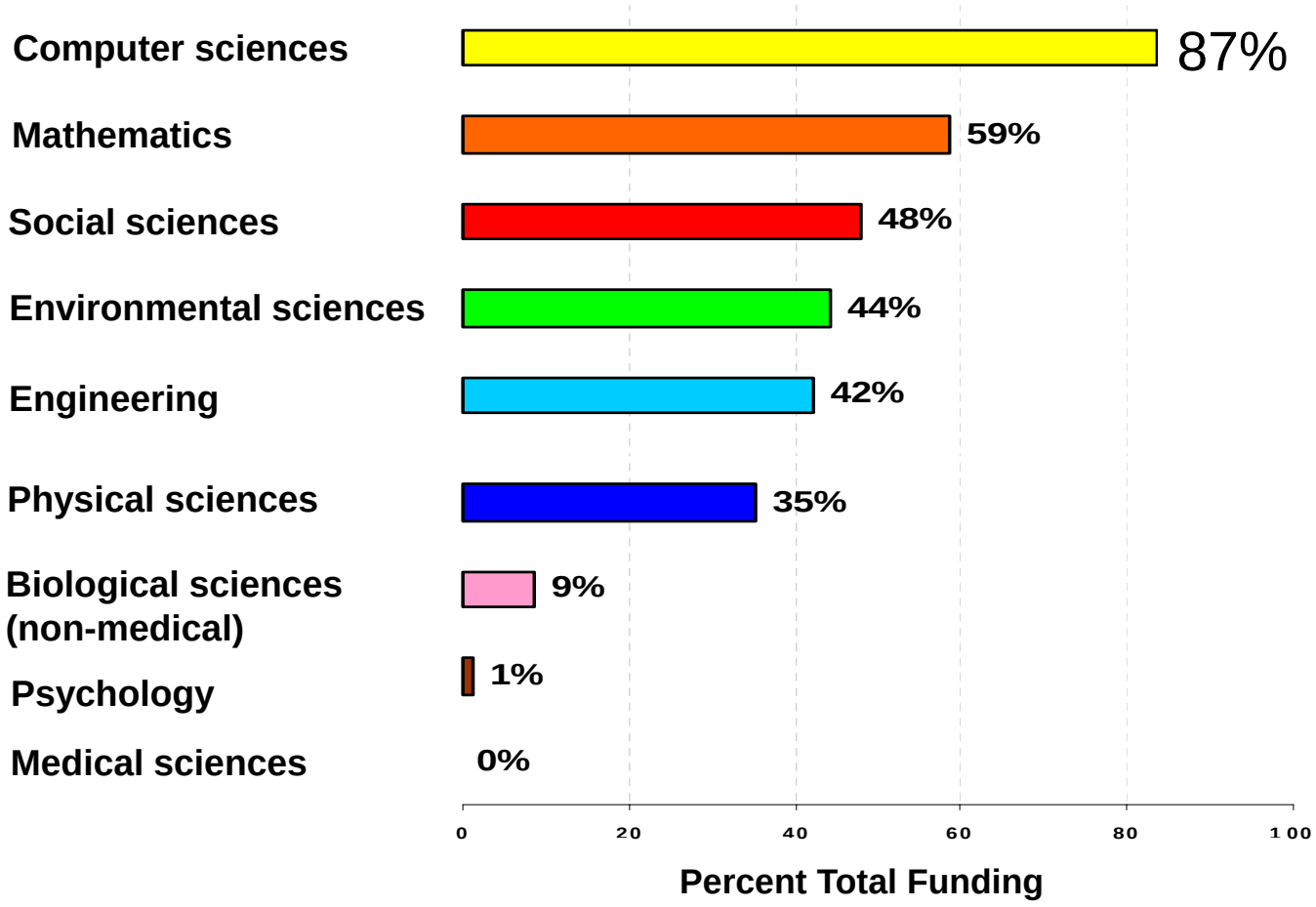
- **42,376 proposal actions**
- **~ 254,000 reviews**
- **~ 58,000 reviewers**
- **10,430 awards**
- **~ 25% funding rate**

  (~ 21% for research)

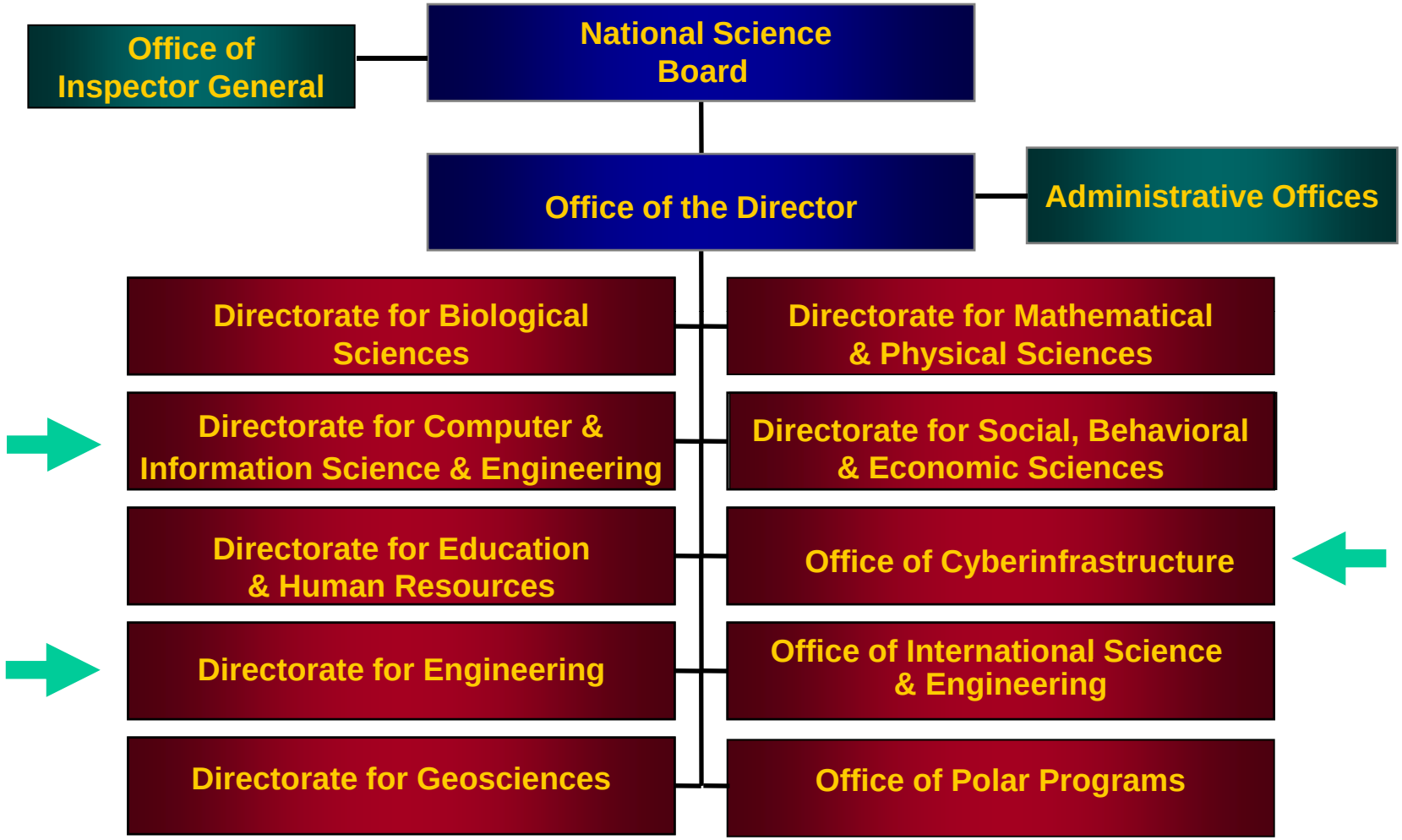
NSF Research Grant Profile (FY 2006)

- **Competitive research awards: 6,635**
- **Average annual award: $134,800**
- **Median annual award: $106,800**
- **Average duration: 2.92 years**

NSF Share of Total Federal Support for Basic Research at Academic Institutions

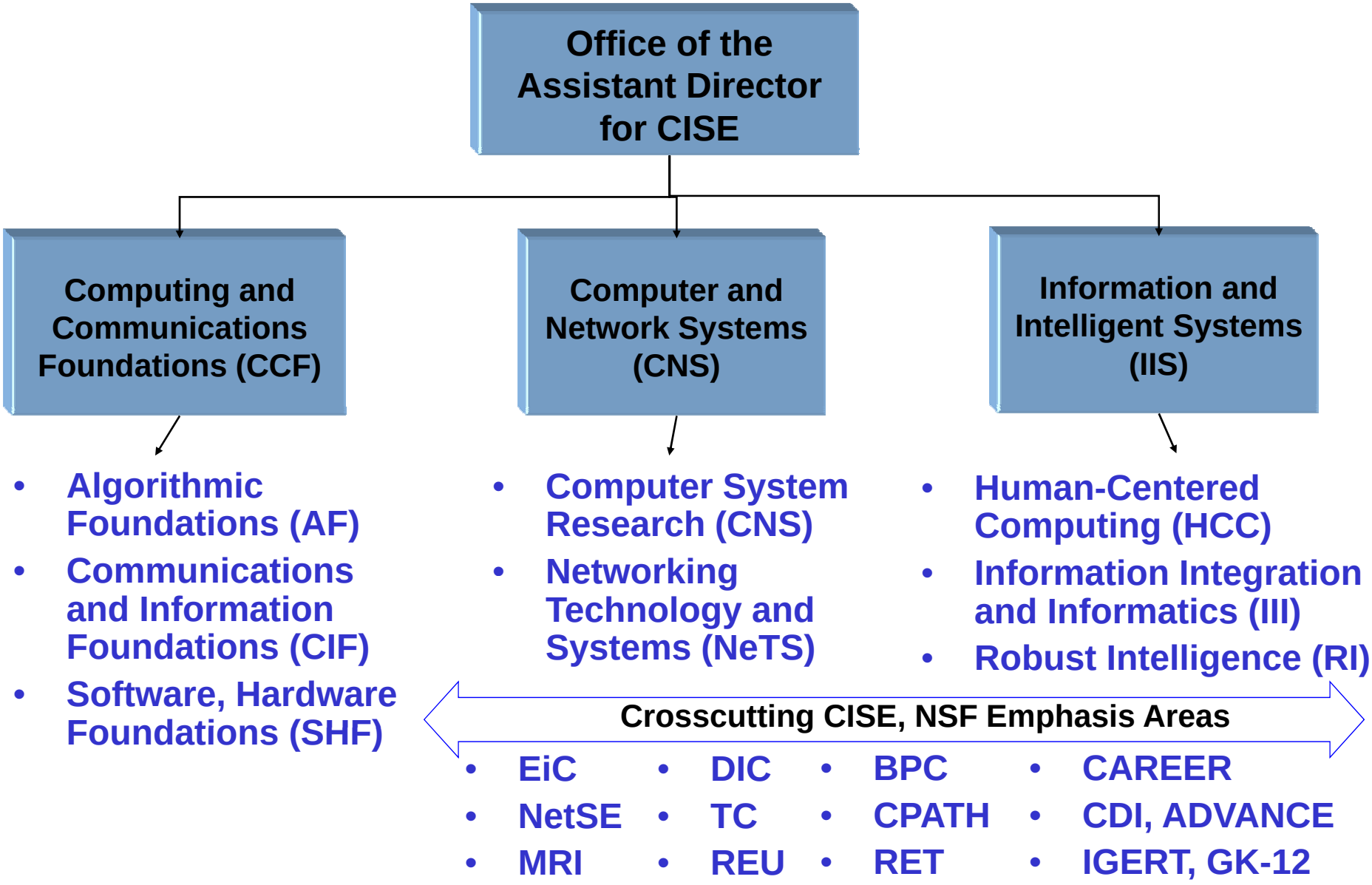


National Science Foundation

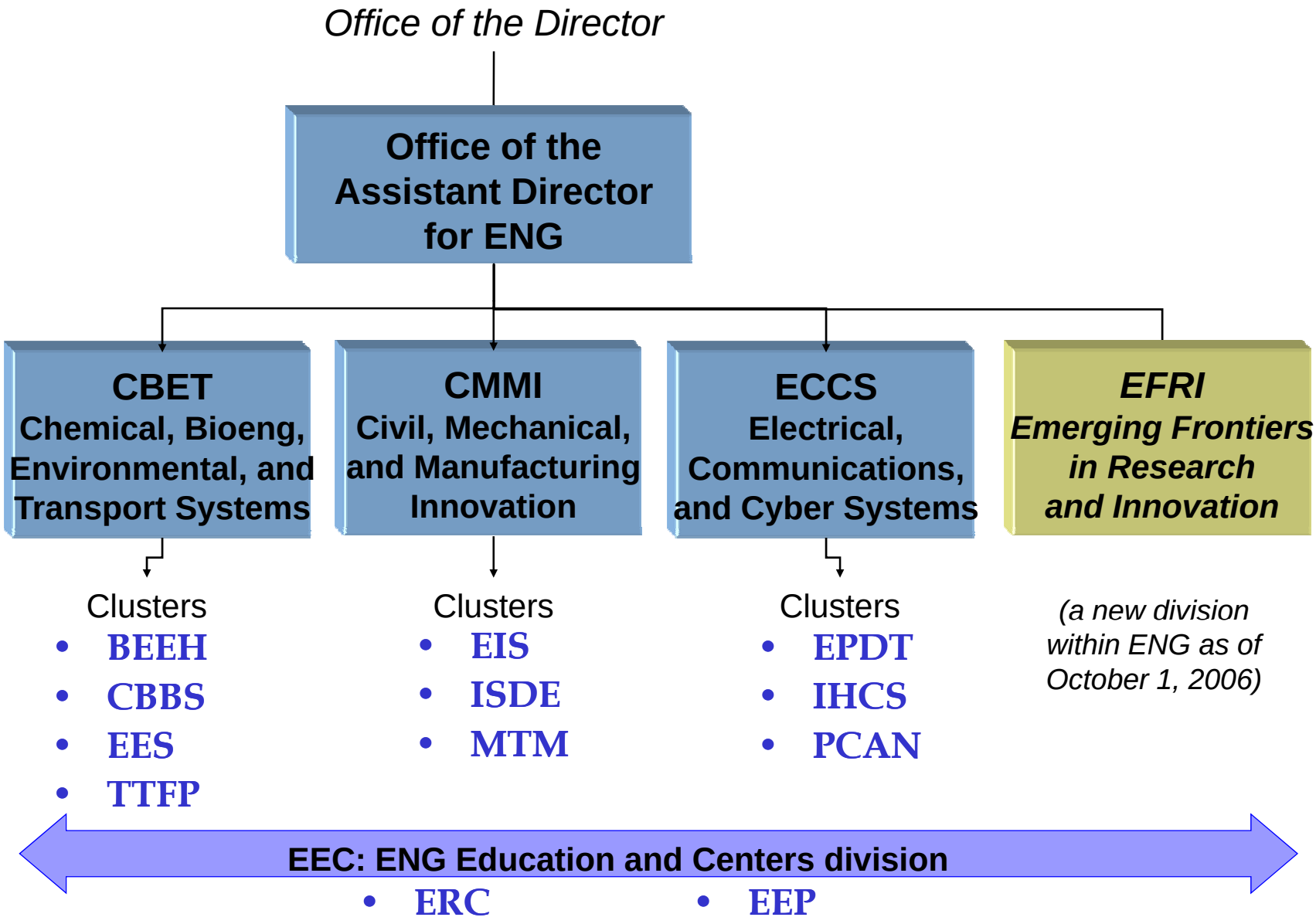


NSF 2011 budget request: *$7.42 billion* (8% increase over 2010)
CISE 2011 budget request: *$684.5 million* (10.6% increase)

NSF CISE Directorate



NSF ENG Directorate



CAREER Program

- **Foundation-wide activity that offers the National Science Foundation's most prestigious awards for new faculty**
- **NSF supports the early career development activities of those faculty members who are most likely to become the academic leaders of the 21st century**
- **CAREER awards have a 5-year duration**
- **The minimum CAREER award (including indirect costs) is $400,000 for all NSF directorates**

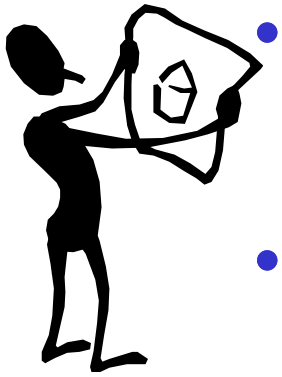
Outline

- ✓ **Types of Proposals and Meta-Tips**
- ✓ **General Funding Agency Information**
  - **DOD**
  - **NSF**
- **Research Proposal Preparation**
  (some slides adapted from Don Ethlon, NSF)
- **Tips for Writing Successful Proposals**
- **Some Fatal Flaws in Proposal Writing**

Research Proposals

A *fundable proposal* describes a good idea and attainable goal, well expressed and motivated, with a clear indication of methods for pursuing the idea, evaluating the findings, making them known and having broad impact.

Step 1: Carefully Read the Program Announcements and Solicitations



- **Find the right program early!**
  - **It's better to do this well before you write than after you get your reviews back**
- **Talk with your Program Officer to make sure that your ideas fit in the program**
  - **If the Program Officer tells you that your ideas are too narrow or don't fit the program, look for other sources**
- **Make sure that your project is worthwhile, realistic, well-planned, and innovative**

Step 2: Develop Your Good Idea

- **Key Questions**
  - What do you intend to do and how will you do it?
  - Why is it important?
  - What does the literature provide?
- **Make sure the idea is innovative and exciting**
  - Survey the literature
  - Talk with others in the field
- **Convince people that you can do it**
  - Obtain preliminary data to support feasibility
  - Determine available facilities and resources
    - What infrastructure do you have to work with?
    - With whom will you work (students, collaborators, industry partners)?

Step 3: Prepare the Proposal

- **NSF Grant Proposal Guide (GPG)**
  http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/gpg_index.jsp
- **Get it - Read it - Follow it**
- **Proposal preparation and submission**
- **Submission of collaborative proposals via**
  - **Subaward**
  - **Separate, yet linked, proposals**
- **Review criteria and review process**
- **Return without review criteria**
- **Withdrawal, declination, and award processes**

Parts of a Proposal (NSF)

- Cover Sheet and Certifications
- Project Summary
  - Both intellectual merit and broader impacts described
- Table of Contents
- Project Description
- References cited
- Biographical Sketches
- Budget and Budget Justification
- Current and Pending Support
- Facilities, Equipment and Other Resources
- Supplemental Documentation
  - What is allowed may vary by programs and directorates
- Single Copy Documents
  - Reviewer suggestions, deviation authority, confidential information, etc.

Project Summary

- **This one page is critical because it:**
  - **It may affect which program or panel will review your proposal**
  - **It must include a statement addressing both merit review criteria: *Intellectual Merit* and *Broader Impacts***
    - **Proposals that do not separately address both criteria within the one-page Project Summary will be returned without review**
- **Intellectual Merit**
  - **Describe the scientific/engineering problem and its importance**
  - **State the overall objective of the project**
  - **State the specific aims**
  - **Describe how the aims will be achieved**
- **Broader Impacts**
  - **Educational & outreach activities; infrastructure; dissemination of results; underrepresented groups; benefits to society**
  - **See http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf**

Project Description

- **This is the key to a strong proposal**
- **Overall concept and rationale**
- **Hypothesis-driven or data-driven or innovation-driven**
- **Execution**
  - **Careful**
  - **Thorough**
  - **Appropriate**
- ***Warning:*** **Most NSF formal proposals are limited to 15 pages. Some preliminary proposals and other special cases may be limited to fewer pages. Check the program solicitation!**

Project Description

In 15 pages, you need to cover

- **Objectives and expected significance**
- **Relation to present state of knowledge**
- **Experimental methods and procedures**
- **Results from prior agency-sponsored support (required if applicable)**
- **Relation to your (the PI's) longer term goals**
- **Optional sections:**
  - **preface, background, preliminary studies, specific objectives, significance, experimental plan**

Project Description

- **Know your audience – the reviewers, PO!**
  - **Write accurately, concisely, and clearly**
  - **Make it easy for reviewers to like your proposal**
  - **You never get a second chance to make a first impression**
  - **First page tells it all**
  - **Figures and tables get your points across clearly**
  - **Some reviewers (particularly on interdisciplinary proposals) may not be experts in your specific field**

Biographical Sketch

- **Usually limited to only two pages**
- **Professional preparation**
- **Appointments**
- **Publications**
  - **5 closely related**
  - **5 other significant publications**
- **Synergistic activities**
- **Collaborators & other affiliations**
  - **Collaborators (last 4 yrs) & co-editors (last 2yrs)**
  - **Graduate and Postdoctoral Advisors**
  - **Thesis Advisor and Postgraduate-Scholar Sponsor**

Budget

- **Budget should be**
  - **reasonable, but request what you need**
  - **for personnel, equipment, travel, participant support and other direct costs (subaward, consultant, computer services, publication costs)**
  - **for cost of educational activities associated with research, where appropriate**
- **Must be accompanied by "Budget Justification" for direct cost line items**

Current and Pending Support

- **List everything, including the proposal being submitted**
  - **current, pending and anticipated**
- **Be careful of overlap**
  - **Perception of overlap could be detrimental in the review**
- **Multiple submissions**
  - **when they are allowed to same program**

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Get Help

- **Read:**
  - Sponsoring agency publications
  - Successful proposals
- **Look before you leap:**
  - Serve as a reviewer and panelist
- **Talk with people in-the-know:**
  - Current Program Officers
  - Former POs (rotators or IPAs)
  - Successful colleagues
  - Sponsored projects office at your institution

Start Early and Get Feedback

- **Write:**
  - **Rewrite and rewrite again…**
- **Get critiques from:**
  - **Mentors and colleagues**
  - **Previous members of review panels**

Be Reasonable

- **Be aware of the scope:**
  - **“Too ambitious” vs. “Too narrow”**
- **Be honest and up-front:**
  - **Address issues instead of trying to hide them**
  - **Acknowledge possible experimental problems and have alternatives**

Make It Easy for Reviewers

- **Know your audience:**
  - **All reviewers may not be experts in your specific field**
- **Simplify and streamline:**
  - **Make sure you get your overall idea across**
- **Pay attention to details:**
  - **Run the spell checker and proof-read**
  - **Prepare clear photos, graphs, etc.**
  - **Make the font size as big as you can**

Seven Deadly Sins of Proposal Writing

1. **Failure to focus on the key problems and payoffs**
2. **No persuasive structure: *poorly organized***
3. **No clear differentiation: *competitive analysis***
4. **Failure to offer a compelling value proposition: *potential impact***
5. **Key points are buried: *no highlights, impact is lost***
6. **Difficult to read or appreciate: *full of jargon, too many low-level technical details or not enough details***
7. **Credibility killers: *misspellings, grammatical errors, wrong technical terms, inconsistent format, …***

Funding Criteria: Intellectual Merit

- How ***important*** is the activity to *advancing knowledge and understanding* within the field or across different fields?
  - ***Significance*** *of expected results*: incremental? high impact? high-risk but high-gain?
- How well ***qualified*** are you to conduct the research?
  - Not necessary to have track record on specific topic, but ***quality*** *of prior work* usually a consideration, as are ***preliminary results***
- How creative, ***original*** are the concepts and ideas?
  - Should be ***ground-breaking*** in some aspect
- How well conceived, ***organized*** is the proposed activity?
  - *Well-articulated* ***problem*** and *well-structured research* ***plan***
- Is there sufficient *access to* ***resources***?
  - Ownership is not necessary, only ***access*** to equipment, facilities, human capital, …

Funding Criteria: Broader Impacts

- Does the activity advance discovery and understanding while *promoting teaching, training and learning*?
- Does the activity *broaden the participation* of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- Will it *enhance the infrastructure for research and education*, such as facilities, instrumentation, networks and partnerships?
- Will the *results* be *disseminated broadly* to enhance scientific and technological understanding?
- What may be the *benefits* of the proposed activity *to other disciplines and society* as a whole?

(See *www.nsf.gov/pubs/gpg/broaderimpacts.pdf*)

Writing a "Successful" Proposal

Baseball Analogy: How to make a "successful" pitch?

- ***Pitcher***: you are the one who has "goods" that need to be pitched (conveyed or put across) "home plate"
- ***Goods***: project (research ideas) you propose for funding
- ***Home Plate***: the collective body of reviewers and program officer who decide if pitch "strikes" the target
- ***Opposition***: the problem space in your area of research

Your task: *Successfully pitch your ideas and strike out the opposition, as judged by the umpire (reviewers, PO)*

Writing a "Successful" Proposal

- ***Three phases***: ***set-up***, delivery, follow-through
- ***Set-up phase***: set the stage for the "appropriate" pitch
  - Take into account previous events leading to current state
  - Convince home plate that
    - you have sufficiently assessed and can "take down" opponent
    - your pitch is worthwhile and significant to accomplish this
    - you have identified where your pitch is headed (the target)
  - If no set-up phase, who knows where your pitch is going or if it is the right pitch to make at this time for this opponent?
- ***Set-up phase in proposal writing***: place research in context, giving current state-of-the-art and key challenges
  - Clearly articulate ***problem***, your mastery of understanding it, and why solving it is important → ***importance***, ***significance***
  - Discuss how prior work fails to sufficiently address it
  - Clearly frame your proposed ***idea*** & approach → ***originality***

Writing a "Successful" Proposal

- ***Three phases***: set-up, ***delivery***, follow-through
- ***Delivery phase***: mechanics that go into executing the pitch
  - The pitcher is channeled, focused, directed
  - Best effort is put forth to structure the delivery of the pitch
  - Mechanics are followed for "delivering the goods"
    - **precise**
    - **targeted**
    - **accurate**
- ***Delivery phase in proposal writing***: provide a detailed description of various components of the proposed research
  - Should provide substance ("mass") to substantiate the validity and promise of the proposed idea → ***preliminary results***
    - Discuss tradeoffs and possible new problems that may arise
    - Stay focused; don't deviate too far in morass of uncertainties
    - Write to the level that an expert on the topic would appreciate and assess that you are ***qualified*** to perform the research

Writing a "Successful" Proposal

- ***Three phases***: set-up, delivery, ***follow-through***
- ***Follow-through phase***: without follow-through, the pitch will never reach home plate
  - Must see the pitch all the way through: from the fingertips to the point at which it reaches the target at home plate
- ***Follow-through phase in proposal writing***: provide a ***plan*** for seeing the research through to completion
  - Devise an ***organized*** plan of attack for carrying out research
  - The research plan may include
    - methods/tools for analysis, simulation, evaluation, experiments
    - descriptions of your prior work, effectiveness, qualifications
    - required ***resources***, personnel, collaborations, facilities
    - expected timelines, milestones, results, artifacts, prototypes, implementations, contributions, dissemination, opportunities
    - ***broader impacts***: training, education, outreach, development

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Top Ten Ways To Write a Good Proposal…

That Won't Get Funded!

Source: NSF

Flaw #10

Inflate the budget to allow for negotiations

Instead…

- **Make the budget reflect the work plan directly**
- **Provide a budget explanation that ties your budget request to project personnel and activities**
- **Make it clear who is responsible for what**
- **Provide biographical sketches for all key personnel**

Source: NSF

Flaw #9

Provide a template letter of commitment for your (genuine) supporters to use. (They will!)

Instead…

- **Ask for original letters of support that detail what your collaborators will do and why involvement in your project will help them**
- **Letters from administrators are stronger if they demonstrate real commitment, e.g. release time, faculty development funds, new course approvals, etc.**
- **Make sure the program to which you are submitting allows letters of support or commitment and if they do, what type are allowed. Read the program solicitation!**

Source: NSF

Flaw #8

Assume your past accomplishments are well known – after all, the agency probably funded them

Instead…

- **Provide results from prior funding – this includes quantitative data and information on impact**
- **Describe how new efforts build on this previous work, and how it has contributed to the broader knowledge base about educational improvement**
- **Recognize that the review panelists are diverse and not all familiar with your institutional context**

Source: NSF

Flaw #7

Assume a project website is sufficient for dissemination

Instead…

- **A website may be necessary, but who will maintain it and how in the long run?**
- **Engage others; “early adopters” can serve as natural dissemination channels**
- **Plan workshops and mini-courses; identify similar projects and propose sessions at regional and national meetings**
- **Visit high schools, other colleges and universities**
- **Present in other public forums**

Source: NSF

Flaw #6

Assert: "Evaluation will be ongoing and consist of a variety of methods"

Instead…

- **Plan for formative and comprehensive evaluation**
- **Include an evaluation plan with specific timelines and projected benchmarks**
- **Engage an objective evaluator**
- **Use an Advisory Committee or team or a small Visiting Committee**

Source: NSF

Flaw #5

Assume the program guidelines have not changed; or better yet, ignore them!

Instead…

- **Read the solicitation completely and carefully**
- **Address each area outlined in the solicitation that is relevant to your project**
- **Check the program solicitation carefully for any additional criteria, e.g. the Integration of Research and Education, potentially transformative, or integrating diversity into NSF Programs, Projects, and Activities**

Source: NSF

Flaw #4

Don’t check your speeling, nor you’re grammer

Instead…

- **Check and double check; first impressions are important to reviewers**
- **State your good ideas clearly; ignore the bad ones**
- **Have a trusted colleague who is not involved in the project read your drafts and final proposal**
- **Watch word usage. For example, don’t use “complimentary” when you mean “complementary” or “principle investigator” when you mean “principal investigator,” etc.**

Source: NSF

Flaw #3

Substitute flowery rhetoric for good examples

Instead…

- **Minimize negatives; describe what you will do and why**
- **Ground your project in the context of related efforts**
- **Provide detailed examples of impact of prior work**
- **Specify who you will work with and why**
- **State how you plan to assess progress**
- **Detail the tasks and timeline for completing activities**
- **Specifically address intellectual merit and broader impacts and use the phrases explicitly in the project summary**

Source: NSF

Flaw #2

Assume page limits and font size restrictions are not enforced

Instead…

- **Consult the program solicitation and the GPG (Grant Proposal Guide) carefully**
- **Make sure your proposal does not exceed page and/or font size limits so that it is not returned without review**

Source: NSF

Flaw #1

Assume deadlines are not enforced

Instead…

- **Work early with your Sponsored Research Office (SRO)**
- **Test drive Grants.gov or FastLane.nsf.gov to make sure your SRO knows how to drive the tool.**
- **Set your own final deadline several days ahead of the formal deadline to allow time to resolve unforeseen problems**

Source: NSF

Closing Remarks

- There may be no *"best"* (or only) way to write a successful proposal, but many successful ones share similar characteristics
  - *clearly written, well motivated, organized, original, targeted, important, accomplishable, impactful, significant*

- *Funding depends* on many things, some of which are beyond your control
  - availability of funds, portfolio of existing funded research projects, set of reviewers, timing, …

- Be persistent and give your *best effort; success will come!*