Career Planning for Prospective Faculty

AIChE Annual Meeting

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Workshop Agenda

- Welcome and Introductions
- New Faculty Success Strategies
- New Faculty Career Planning
- Writing Proposals
- Research Career Planning
- Applying to the NSF
- The CAREER Award

Workshop Agenda

- Managing Research
- NSF Engineering Overview
- Identifying Research Problems
- Developing Research Proposals
- Contacting Funding Agencies
- Time Management
- Evaluation & Closing Remarks

Comments

- **Presentation will highlight key points**
  - **Many slides will be hidden – mostly informational**
    - **Full presentation at**

http://www.nsf.gov/eng/cts/about.jsp

- **Designed to be an active workshop – please ask questions / add experience**

New Faculty Success Strategies

What Do We Know About New Faculty Development?

- Very little study of new engineering faculty development
- Can be stressful
  - What is the most stressful aspect of being a new faculty member?

Exercise

- Write on this page what you expect to find most stressful about becoming a faculty member
- Break into groups of 4-6, introduce yourselves, and share this information

What Do We Know About New Faculty Development?

- **Stress Points (Sorcinelli, 1992)**
  - Not enough time
  - Inadequate feedback and recognition
  - Unrealistic self-expectations
  - Lack of collegiality
  - Balancing work and outside life

Faculty Characteristics

(Boice 1991, not limited to engineering faculty, extremes)

Quick Starters

- Seek social support / advice
- Exemplary teachers
  - positive attitude towards students
  - less time preparing for class
  - more time on scholarly work
  - 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

Success Strategies

- **Schedule regular time for scholarly writing (proposals, papers, reports); keep time log**
  - **30-45 minutes daily or 2-3 longer blocks weekly**
  - **Keep record of time spent on all activities**
- **Limit preparation time for class (especially after the first offering)**
  - **≤ 2 hours preparation for 1 hour of lecture**
  - **Keep track of time spent in time log**

Success Strategies

- **Network at least 2 hours / week**
  - Visit offices, go to lunch, have a cup of coffee with colleagues in and out of the department
  - Discuss research, teaching, campus culture
- **Develop clear goals and a plan to reach them**
  - Get feedback on plans from department head, mentor, other colleagues, and make adjustments
  - Use planning tool (e.g. Gantt chart to plan course development, research, presentations, publications)
  - Periodically review progress (at least annually)

Collegiality & Service

- **Be friendly**
  - **No excuse for surly, rude behavior**
- **Service – Projects**
  - **Pick *one* you enjoy & make it yours (e.g., contest for high school day)**
- **Service – the Commons**
  - **Do *your share* (but not more) of committees, homecoming, visitors and so forth.**

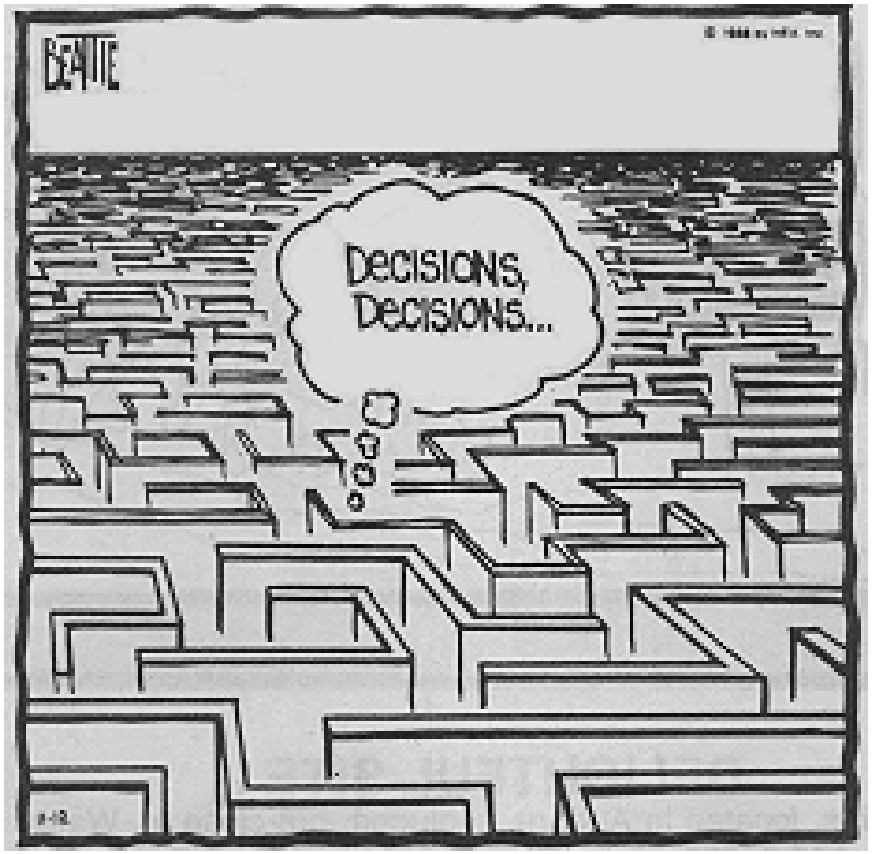
Faculty Time Scales

Next lecture	2 days
Proposal written	4 weeks
Course	4 months
Publication submitted-published	6 months
Annual evaluation	1 year
Mid-career review	3 years
PhD graduates	4 years
Tenure package due	5 years

New Faculty Career Planning

"If you don't know where you are going, any road will get you there."

The Cheshire Cat
Alice in Wonderland



SNAFU® by Bruce Beattie *Valley Daily News* Nov. 13, 1988

Components of Career Planning

- Research Career
- Teaching Career
- Professional Career
- Personal Career

Career Elements Are Connected

What Does University Want?

Research University

- Money
- Impact & Fame
- Good Teaching
- Collegial & Service

Teaching Institution

- Great Teaching
- Collegial & Service
- Money
- Impact & Fame

Missions

What you have a passion for . . .

- What are your strengths?
- What do you like learning?
- What outcome would you like to see?
- Who do you admire?

May change with time

Goals

What you would hope to accomplish . . .

- You decide vs. others decide
- Routine vs. non-routine
- Idealistic vs. realistic
- Growth goals

Objectives and Activities:
The Plan to Achieve Your Goals

What you will accomplish by specific Activities ?

- **List only feasible activities**
- **Be specific**
- **Include activities currently doing**
- **State time frame – can separate (week, term, year)**
- **Prioritize list – cannot do all**

Example

Mission: Contribute to realizing broader use of solar energy

Goal (6 yr): Obtain tenure

Sub goals: Established funded research program in photovoltaics

Objectives: Submit a CAREER proposal this semester

Activities:

- Write literature review by March 15
- Have student complete preliminary experiment by April 15
- Draft white paper of proposed REU concept by April 1
- Call NSF program manager on Monday to discuss questions

Implementation

- Establish realistic balance; eliminate goals if necessary
- Implement in context of your situation (institution, family, health, finances…)
- Revisit periodically – goals change
  - Obtain feedback and tune (chair, colleague, mentor)
- Keep it visible (e.g., white board, Gannt chart)

Writing the Proposal

Successful Proposals

- Stress the novel aspects of your approach
- Differentiate your work from that done by others
- Emphasize the hypothesis that your research will test
- 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 – teach not snow

Common Sections

I. Project Summary

II. Project Description

- A. Results from prior agency support
- B. Statement of problem and significance
- C. Introduction and background
  - ❖ Relevant literature review
  - ❖ Preliminary data
  - ❖ Conceptual or empirical model
  - ❖ Justification of approach or novel methods

Common Sections

D. Research plan

- Overview of research design
- Objectives, hypotheses, and methods
- Analysis and expected results
- Timetable

E. References cited

F. Budgets

G. Current and pending support

H. Description of Facilities

Don’t Annoy Reviewers

- Typographical errors
- Erroneous references
- Exceed page length guidelines
- Too small font
- Overly dramatic

Significance Statement

(Overall Objectives, Overview and Significance, Significance and Project Objectives, Statement of the Problem)

- Ask what scientists inside vs. outside field would perceive as greatest contribution
- Consider both empirical and theoretical contributions
- Identify and contrast basic and applied uses of results
- Ask how you expect others to use your results
- Compare contributions that are likely to be important 1 year vs. 10 years after completion
- Be your own best critic – How would you dispute claims ?

Significance Statement

- Feature significance statement at beginning
- Keep it short
- Funnel the reader: broadest goals to specific aims
- Explain the value of the work
- Link with other fields
- Don’t go overboard

Proposal Title

- Present in clear, concise, meaningful manner
- Avoid jargon and overstatement
- Be careful with buzzwords (some folks are annoyed)
- Avoid cute and too informal titles

Executive or 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
- Usually 1-2 pages
- Conventions vary by field – seek samples

Goals, Objectives, Hypotheses

- **Scientifically far-reaching aspects vs. specific outcomes**
- **Hypotheses: Specific set of testable conjectures**

Goal: **"to further our understanding of the implication of global climate change on wetlands"**

Objective: **"to measure the diffusivity of methanol in water as a function of temperature and composition"**

Hypothesis: **"Zinc can effectively compete with other metals for enzyme-active sites, transporter proteins, and other biologically important ligands."**

Introduction and Background

- Focus on important points and establish relevance
- Discuss motivation for the project
- Not too long
- Use schematics, models, headings, and formatting to channel the reader to show direction that proposal is going
- Relevant literature review
- Preliminary results
- Results from prior agency support
  - Judging productivity
  - Keep concise

Research Plan

- Overview of research plan and justification
- Methods and materials
  - Sampling procedures
  - Experiment description
  - Technical procedures
  - Algorithm descriptions
- Data analysis

Research Plan

1. Objective 1
   - Hypothesis 1A
     - methods, materials, and protocol
     - data analysis
   - Hypothesis 1A
     - methods, materials, and protocol
     - data analysis
2. Objective 2
   - etc.

References

- Be unbiased – cite disputed work
- Cite peer reviewed work, minimize unreviewed
- Cite your own work but not excessively
- Cite recent work
- Cite only work you have read – don't cut & paste
- Reviewers will look for their references
- Include a sufficient number of references to establish credibility and feasibility
- Ensure accuracy of citations
- Place correctly and concisely

Tips

- When your 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 ‘boiler plate’ and parallel process
- Respect intellectual property, give appropriate credit
- Don’t promise too much

Tips

- Contact program monitors
  - Meet at professional societies
  - Volunteer to serve as reviewer
- Submit early
  - ~ 1% NSF proposals returned
- Federal fiscal year begins October 1

"Press On": Persistence . . .

"**Nothing in the world can take the place of persistence.**

"**Talent will not:** **nothing is more common than unsuccessful men with talent.**

"**Genius will not:** **unrewarded genius is almost a proverb.**

"**Education alone will not:** **the world is full of educated derelicts.**

Persistence and determination alone are omnipotent."

On-Line Proposal Writing Guides

National Science Foundation

www.nsf.gov/pubs/

Environmental Protection Agency

www.epa.gov/seahome/grants/src/intro.htm/

The Foundation Center

www.fdncenter.org/onlib/shortcourse/prop1.html

University of Pennsylvania

www.the-scientist.library.upenn.edu/
yr1997/prof_070428.html/

"A Winning Strategy for Grant Applications"

On-Line Proposal Writing Guides

Style Guide

http://www.colorado.edu/Publications/styleguide/symbols.html

Research Career Planning

Note: This workshop will focus on establishing and developing a research career, but encourage you to attend other workshops on teaching (e.g., NETI) and professional development.

From Graduate Student to Faculty

What was the most difficult aspect about the transition from Graduate Student to Faculty?

And I Get Paid to Do This!

- Work with young, bright and eager students
- Perform research on topics of my choice (to a degree)
- Sabbatical every 7th year
- Travel
- Enjoy colleagues in own and other disciplines, around the world
- Retire gracefully
- And have great job security (tenure)

Research Career

- Develop 5-year and long term plans and revise (at least annually)
- Peer recognized excellence ('potential' required for tenure at most institutions) in research area is long term goal
- Important to remain research active throughout career (traditional graduate program, REU's, collaborate with industry, sabbaticals, education research . . .)

Research Areas

- Most researchers only work in a few research areas during their career (~1 to 5)
- Identify engineering science(s) (base) and technology (driver)
- Criteria for selection: Interesting, importance of problem, match to your skills, long-term funding prospects, available resources, presence of colleagues, fit with department vision, student interests, local interests

Research Hierarchies

❖ Chemical Engineering	**Research Discipline**	Established
❖ Electronic Materials Processing	**Research Field**	Likely fixed (sometimes different than Ph.D. topic)
❖ CVD of semiconductors ❖ Bulk crystal growth ❖ Solid-state sensors	**Research Area**	Only a few in one's career
❖ p-type doping of GaN	**Research Issues**	<u>Distinguishes</u>
❖ Cluster doping	**Problem Solution**	Innovative

The Numbers ($)

- **Graduate students: 5 yr. before first PhD & continuity, 1 PhD/yr = group size 6-7, 40 yr career = 35 PhDs in career**
- **35 solutions; ~20 problems; few research areas in career**
- **Grad. student cost: $22K (stipend) + 11K (overhead) + 7K (tuition) = $40K/yr**
- **$280K (7 students) + 50K (3 summer mo) = $320K + cost of research (~30K/student) = $530,000/yr funding**

The Numbers ($)

- **The department investment:**
  Chair's view
  - **Salary: $70K/yr for 6 yr = $420K**
  - **Start-up (variable): students, summer salary, equipment, supplies, reduced teaching service assignment, . . . = $400K**
  - **Total = $820K**

The Numbers (time)

- Idea to publication: 3 to 7 years
- t = 0 (idea) + 3 mo (preliminary results)
  + 2 mo (write proposal)
  + 3-6 mo (review)
  + 1-13 mo (funding cycle - note 10/1)
  + 0-12 mo (identify graduate student)
  + 12-36 mo (do research)
  + 3 mo (write manuscript)
  + 6-15 mo (submit / review / publish)
  = ***30-90 months***

Already Have Grant or Do Without $

Theory/Modeling

- t=0 idea
- + 1-3 months, theory/simulations
- + 1-3 months, write
- + 6-15 months, submit, review & publish
- = 8-21 months

Experimental

- t=0 idea
- +3-12 months, experiments
- +1-3 months, write
- + 6-15 months, submit, review & publish
- = 10-30 months

Identifying Research Area and Issues in your Field

- **Extension of thesis or post-doctoral research**
  - **Easiest but competing with former advisor(s)**
- **Tangent to thesis or post-doctoral research**
  - **Easy transition but credibility not fully established**
- **New area**
  - **Longer time constant & higher risk, but return may be high; consider collaboration (your contribution must be recognizable)**

Misconceptions
About Education Research

'Education research is not real research'

- Few engineers are exposed to 'real education research', but it is a sophisticated combination of cognitive & behavioral sciences, design and analysis of experiments w/human element, . . .

'There is no funding for education research'

- Workforce development $ growing rapidly
- Success rate often higher than for discipline research

'Education research will hurt my career'

- Recipients of education scholarship awards are often discipline leaders of research

Advice on Education Research and Scholarship

- **Insist on the same standards of excellence as for discipline research**
- **Include following in proposals (CAREER also)**
  - **Literature review**
  - **Assessment and evaluation plan**
  - **Dissemination plan**
  - **Leverage resources (partners, plug-ins, pyramid)**
  - **Plus usual elements w/ emphasis on hypothesis testing**
  - **Focus**
- **Collaborate with experts in other fields**

Advice on Education Research and Scholarship

- **Decide your level of activity, but do some**
  - **Within context of assigned activities *to* integrated with discipline research *to* pure education research project *to* sole research**
- **Ensure chair is aware of your plans**
  - **Often post-tenure activity**
- **Focus on an area you enjoy**
  - **Learning with technology, text writing, experiential learning, multidisciplinary design, K-12 outreach, . . .**

Your Academic Career

- 40 years as a faculty
  - ~20 research problems
  - 35 PhD students
  - 140 publications
  - $15 million in funding
    - 300 proposals
  - 70 courses taught
    - >2000 students
  - 6 chairs, 7 deans and 8 presidents
  - 4 sabbaticals
  - 2080 Saturdays

Applying for NSF Grants

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

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
  - Sensors initiative
  - NSE initiative

Award List for Program: SEPARATIONS and PURIFICATION PROCESSES

[Click on the Award Number for Additional Information (on Web)]

❶ Multicomponent Space-Charge Ion Uptake and Ion / Solvent Transport Models for Ion-Exchange Membranes

Award#: 0331389 Current Year Award Amount: $0 Cumulative Award Amt: $166,310
Estimated Total Award Amount: $166,310
Original Start Date: Sep 01, 2002 Projected Duration: 12 Months
PI: Pintauro Institution: Case Western Reserve State: Ohio District: 00

❷ New Pressure Swing Adsorption Processes

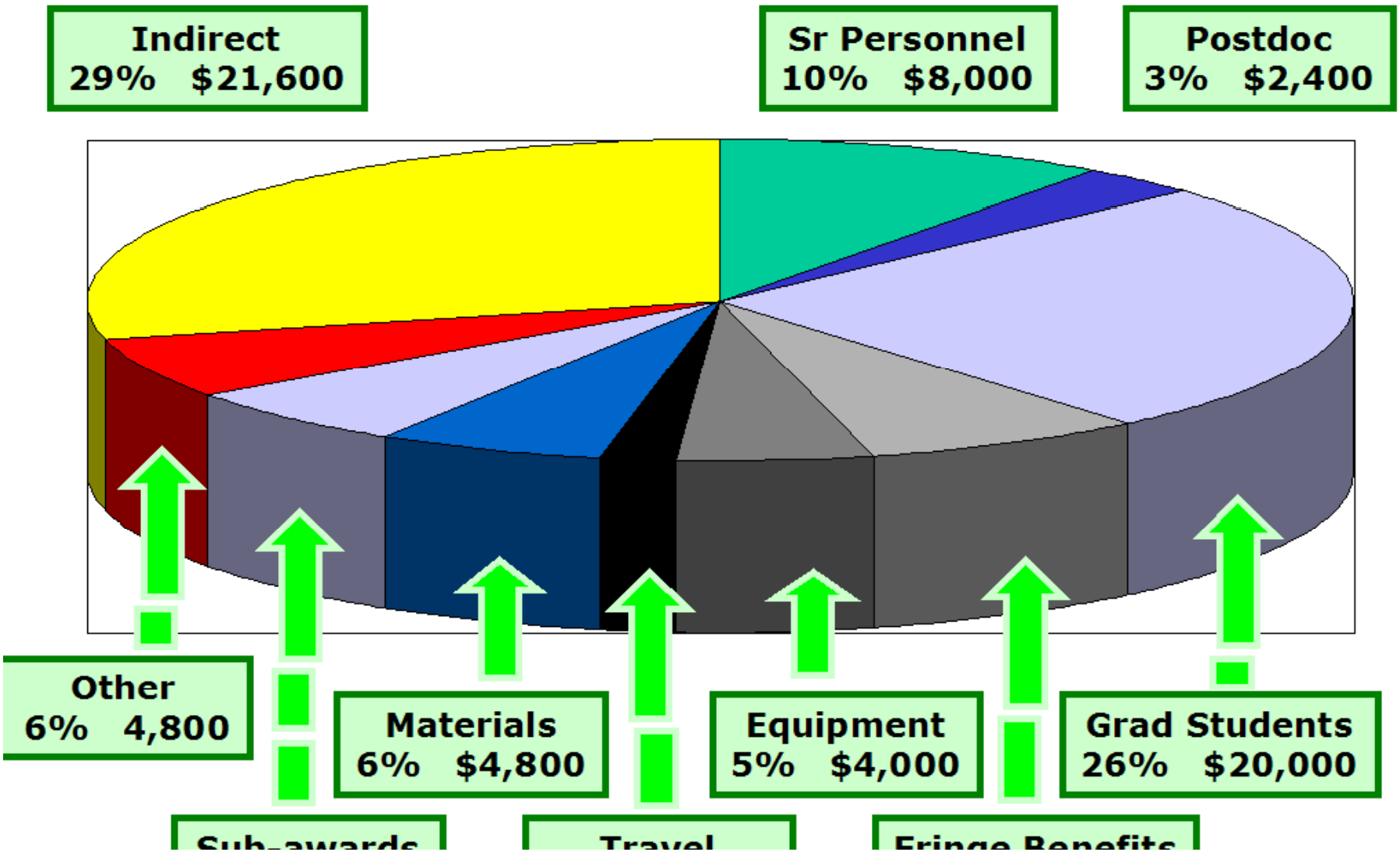
Award#: 0327089 Current Year Award Amt: $90,366 Cumulative Award Amt: $90,366
Estimated Total Award Amount: $277,155
Original Start Date: Aug 01, 2003 Projected Duration: 36 Months
PI: Wankat Institution: Purdue University State: Indiana District: 07

❸ SGER: Distillation Using Hollow Fibers as Structured Packing

Award#: 0322882 Current Year Award Amt: $49,937 Cumulative Award Amt: $49,937
Estimated Total Award Amount: $49,937
Original Start Date: Jun 01, 2003 Projected Duration: 12 Months
PI: Cussler Institution: Univ of Minnesota-Twin Cities State: Minnesota District: 05

Average CTS Annual P.I. Budget

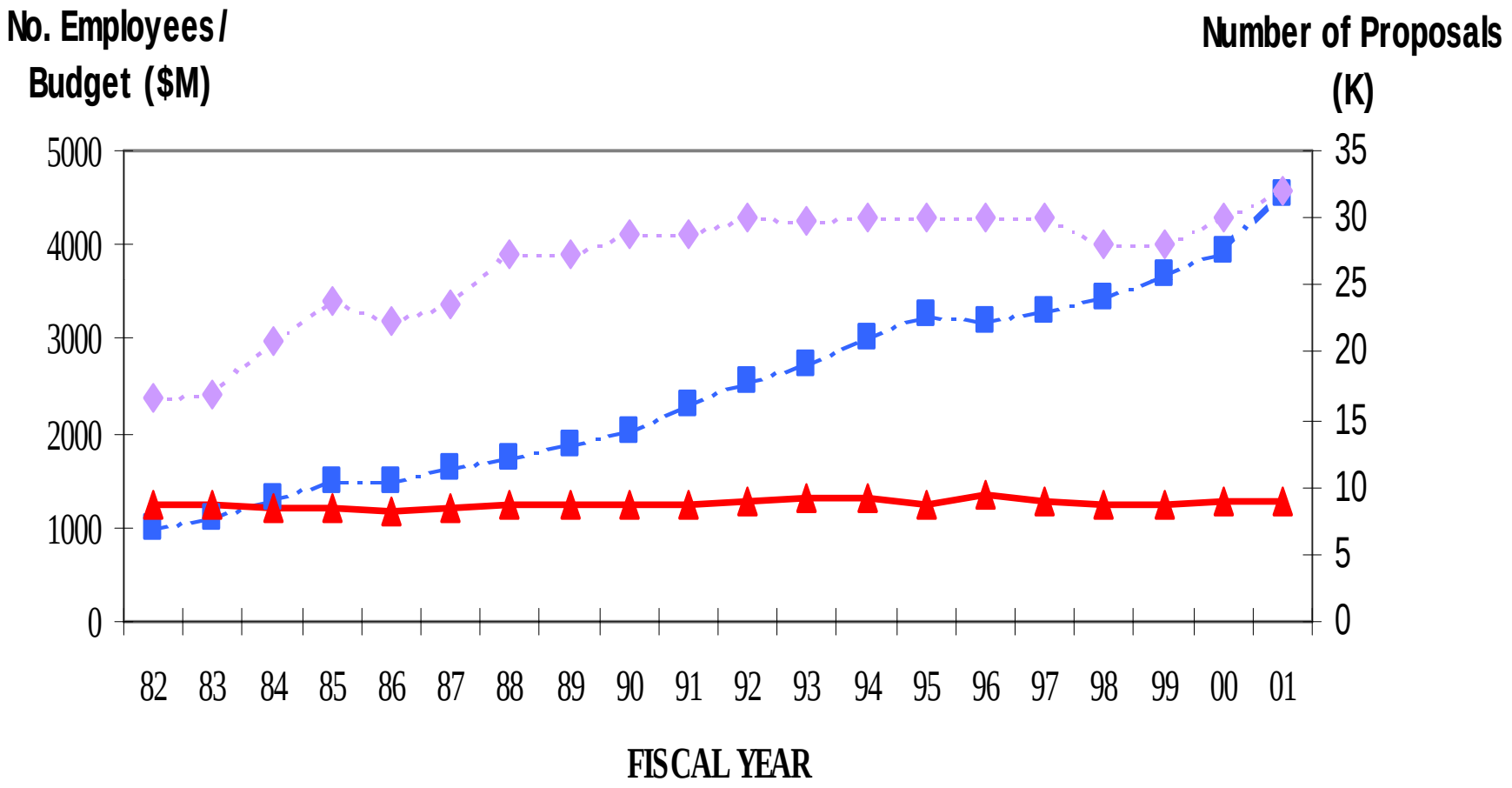
FY 2002 ($80,000/yr)



Award Statistics

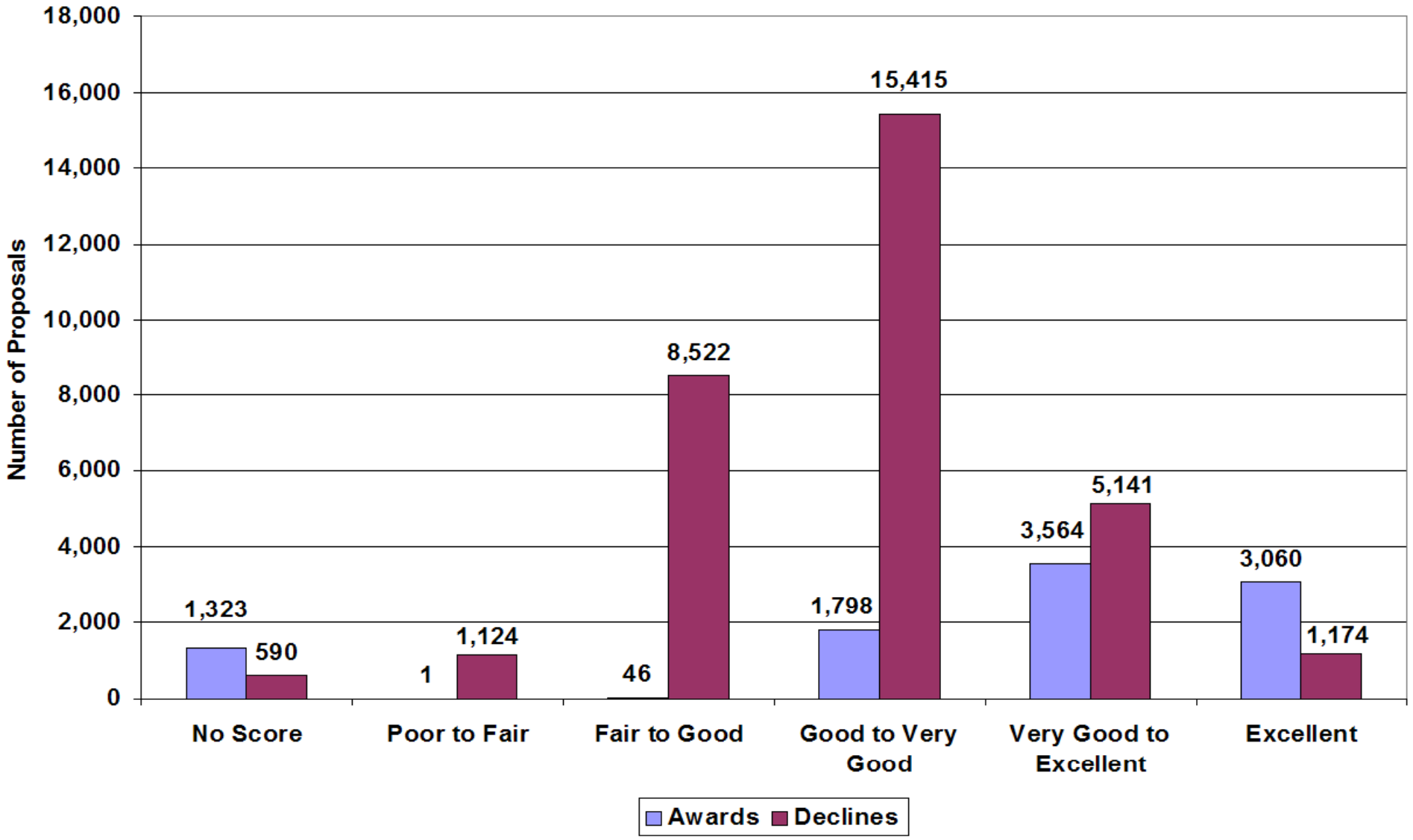
- **Distribution by experience**
  - **Approximately 30% new investigators**
  - **70% recently funded by NSF**
- **Success rates**
  - **Unsolicited proposals about 15%**
  - **CAREER about 15%**
  - **Initiatives about 10% (varies widely)**

Comparison of NSF Budget, Staff and Competitive Proposal Submissions over Time



Distribution of Average Reviewer Ratings

FY 2005



Number of Proposals: 41,758 (31,966 Declines & 9,792 Awards)

Post Award Considerations

- **Keep program director informed**
  - Write nuggets (research achievements) when requested
  - Give advance notice of significant publications (e.g., Science, Nature); the NSF public relations department (OLPA) can help publicize
  - Submit annual report (90 days before anniversary of grant) and final report (90 days after grant expiration)
- **Request supplements**
  - Research Experiences for Undergraduates (REUs) and Research Experiences for Teachers (RETs) are common
  - International supplements available

Final Thoughts

- **Contact program directors**
  - Meet at professional society conferences
  - Volunteer to review proposals, e.g., http://www.nsf.gov/eng/cbet/reviewer/
- **Examine successful proposals**
  - Ask colleagues for their proposals
  - Get proposal reviews from colleagues
- **Suggest reviewers for your proposal**
  - Use FastLane form provided

Faculty Early Career Development Program

(CAREER)

NSF Announcement 08-557 **2008–2010 Submissions**

CAREER: Program Goals

- 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 integrative and effective research and education careers
- Increased participation of those traditionally underrepresented in science and engineering encouraged

CAREER: Eligibility

Applicants Must:

- **Hold a doctoral degree as of submission date**
- **Be untenured as of submission date**
- **Be employed in a tenure-track (or equivalent) position as of October 1 following submission**
- **Be employed as an assistant professor (or equivalent) as of October 1 following submission**
- **Have not competed more than two times previously in the CAREER program**
- **Have not previously received an NSF CAREER or PECASE award**

CAREER: Self-Certification

- At time of submission, applicants will self-certify for both CAREER and PECASE eligibility. Unless applicants properly complete the checklist, they will not be able to submit their proposal.
- CAREER certification will appear after the cover page and will be sent to reviewers as part of the proposal.
- PECASE certification will appear on the Form 1225 (Information about the PI) and will not be sent to reviewers.

CAREER Proposals

- **Critical Elements**
  - Research *and* education
  - Departure from Ph.D. work
- **Special Considerations**
  - Panel review - - bring reviewers up to speed
  - Read *current* announcement: rules change
  - PI specifies program for initial assignment
- **Logistics**
  - Submit early and resubmit if necessary
  - Follow-up: check for successful submission
  - Fix errors through FastLane *before deadline*
  - About 1% of proposals returned unreviewed

CAREER: Departmental Letter

- **Departmental Letter (about 1 page):**
  - **Include integration of research and education**
  - **Describe the departmental/institutional support**
  - **Verify the self-certified PI eligibility information**

CAREER: Proposal Review

- **Evaluated using NSF's two merit review criteria:**
  - **What is the intellectual merit of the proposed activity?**
  - **What are the broader impacts of the proposed activity?**
- **Reviewers are also asked to consider the capability of the applicant to make an integrative contribution to both education and research and to integrate diversity in all program activities.**

CAREER:
Award Duration and Size

- 5-year duration
- Minimum award size of $400,000
- BIO minimum award size of $500,000 for FY03
- No maximum award size

CAREER Deadlines

- **July 21, 2009** — **BIO, CISE, EHR**
- **July 22, 2009** — **ENG**
- **July 23, 2009** — **GEO, MPS, OPP, SBE**

PECASE

- **P**residential **E**arly **C**areer **A**wards for **S**cientists and **E**ngineers
- **R**ecognizes outstanding scientists and engineers who, early in their careers, show exceptional potential for leadership at the frontiers of knowledge
- **H**ighest honor bestowed by the U.S. government on scientists and engineers at the beginning of their careers

CAREER & PECASE

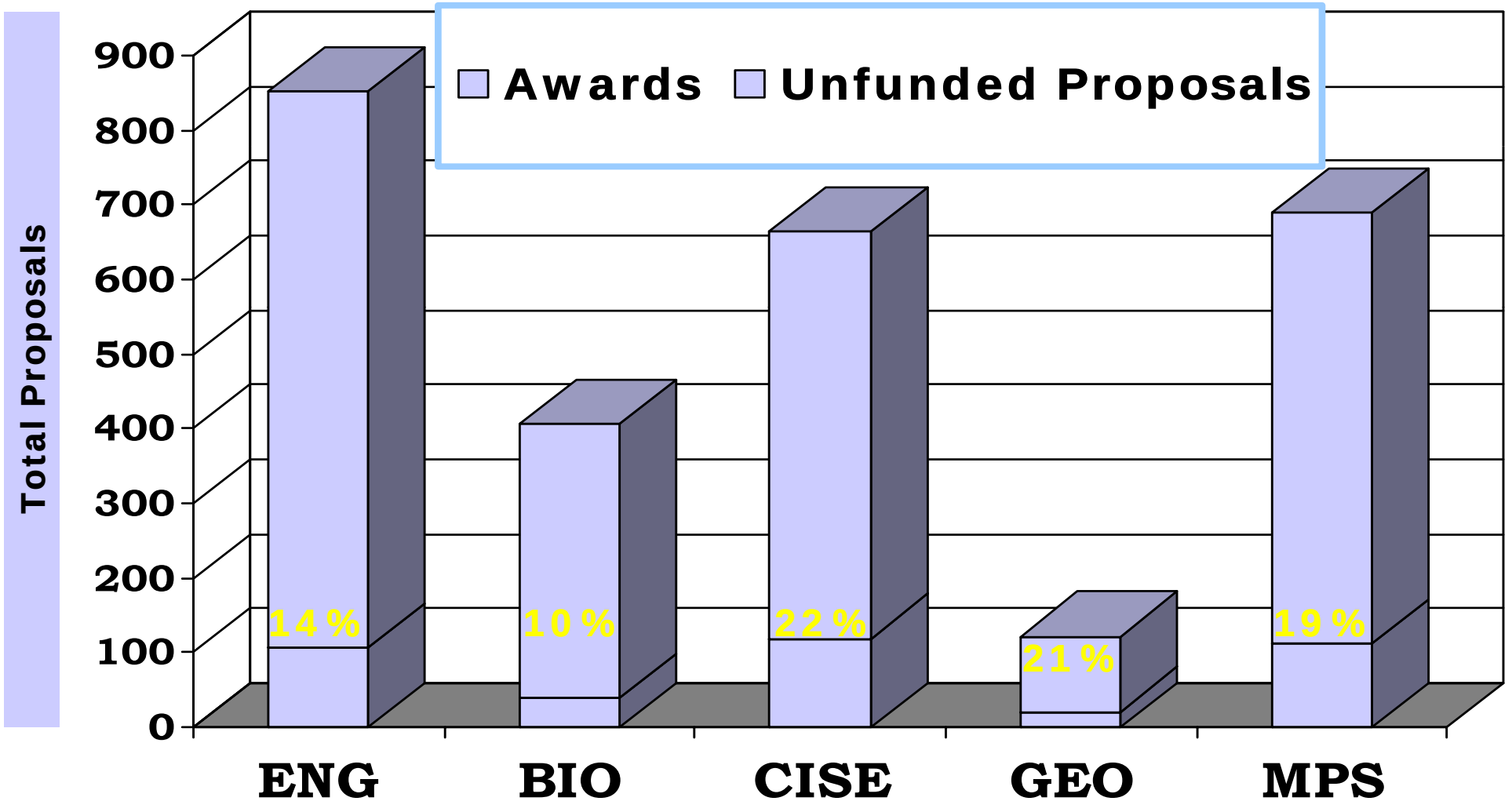
- As in previous years, **NSF will have twenty PECASE "slots"**
- **Number of slots per directorate** will be determined by number of proposals received in each directorate
- **Each directorate will nominate** their most meritorious CAREER PI(s) for PECASE
- **PECASE awardees will be announced** in the fall following receipt of the CAREER award (i.e., approximately 15-18 months after CAREER proposal submission)

PECASE: Eligibility

- **NSF nominates the 20 most meritorious CAREER awardees for PECASE**
- **NSF Applicants Must:**
  - **Meet all of the CAREER eligibility requirements**
  - **Be U.S. citizens, nationals, or permanent residents who hold such status on or before their Directorate's July deadline for submission of CAREER proposals**
  - **An individual can receive only one PECASE award**

National Science Foundation ❖ Directorate for Engineering

CAREER Program Awards by Directorate FY 2006

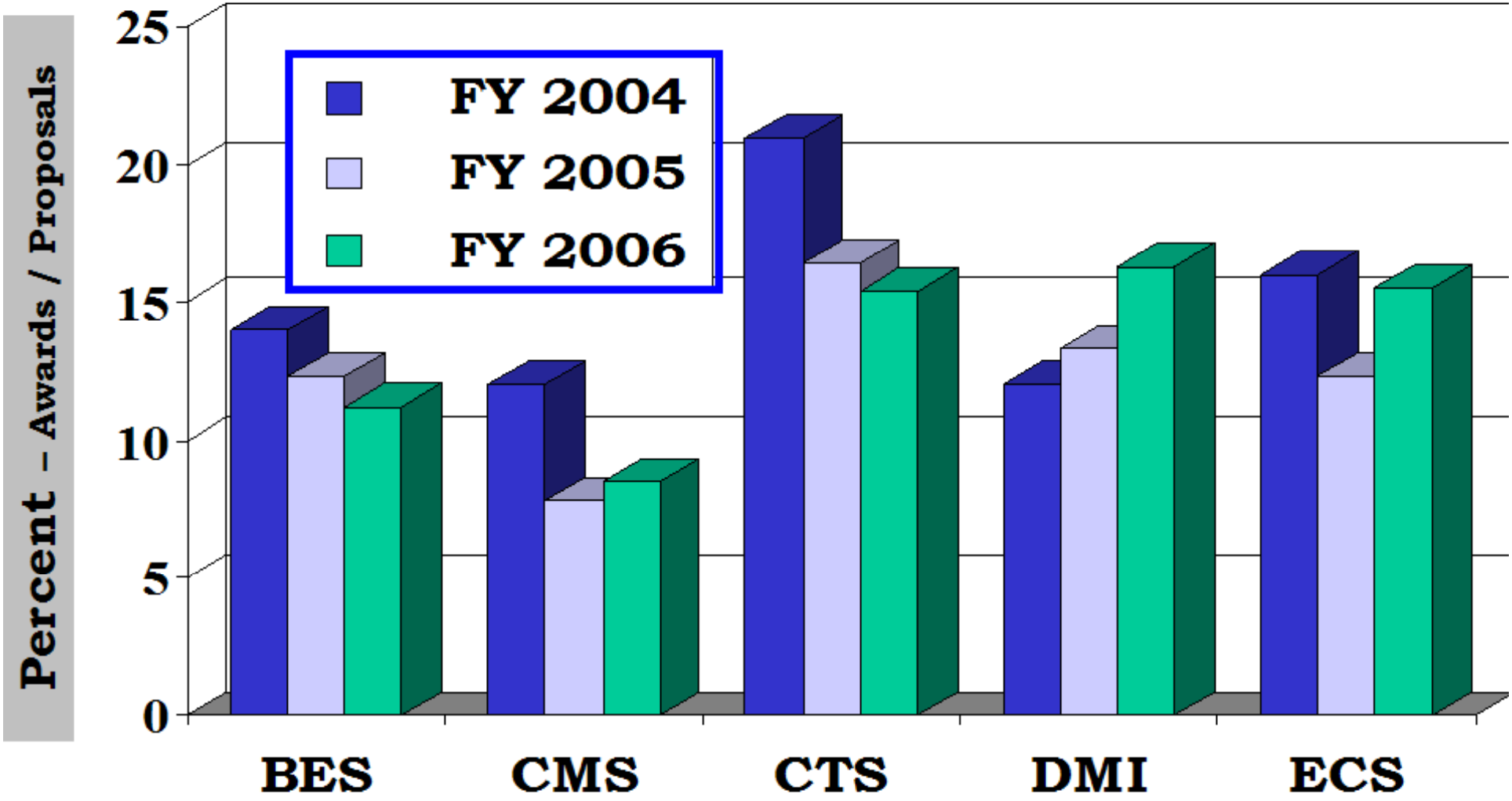


	ENG	BIO	CISE	GEO	MPS
Awards	106	38	119	21	112
Declines	747	368	545	101	577

National Science Foundation Directorate for Engineering

CAREER Grant Award Success Rates

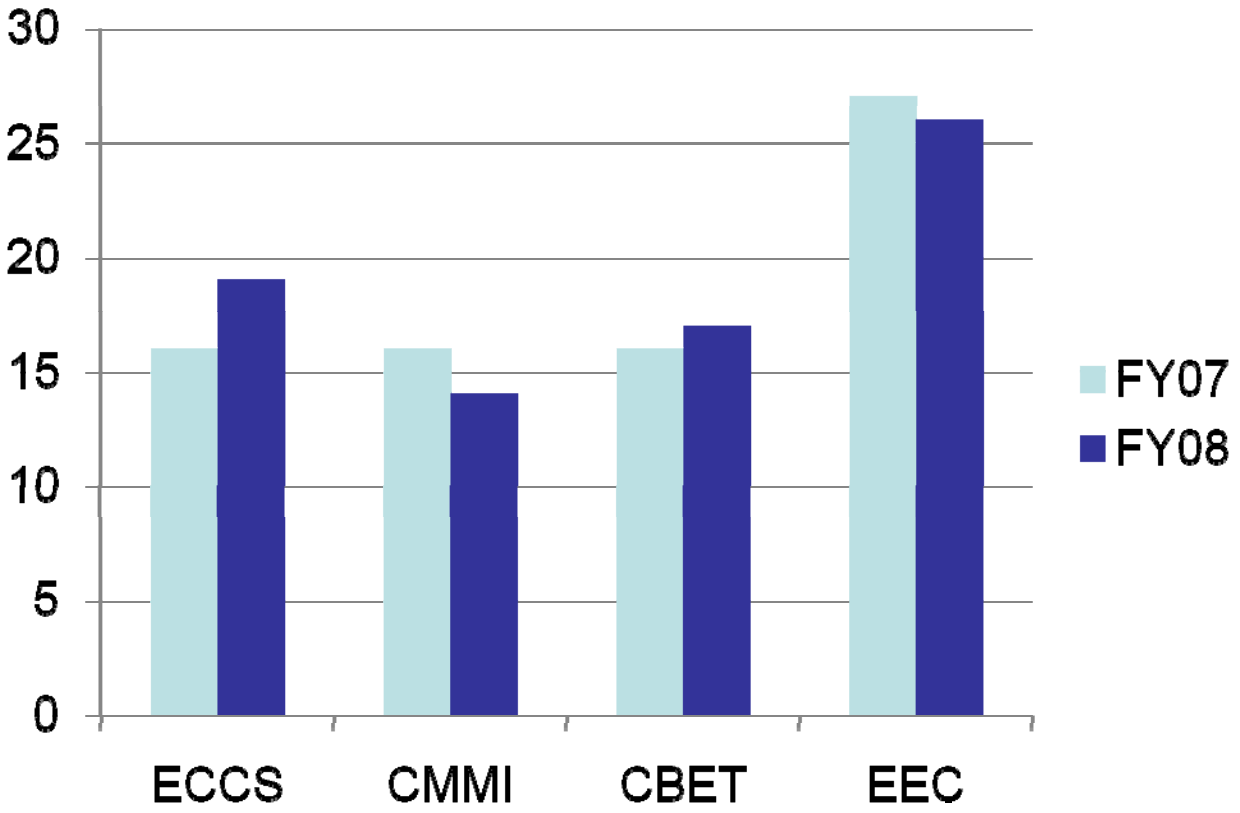
FY 2004-2006



Five Divisions

15 February 2006

ENG CAREER Proposal Success Rates



CAREER: Useful Websites

- Examples of the "broader impacts criterion":

  http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf

- CAREER Homepage:

  http://www.nsf.gov/career

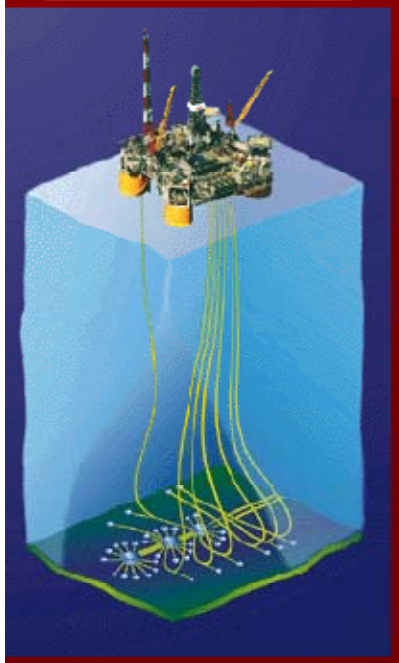
  - Program Solicitation
  - Submission Checklist
  - Awards lists and abstracts

- FAQ (NSF08051)

Obtaining DoE Funding

DOE Mission Areas

Office of Science
U.S. Department of Energy



Energy Resources - *To Foster a Secure and Reliable National Energy Supply*

National Security - *To Maintain the Safety and Reliability of the Nuclear Stockpile*

Environmental Quality *To Repair the Environmental Consequences of the Cold War*

Science

Main Funding Energy Offices

- Office of Energy Efficiency and Renewable Energy
  Alternative & renewable energy, energy efficiency, business development, & superconductivity.
- Office of Fossil Energy
  Electric power, oil, gas, & coal technologies.
- Office of Nuclear Energy, Science and Technology
  Nuclear energy, isotopes, and nuclear facilities management.
- Office of Science
  Basic science, advanced computing, biological and environmental research, fusion, high energy and nuclear physics, materials, and medical.

Major DoE Labs

- Ames Laboratory
  Chemical, engineering, materials, mathematical and physical sciences.
- Argonne National Laboratory
  Basic science research in the physical, life, and environmental sciences.
- Brookhaven National Laboratory
  Basic and applied science and technology research.
- Fermi National Accelerator Laboratory
  High-energy physics.
- Idaho National Engineering and Environmental Laboratory
  Science and engineering solutions, and environmental cleanup.
- Lawrence Berkeley National Laboratory
  Advanced materials, life sciences, energy efficiency, detectors, and accelerators.
- Lawrence Livermore National Laboratory
  Science and engineering related to national security and nuclear weapons.
- Los Alamos National Laboratory
  Science and engineering related to national security and nuclear weapons.
- National Energy Technology Laboratory
  Fossil energy exploration, supply, and end-use technologies.
- National Renewable Energy Laboratory
  Renewable energy and efficiency.
- Oak Ridge National Laboratory
  Neutron, chemical & radiochemical, biological, energy, engineering and robotics, environmental, high performance computing, materials, measurement, physical, chemical, and simulation sciences.
- Pacific Northwest National Laboratory
  Environmental, energy, chemical, biotechnology/medical, security technologies, information technology, instrumentation, and materials.
- Princeton Plasma Physics Laboratory
  Fusion energy and plasma physics research.
- Sandia National Laboratories
  Science and engineering related to national security and nuclear weapons.
- Savannah River National Laboratory
  Applied research and development related to national and homeland security, energy security, and environmental and chemical processing technology.
- Stanford Linear Accelerator Center
  Electron accelerators, high-energy physics, and synchronotron radiation research.
- Thomas Jefferson National Accelerator Facility
  Nuclear physics, accelerator science.

Main DoE Agency Sites

- DoE Researcher's Site http://www.energy.gov/forresearchers.htm
- Office of Energy Efficiency and Renewable Energy EERE: http://www1.eere.energy.gov/financing/
- Office of Science: http://www.science.doe.gov/grants/
- Office of Nuclear Energy, Science & Tech. http://www.ne.doe.gov/
- Office of Fossil Energy http://www.fossil.energy.gov/business/Business_Opportunities.html

Solicitations

- Office of Science – open solicitation: ~$400M FY08 http://www.science.doe.gov/grants/
- EERE http://www1.eere.energy.gov/financing/business.html
- Office of Fossil Fuels http://www.netl.doe.gov/business/solicitations/index.html
- Nuclear Energy http://www.ne.doe.gov/universityPrograms/neUniversity2a.html

Obtaining DoD Funding

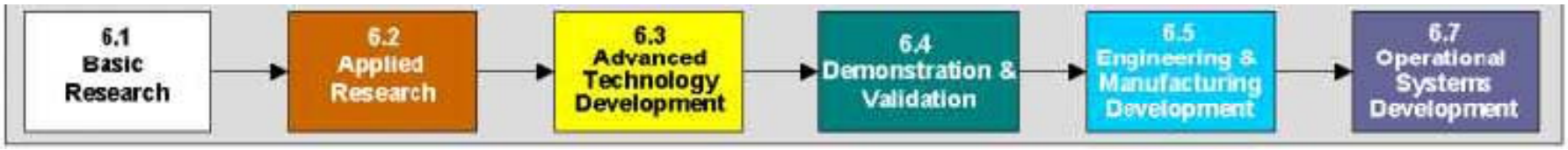
DoD Organization

- **DoD is an Executive Branch function with oversight by the House and Senate Armed Services Committees**
- **Congressional oversight = appropriations**
  - **can specify DoD spending**
- **All DoD departments are headed by civilian officers**
  - **Secretary of Defense is a cabinet-level civilian post**
- **Congress requires Sec. Defense to study the overall priorities of the military & report them every 4 years in the Quadrennial Defense Review**

Quadrennial Defense Review

- QDR discusses threats, structure, & capabilities for DoD
  - Includes future capability requirements (10 to 20 years)
- From this document, each service creates technology objectives and future operational capabilities
- These capability requirements form the basis for military research, development, test, & engineering (RDT&E) activities
- All of these activities must be part of the overall plan to be defensible
- DDR&E (Director, Defense Research & Engineering has control of the RDT&E budget for these activities

Budget Categories



- The service research offices are mostly 6.1
  ARO, ONR, AFOSR
- The service labs are mostly 6.2
  ARL, NRL, AFRL
- Battle labs are mostly 6.3
  e.g. Army RDECs, Navy NAVAIR and NAVSEA
- DARPA is a mix of 6.2 and 6.3
  University research as subs can be 6.1

Observations: DoD Funding

- Read solicitations very carefully
- Agencies tend to develop long term relationship with PI
  - Often disappears after program manager leaves
- Well defined objectives indicated and progress judged on meeting them
- Generally like ‘feelies’ as evidence of success
- Reports and reviews are more numerous than other federal agencies
- Teams of ‘best researchers’ valued, independent of location

Observations: DoD Funding

- Take all opportunities to be introduced to others in agency
- Submit early – lower log numbers evaluated first and will get more attention
- Build case for your team in very direct manner
- Tech transfer is very important
- Include glossary of terms, white paper in appendix
- DURIPS – PM must give OK
- MURIs – Help write the call

Observations: DoD Funding

- White paper approach is effective
- Program officers often conduct research
- Faculty Fellowship Program is effective means to establish a relationship
- The agencies report to the “Generals”
- The art of discerning directed RFPs
  - short time line
  - anticipated total award/number awarded
  - review process

Managing Research

Now that you have funding!

Guiding Observations

- Every student is different
- There is not a single correct management style
- When in doubt ask: What is best for the student?

Reasons Grad Students Fail

- Project too difficult or unmanageable
- Student lost interest in topic
- Student isolation
- Poor planning and project management
- Writing the dissertation
  - Few problems if turn in parts while still doing research
- Personal problems: Money is #1
- Inadequate or no supervision

  (22% of Graduate Students in survey)

Identify something your advisor did that was effective in managing the group.

Student Project Definition

A Four-Step Process

Step One: Select Student

- Keep a sharp eye in the classroom
- Participate in the recruiting and application review process
- Impress on the student that this is the most important decision they will make in graduate school!

Student Project Definition

A Four-Step Process

Step Two: Involve the student in defining the project. It is a periodic process.

- Teach student how to define research problem
- Scientific method
- Synthesis of literature
- Grant/contract requirements must be met
- Funded project likely more successful (peer reviewed, long term support)

Student Project Definition

A Four-Step Process

Step Three: Incorporate early milestones

- e.g., specific classes to take, a report, first paper or presentation, a piece of equipment designed, literature review, hypotheses / broad objectives, etc.
- Establish a 2-way “probationary” period
- Establish a timeline for project
- Require regular progress reports

Student Project Definition

A Four-Step Process

Step Four: Establish the research committee

- Help the student choose the committee, impressing on them the purpose of a research committee
- Have the student present her/his hypotheses (depending upon department rules), objectives, and any initial results to her/his committee within the first year.

Group Meetings

- **Periodic group meetings are helpful**
  - **Presentations, guests, lectures, paper reviews, book chapters, special events**
  - **Meet with other groups occasionally**
  - **Keep it technical**
- **Social events**
  - **Holiday party, picnic**

Individual Meetings

- Establish mechanism for regular meetings
- Every student is different
  - Identify strengths, weaknesses
  - Academic children
- Clearly convey your expectations

Faculty Role

- **You are the research advisor not fellow student**
  - **Maintain professional relationship**
  - **Thesis is authored by 1 person**
- **You are role model, academic counselor, consultant, sounding board, evaluator, supporter, editor, agent**
- **Establish traditions / build pride**
  - **Hardbound dissertation, dinner, pedigree chart, . . .**
  - **Maintain contact**

Ideal Advisor

- Advisor active in research
- Has regular meetings with Grad Students
- Creates a research climate that encourages Graduate Students to have independent ideas
- Expects quality
- Model for ethical behavior
- Want graduates to *almost* think they did research & thesis by themselves

Graduate Student Evolution

- GS like warm, *structured* advisors
- 1st year Grad Students want to develop a personal relationship with advisor
- 2nd & 3rd year Grad Students want expertise and availability
- Grad Students want advisor to adjust to their growing maturity
- In US, *laissez-faire* often interpreted as neglect - - particularly by international Grad Students

Research Advisor Attitude

- **Advising is a form of teaching.**
- **Advisors need to remember that student's growth is more important than research. Do what is best for the student at all times.**

  Kant's imperative: ***Act so that you treat human beings always as ends and never only as means. Graduate students deserve dignity and respect.***

- **The best thing for the Grad Student may not be what the Grad Student wants.**
  - **Thus, there may be periods when the Grad Student is unhappy.**
  - **Advisors can discuss reasons for their behavior.**

Professors as Advisors

- A few are effective with all students, most are effective with some, and a few are incapable of advising anyone.
- Some professors have problems over and over.
- Some professors are better with Undergraduate and Masters students, and others are better with PhD students.
- Professors improve with experience.
- Departments: Track performance of PhD candidates

Student Evaluation and Feedback

- Develop an evaluation process
  - Examples: Formal process (e.g., your University may have a process), biweekly meetings, group meetings
- Build in methods to detect problems early
  - Sample writing, timelines, independence, professionalism, …
- It is never inappropriate to send words of "thank you," "job well done," and "good luck" or to likewise let them know that you are expecting better things from them!
- Students are usually better than you think!!!
  - Don't be afraid to challenge them!!!

Student Evaluation and Feedback

- **Utilize peer group**
  - **Feedback on presentations, research plan, writing**
- **Return material in a timely manner**
- **Seek advice**
  - **Counselors, other faculty, international office, …**

Placement and Professional Development

Help students determine career goals

- **Academics: Research, Service, and Teaching**
  - **Expose them to your world in a positive way!**
  - **Examples: meaningful TA, involve in writing proposals, direct undergraduates, have them attend key technical meetings (have them prepare business cards)**

Placement and Professional Development

Help students determine career goals

- **Off-campus experience**
  - **Take them on visits to industrial, consulting, and governmental facilities, host visitors from these facilities, choose someone who works in one of these locations as an external committee member, etc.**
- **Discuss pros and cons of each career choice**

Placement and Professional Development

Help students prepare for placement

- **You have an obligation to assist student in obtaining a suitable position**
  - **Put in the "leg work" for your student**
    - Network, letter, promote, attend right conference
  - **Maintain contact lists** (industry friends, former students)
  - **Expose them to the profession** - Include students in conference/session planning, encourage them to volunteer for their professional societies, participate in short courses, and other activities that may promote their interaction with professionals
  - **Host Visitors**

Placement and Professional Development

Help students prepare for placement

- **Assist in presentation development, review resume and supporting documents**
  - **Typical questions, talk with other students, observe faculty candidates, sample resumes**

Other Personnel

- **Undergraduates**
  - Realizing good productivity by UG's challenging
    - Let graduate students advise Ugs
    - Well defined/scoped project required
- **Post-doctoral researchers**
  - More productive, less guidance, assist in directing graduate students
  - Select carefully
  - Remember their objective is to find next job
  - Cost issue

Other Personnel

- **Technicians**
  - They provide continuity / institutional memory
  - Involve in education as well
  - Remember this is their career
- **Staff can be very helpful – treat with respect**

Managing Students

- **Qualifying exam (understand your department's process)**
  - **Complete early (key indicator of potential)**
  - **Allow appropriate time for preparation**
  - **Provide good samples**
  - **Use opportunity to require corrective measures (e.g., additional coursework, language course)**

Managing Students

- **Thesis writing**
  - Students always underestimate time
  - Encourage continuous writing
  - Develop “living” outline early
  - Do not let student leave before finished!
- **Defense**
  - Practice with research group
  - Involve student with committee selection
  - Demonstrate breadth and depth
    - Cannot present entire thesis

Managing Students

- **Teaching Assistants**
  - **T.A. with faculty other than advisor**
    - Better learning experience plus they get to know other faculty
  - **Emphasize teaching not grading**
    - Provide feedback on teaching effectiveness
  - **Include a creative aspect to teaching experience**

Continuity

- **Overlap students**
  - **Have each student be responsible for training her / his successor**
  - **Use a checklist of basic lab techniques they must first master**
- **Technicians, research faculty useful**

Continuity

- **Make certain that the laboratory has teaching resources**
  - **Develop a notebook of SOPs. Have students write these.**
  - **Keep copy of all equipment manuals locked up but available**
  - **Have good methods books on hand**

Continuity

- Document programs, thesis is good repository
- Use lab books (good for IP too)
- Maintain contact with students after graduation

Budget Management

- Check expenditures routinely (monthly)
  - But don't spend too much time. Let system work for you!
  - Early on, have the administrative staff in your department and College explain their roles in the budget process
- 'Bank' fund – overhead account/Foundation
- If trouble predicted, tell folks
- Use educational institution discounts
  - 'training future customers' rationale

When/What to Disclose

- **WHAT:** Disclose novel ideas, discoveries, inventions that are timely and useful to the marketplace
- **WHEN:** Disclose with sufficient notice before any publication (*prior to submission*) or enabling public disclosure
- Don’t know if you should disclose? ***Call local office of licensing/technology***

University Owns Employee Inventions When:

- The invention was made while you were employed at university

AND

- The invention is in the field/discipline in which you are/were employed

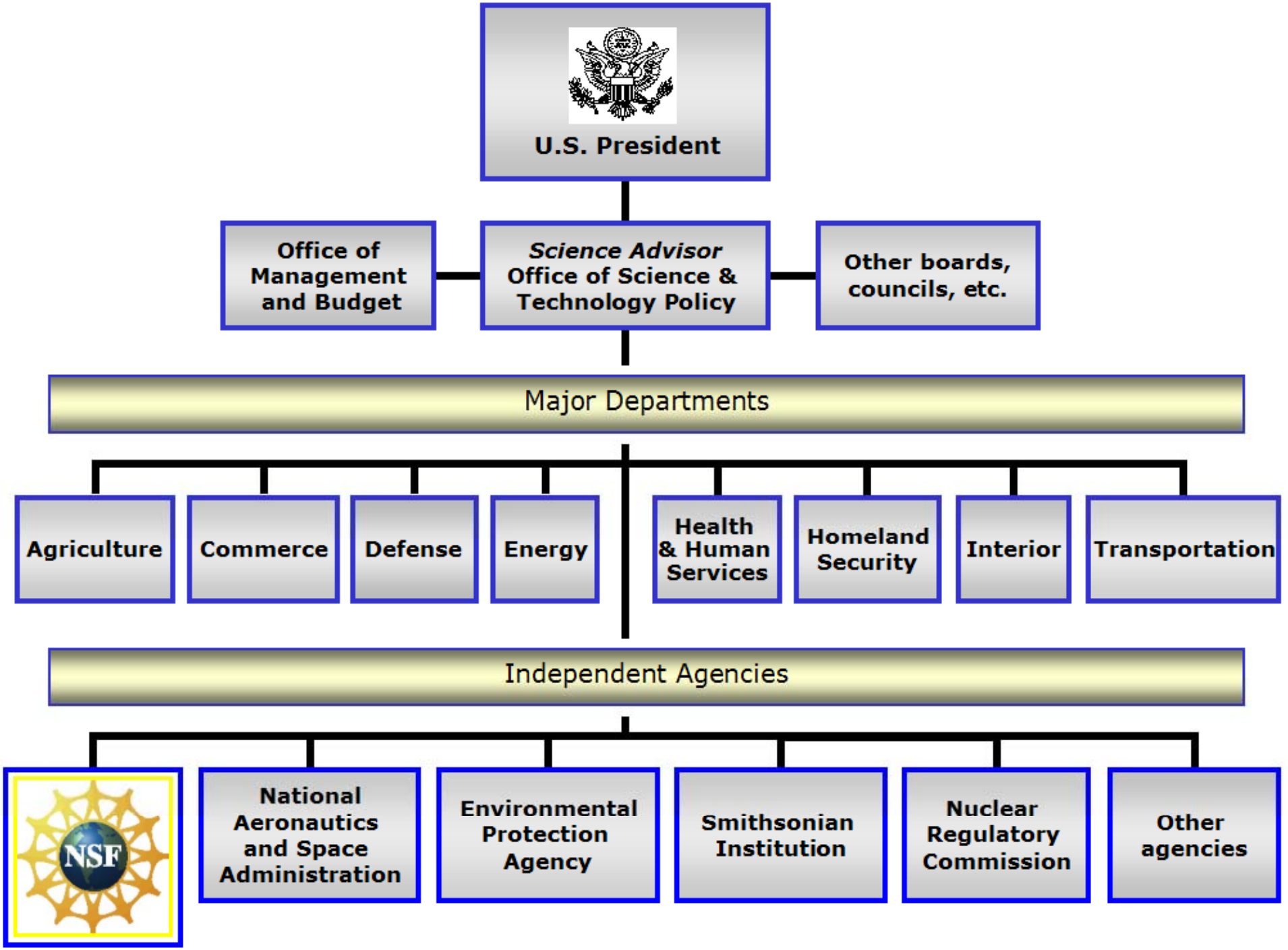
OR

- The invention was made with university resources

Types of Intellectual Property

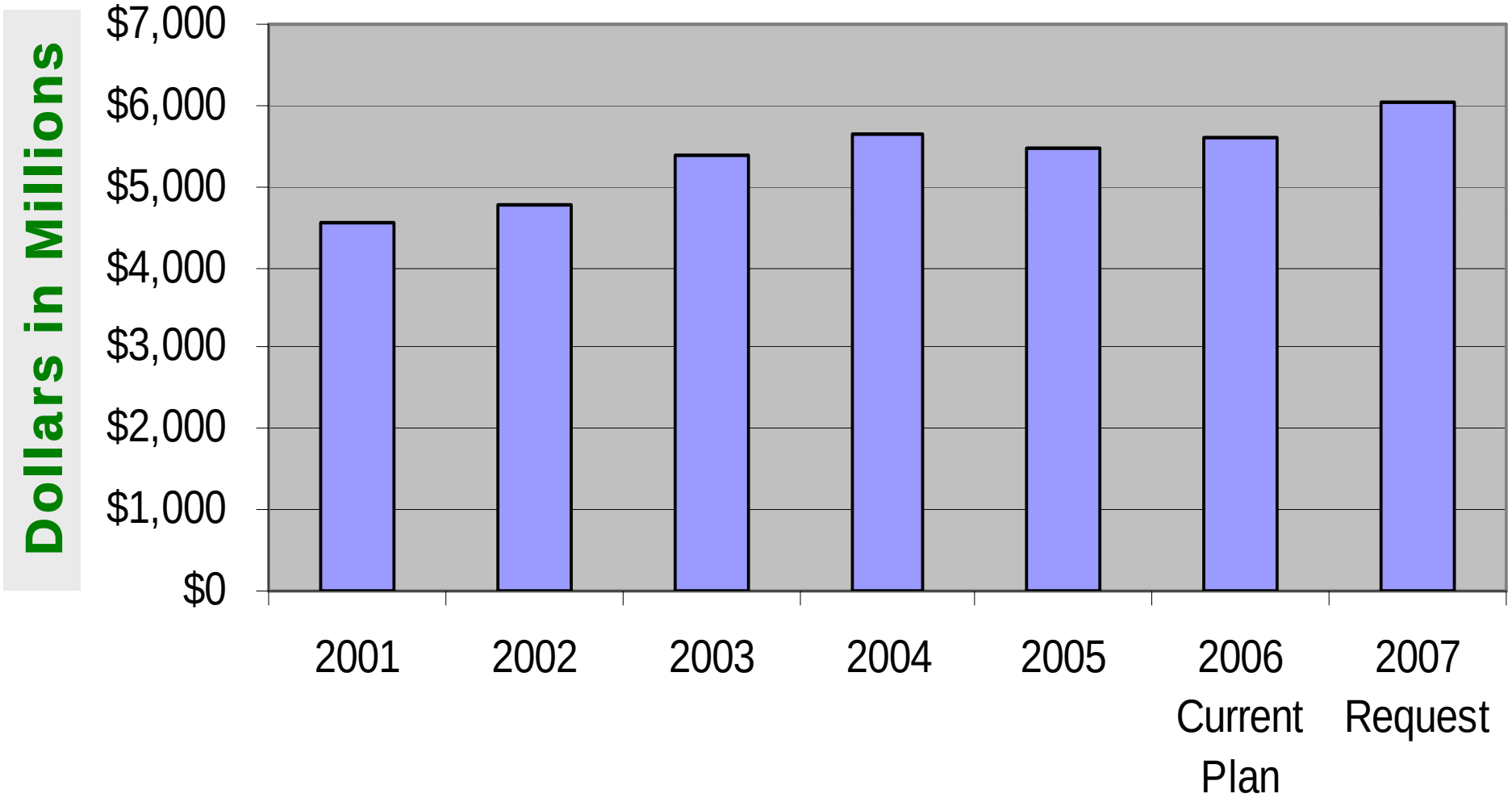
- Patents
  - Enable you to exclude others from using your ideas for a limited period of time
- Copyrights
  - Grant you the right to exclude others from reproducing your work without permission
- Know-how
  - Expertise required to reproduce a patent, licensed in conjunction with the patent

Engineering Directorate Activities


U.S. President
Office of Management and Budget
Science Advisor
Office of Science & Technology Policy
Other boards, councils, etc.
Major Departments
Agriculture
Commerce
Defense
Energy
Health & Human Services
Homeland Security
Interior
Transportation
Independent Agencies
NSF
National Aeronautics and Space Administration
Environmental Protection Agency
Smithsonian Institution
Nuclear Regulatory Commission
Other agencies

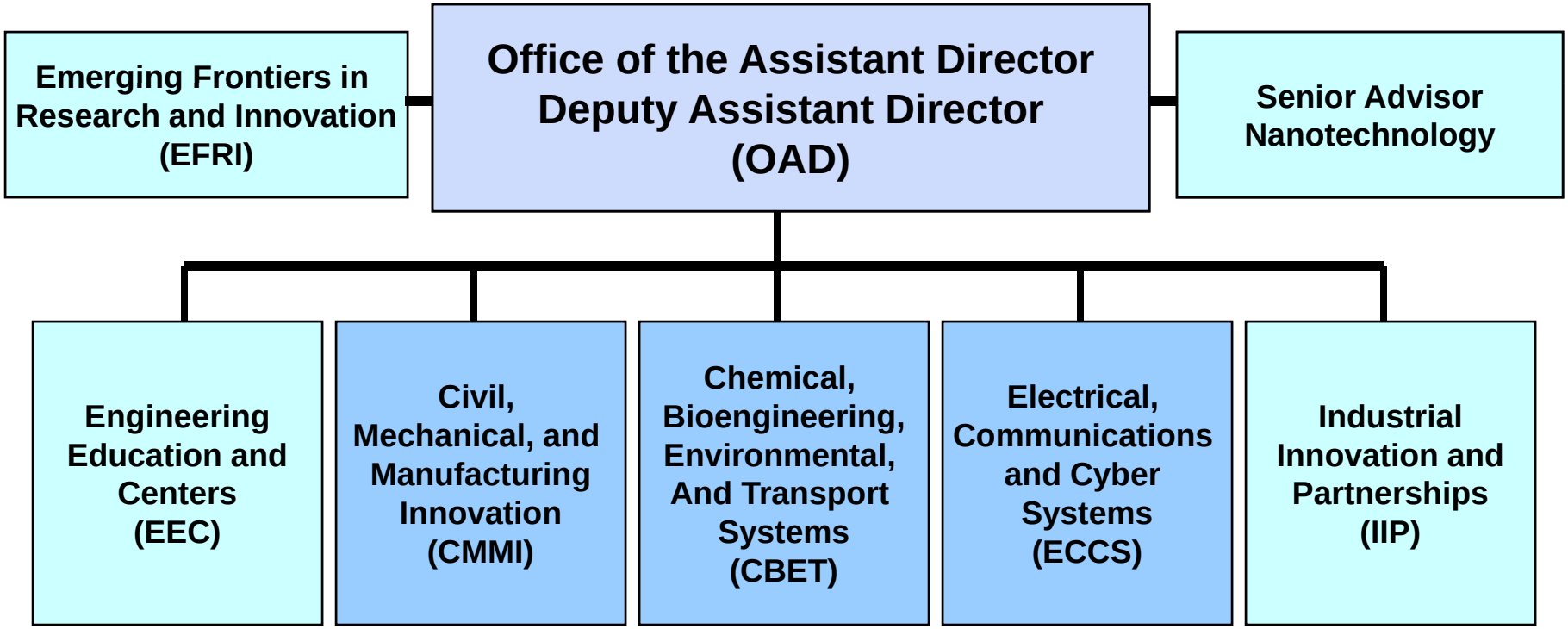
NSF Budget

FY 2001-2007



Directorate for Engineering

FY 2007



Chemical, Bioengineering, Environmental, and Transport Systems (CBET) Organization

- **Chemical, Biochemical, and Biotechnology Systems**
  - **Biotechnology, Biochemical, and Biomass Engineering (Fred Heineken)**
  - **Catalysis and Biocatalysis (John Regalbuto)**
  - **Chemical and Biological Separations (Rose Wesson)**
  - **Process and Reaction Engineering (Maria Burka)**

- **Biomedical Engineering and Engineering Healthcare**
  - **Biomedical Engineering (Semahat Demir)**
  - **Biophotonics, Advanced Imaging, and Sensing for human Health (Leon Esterowitz)**
  - **Research to Aid Persons with Disabilities (Ted Conway)**
  - **Bioengineering, Interdisciplinary, and Centers (Alexandr Simonian)**

Chemical, Bioengineering, Environmental, and Transport Systems (CBET) Organization

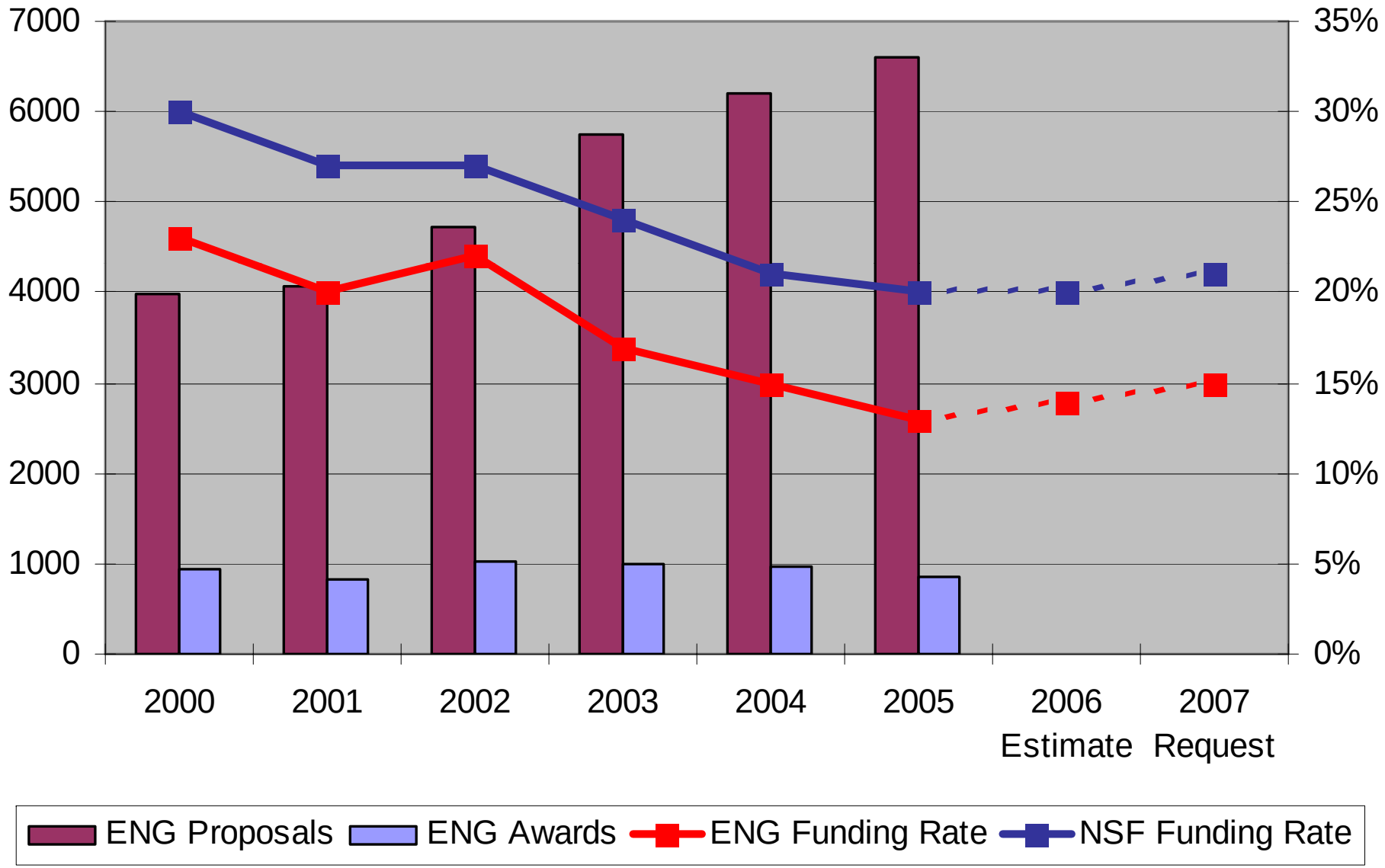
- **Environmental Engineering and Sustainability**
  - **Energy for Sustainability (Trung Nguyen)**
  - **Environmental Engineering (Clark Liu)**
  - **Environmental Sustainability (Bruce Hamilton)**
  - **Environmental Implications of Emerging Technologies (Paul Bishop)**

- **Transport and Thermal Fluids Phenomena**
  - **Combustion, Fire, and Plasma Systems (Phil Westmoreland)**
  - **Fluid Dynamics (Bill Schultz)**
  - **Interfacial Processes and Thermodynamics (Bob Wellek)**
  - **Particulate and Multiphase Processes (Marc Ingber)**
  - **Thermal Transport Processes (Theodore Bergman)**

http://www.nsf.gov/div/index.jsp?org=CBET

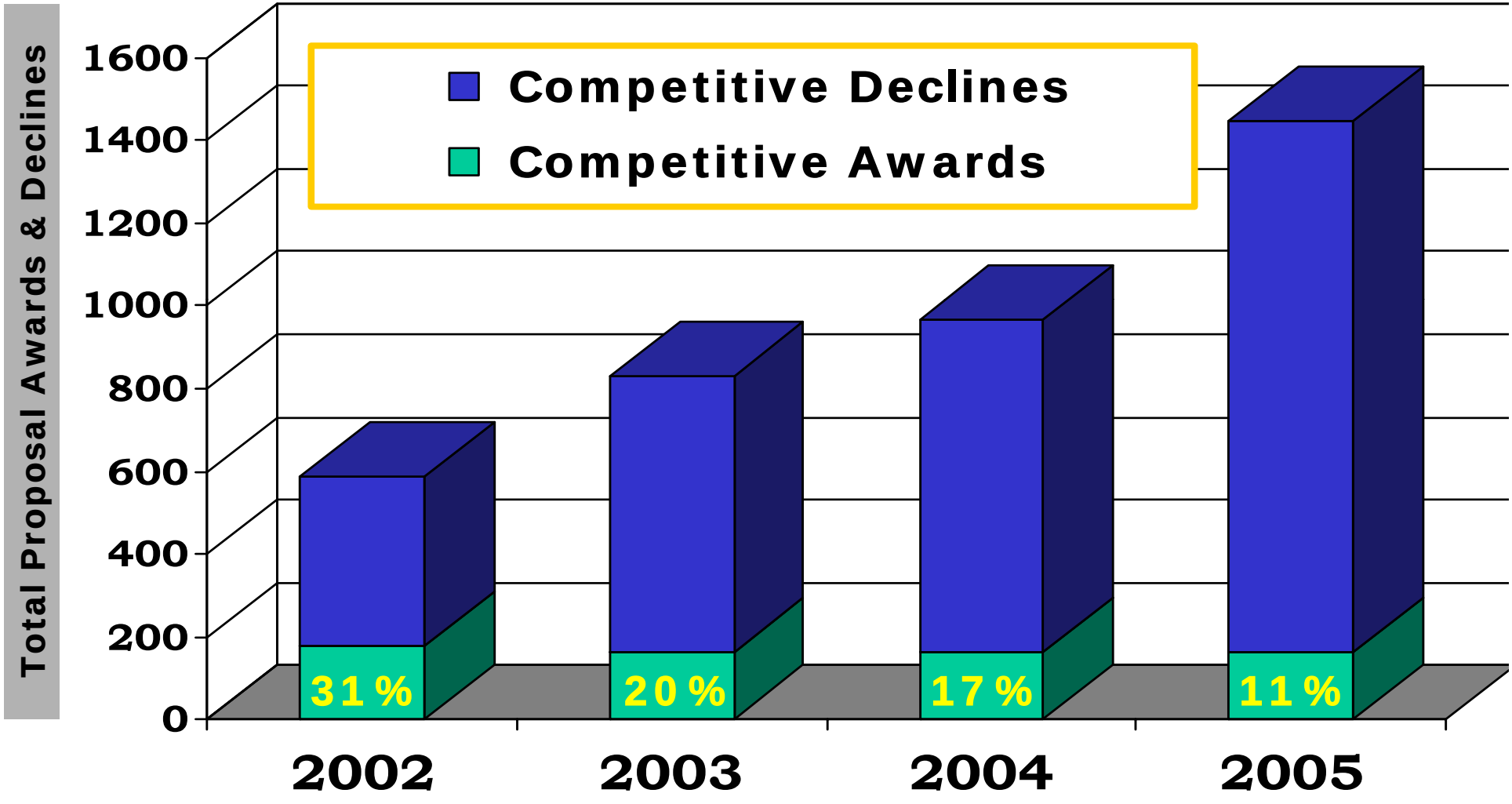
ENG and NSF Funding Rates

Research Grants



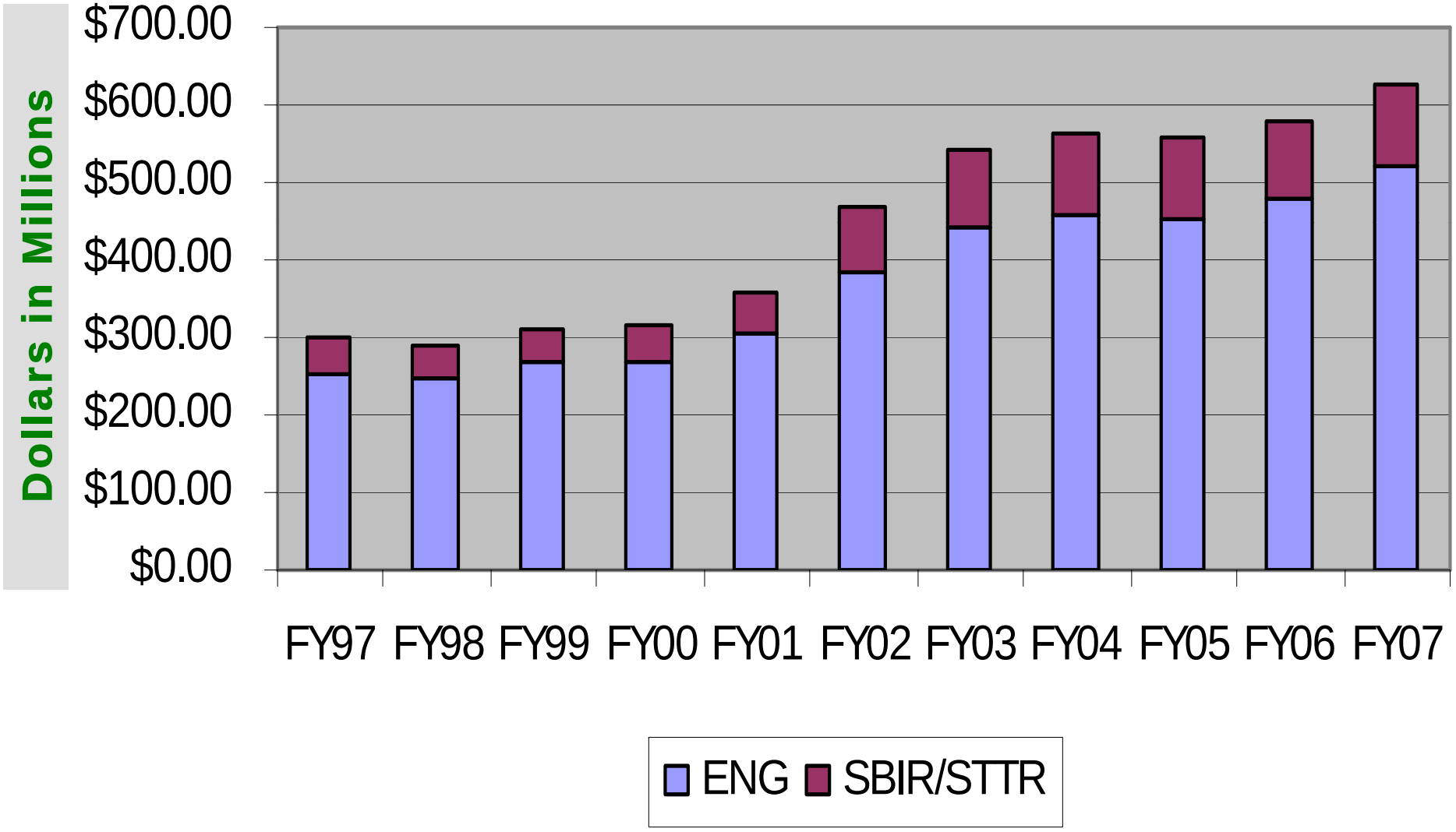
National Science Foundation ❖ Directorate for Engineering

CTS Funding Rate for Competitive Awards



Declines	**407**	**664**	**803**	**1286**
Awards	**179**	**166**	**163**	**162**

ENG & SBIR/STTR Budget History



NSF FY 2008 Budget Request
National Science and Technology Council (NSTC) Crosscuts

Dollars in millions

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request Amount	Change over FY 2007 Request Percent
National Nanotechnology Initiative	$359.71	$373.18	$389.90	$16.72	4.5%
Climate Change Science Program	196.88	205.25	208.25	3.00	1.5%
Networking and Information Technology	811.53	903.74	993.69	89.95	10.0%
Homeland Security	342.10	385.91	375.36	-10.55	-2.7%

ENG Research Priorities FY08

- Nanotechnology
- Cyberinfrastructure
- Human and Social Dynamics
- Network for Earthquake Simulation (NEES)

Proposed NSF Research Priorities FY09

- **Beyond Moore's Law - $20 million**
- **Adaptive Systems Technology - $15 million**
- **Dynamics of Water Processes in the Environment - $10 million**

Proposed NSF Research Priorities FY09

- **Cyber-enabled Discovery and Innovation - $100 million**
- **Petascale Computing and Cyberinfrastructure - $682 million**
- **Climate Change - $221 million**

http://www.nsf.gov/news/priority_areas/

Emerging Frontiers in Research and Innovation (EFRI)

- EFRI focuses support on important emerging areas in a timely manner
- Typically, the annual budget for EFRI will be 3-to-5 percent of the Directorate budget (~$15-to-$30 million)
- It is expected that the investment in any topic will range from $3 million to the total annual ERFI budget

Major Initiatives with Impact on CBET

in FY 2008-9

- **Cyber-Enabled Discovery and Innovation (CDI) 08-604**
- **Accelerating Discovery in Science and Engineering Through Petascale Simulation and Analysis 08-592**
- **EFRI 08-599 (FY09: 1. Biosensing and Bioactivation and 2. Hydrocarbons from Biomass)**

Identifying Research Problems

Research Problem Solutions

- **Problem / Solution types:**
  - **Straightforward extension of known (likely to succeed, but unlikely to discover much)**
  - **Substantial in novelty and approach (higher risk, but chance of greater return)**
  - **Wildly innovative, a hunch (provocative, but difficult to justify)**

What should you look for?

- What is my expertise? What is particular about my expertise that contributes to the agency's mission?
- What is the right agency for my proposal?
- What is the funding agency funding or planning to fund?
- How can I apply my expertise to satisfy the funding agency's needs?
- What does the rfp ask for?
- Who are the key people to contact?
- Who are my competitors?

Understanding Industry

- **Pick one subfield of industry.**
  - **e.g., industrial gases**
- **Products, processes, economics, companies & people.**
- **Read and clip articles.**
  - **e.g., *Chemical & Engineering News* *and* annual reports.**
- **Talk to industrial people at meetings. Persist.**

Advice - Slide 1 of 2

- **Think Big**
  - Reflect on problem from its broadest perspectives
  - Imaginative solutions to fundamentally important problems
  - If you start small, you will finish even smaller
- **Invest Discretionary Funds to Differentiate – equipment dollars are the most difficult**

Advice - Slide 2 of 2

- **Avoid Tunnel Vision**
  - Plan for long-term, beyond immediate research area
- **Take Your Time**
  - It takes considerable time to design a research program
- **Envision Outcomes**
  - Difference that research can make, significant papers produced, credited with solution to important problem

Developing a Research Proposal

Developing a Research Proposal: Overview Slide 1 of 2

- Identify and describe the conceptual framework
- Review relevant literature for problem and related problems
- Articulate the general research question in context of above
- Formulate set of hypotheses

Pitfalls

- Failure to establish significance of your work
- Too much text devoted to complex details or past accomplishments
- Failure to construct *testable* hypotheses
- Constructing too many hypotheses

Pitfalls

- Too ambitious for time/money
- Inadequate skills or credentials for proposed task
- Poor experimental design
- Bad analytical or statistical methods

Know the Proposal Review Process

- External
- Panel
- In-house
- Review criteria
- Background of reviewers

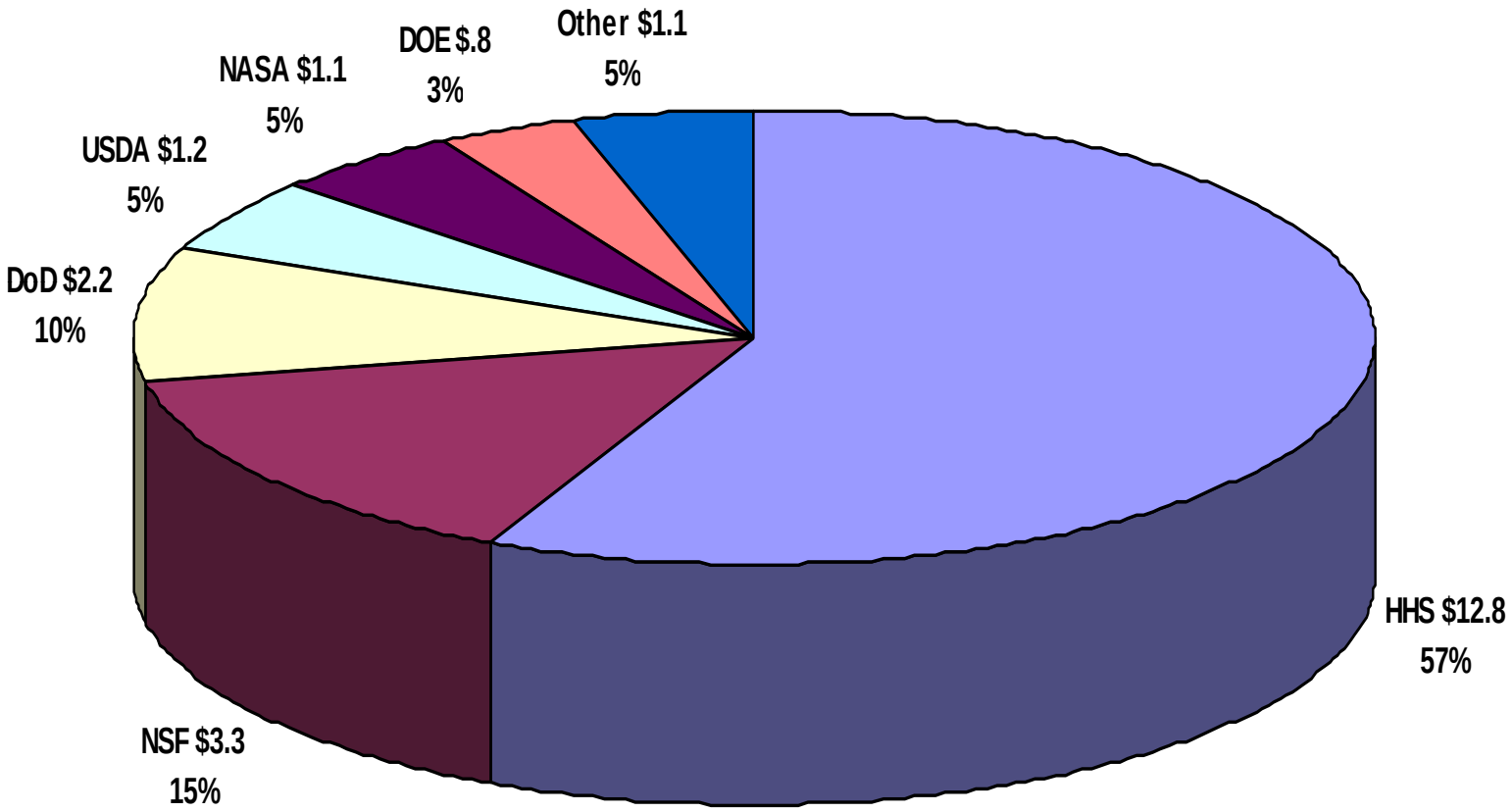
Know the Review Criteria

- Scientific content and merit
- Innovation and scope
- Relevance of problem
- Rigor of hypotheses

Know the Review Criteria

- Feasibility of research design
- Qualifications of Investigator(s)
- Suitability of facilities
- Impact on broader issues (e.g., education)

Federal Academic S&E Support FY01 ($Billion)



How Do We Get Information ?

Surf the Web at:

http://www.nsf.gov

http://afosr.sciencewise.com

http://www.onr.navy.mil

http://www.darpa.mil/baa/

http://www.nih.gov/grants

http://www.pr.doe.gov

How Do We Get Information?

- **Community of Science**
  http://www.cos.com/
- **Commerce Business Daily**
  http://www.cbd.cos.com/
- **Federal Information Exchange**
  http://www.sciencewise.com/fedix/
- **University Research Web Page – Resources**
  http://rqp.ufl.edu/research

Contacting Funding Agencies

Matching Your Problem with Funding Source

- **Most important problems/good solutions are eventually funded**
- **Explore**
  - **Funding source's mission, interests, priorities**
- **Be flexible**

Why Contact Program Officer

- Establish credibility
- Guidelines on how to shape your proposal to match program needs
- Increase funding probability
- Save time

Who to Contact

- Identify suitable agency
- Identify suitable person at agency
  - Ask colleague / advisor
  - Search website
  - Read solicitation
- Industry: research expert
  - Professional meetings
  - Other networking opportunities

The Monitor's Perspective

- **Monitor's job is to assemble the best research program**
  - **Must convince others to fund programs**
  - **Wants the best people on board**
  - **Often looking for breakthroughs**
  - **Open to new ideas, but current pgm**
- **Likely competent but not necessarily expert in field**
- **Has agency responsibilities, but also personal agendas (the 15/70/15 rule)**

Learn more about Monitor

- Ask colleague about monitor's style
- Probe funding patterns
- Education
- Own research area
- Rotator or staff
- Program responsibilities

How to Contact the Program Officer

- **Email**
  - Solicitation,website
  - Simple questions, phone appointment
- **Phone call**
  - Prepare questions in advance
  - Be professional and yourself
  - Listen carefully

How to Contact the Program Officer

- **Personal Visit**
  - **By appointment only (will be in area)**
  - **Can be most effective**
  - **If appropriate volunteer seminar (e.g., at lab, foundation)**

How to Contact the Program Officer

- **White paper / pre-proposal / letter of intent**
  - **Increasingly required / recommended**
  - **Some program officers will volunteer to offer feedback on short versions**

What to Ask

- Deadlines
- Duration restrictions
- Funding schedules
- Earliest start date
- Overhead restrictions
- Maximum direct cost allowed
- Review process and criteria
- Research objectives
- Project plan
- Personnel issues
- Application process
- Which program?
- Advice?
- $ for new faculty?
- Typical award size
- Special equipment needs

Proposal Title

- Present in clear, concise, meaningful manner
- Avoid jargon and overstatement
- Be careful with buzzwords (some folks are annoyed)
- Avoid cute and too informal titles

White Paper

- Gives essence of idea
- Contains goals and scope of study, significance, brief description of methods, hypotheses & expected results
- Clear, concise, accurate, exciting
- Addresses broader impact
- Usually 1-2 pages
- Conventions vary by field/agency – seek samples

Other Ways to Contact Program Officer

- Attend open workshops
- Attend agency conferences
- Meet with at professional/research society meetings
- Get on schedule during campus visits
- Invite for seminar
- Volunteer to review, especially panels

Tips

- Second time phenomenon
- Federal fiscal year begins 10/1
- Get involved in proposing program ideas
- Attend program reviews when appropriate

If Match Not Found

- Don't take it personally
- You saved considerable time and made a contact
- Can idea be changed to match interest?
- Discuss what you learned with colleagues
- "Press On": Persistence
  - "Nothing in the world can take the place of persistence.
  - Talent will not: nothing is more common than unsuccessful people with talent.
  - Genius will not: unrewarded genius is almost a proverb.
  - Education alone will not: the world is full of educated derelicts.
  - Persistence and determination alone are omnipotent."

Time Management

Academic Freedom

Lots of it and no personal assistant!

Academic tasks

- teaching
- research
- book writing

Non-academic tasks

- calendar
- filing
- student recruiting

Mandated time

- classroom
- grading
- report writing
- committee meeting

Discretionary time

- literature reading
- proposal writing
- email
- session chair

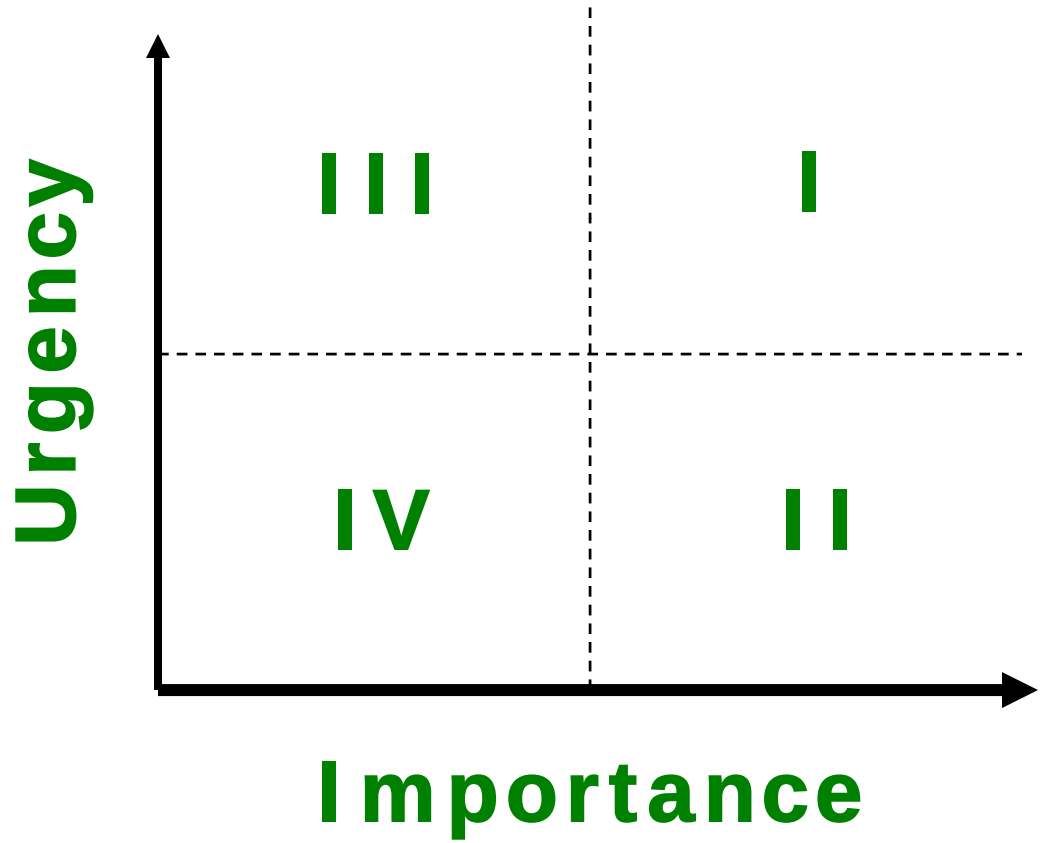
Time Management Exercises

- Write down the most important time saver that you use
- Write down the largest time waster you face
- Share tips

Know Yourself

- **Perform time audit**
  - **For one week write what you do every 30 min**
- **When do you work best?**
  - **Internal – time alone**
  - **External – time in groups**
- **Cannot do everything – know priorities**
- **Decide flexibility level you can tolerate**

Task Classification



Classifications

I. **Urgent and important.** (Deadline-driven activities that further your goals.)

II. **Important but not urgent.** (Long-term professional, family, and personal activities that further your goals.)

III. **Urgent but not important.** (Much e-mail, many phone calls and memos, things that are important to someone else but don't further your goals.)

IV. **Neither urgent nor important.** (TV, computer games, junk mail.)

S.P Covey, A.R. Merrill, and R.R. Merrill, *First Things First*, New York, Simon & Schuster, 1994.

Recommendations

- **Commit to several hours a week on Quadrant II items, and cut down on time spent in Quadrants III and IV.**
- **Work on Quadrant I and II items when you're at peak efficiency.**
- **If you're trying to write a book, put it on the Quadrant II list, otherwise it will never get written.**

Tips

- 55 hours/week doing professor stuff is about right
  - More productive, creative, accurate
- Touch stuff only once, if possible
- Ask for help when needed
- Delegate with clear instructions of expectations

More Tips

- **Schedule meetings at office of others – you can leave**
- **Know your business and say no to other's**
  - **Learn to say no nicely**
    - **"I'm sorry, but I've just got too many other commitments right now."**
    - **"Good talking to you, but I've got something I need to attend to now."**
- **Learn to finish**
  - **Don't keep revising (perfectionist) needlessly**
  - **One writing/proofing on low importance items**

Keeping track of it all

- **Use a calendar**
  - Develop own system
  - Schedule **all** priority activities: research, writing, student advising/direction, professional development
  - Schedule teaching preparation time (not too early or late – will make a better teacher)
- **Schedule large blocks of time**
  - Understand work 'start-up' time, location
- **Schedule personal time**
  - Vacations, growth, extra fun day on travel
- **Stick to it (as much as possible)**
  - Others will adapt

Keeping track of it all

- Use a to do list
  - Card system, PDA, Outlook
  - Identify time for daily update
- Filing system vs. Piling system
  - Decide appropriate level of effort
  - Larger chunks, delegate, electronic
- Develop system for time sensitive stuff

(Optimal) Procrastination

- **Fun vs. urgent vs. important activities**
- **Fear factor is often cause**
  - **Break into smaller tasks**
  - **Schedule it**
  - **Delegate it**
  - **Reward or punish self**

E-mail

- Don’t check e-mail 1st thing in the morning (do something important 1st, e-mail’s an excuse).
- Don’t check e-mail in late evening (interferes with sleep).
- Minimize exchanges: ‘propose not ask’ Suggest solutions, use ‘if then’
- Unsubscribe if you don’t read
- Fewer and more concise message
- If message train longer than 3, phone

E-mail

- Assume that your e-mail messages are not private.
- Never write a “hot” e-mail message. It is too easy to send by accident. Don’t ever send messages when you are angry.
- Make e-mail brief and proof-read it.
- Don’t read other people’s e-mail.
- Respond to e-mail in batches.

E-mail

- If you will be away, have the e-mail automatically reply that you will respond when you return.
- Aliases are convenient for sending e-mail to a number of people, but the messages loses its personal touch.
- Requests for people to do work are much more effective if they are addressed to only one person instead of to a group.

Telephone

- If the phone rings at a truly bad time, such as the moment you're leaving for class, do not answer it.
- If a call is going to take more time than you have available, it is polite to ask if you can call back.

Telephone

- **With sales people you do not want to talk to, be polite but firm – ”I’m really not interested.” If the caller is rude and ignores this, repeat the statement and hang up.**

- **If you leave an important message on an answering machine, make sure you provide a way (e-mail or return call) for the recipient to let you know the message was received and understood.**

Postal Mail

- **The goal is to handle each item only once.**
- **Don’t handle mail (or e-mail) during your prime work-alone times.**
- **Sort the mail into valid, invalid, and semi-valid. Discard invalid mail or save it for a very low energy period.**
- **Open the semivalid mail, scan it, and reclassify it.**

Postal Mail

- **Open the valid mail, and as much as possible complete whatever you have to do – respond, file it, talk to someone about it, or discard it at one sitting.**
- **Do *something* to move mail forward every time you pick it up.**
- **Write directly on the letter to respond to the sender or to make notes for yourself.**

Postal Mail

- Respond immediately to the rare truly urgent item by fax, e-mail, or phone.
- When you send mail, include your e-mail address, phone, and fax numbers, and perhaps the URL to your homepage on the letterhead.
- Envelopes should have return addresses.

Postal Mail

- **Letters should be polite, short, and to the point.**
- **If you are really angry about something, write a letter to calm down, but do *not* send it. After you have calmed down, put this "hot" letter in the trash.**

Time Management

#1. Set goals & prioritize.

#2. Delegate. How can we do this?

- To secretaries & assistants
- To graduate students and undergraduates as part of learning experience. (They don't *work* for you!)
- Give clear assignments & responsibility for details.
- Check on results & give feedback.
- Give credit.

#3. Use efficient processes.

To Achieve Flow, You Need:

1. Sense of control.
2. To set realistic goals & subgoals
3. Meaningful rules (e.g., sports & games)
4. Feedback on progress
5. Focused attention
6. Balance between challenge & skills
7. To increase challenge & skills
   to prevent boredom

Truths

- There are 24 hours in a day – everyone is given the same each day
- Rate at which humans communicate is relatively constant
- If you are doing something you really enjoy, it is not called work
- A proposal will not be funded if not submitted

Closing Remarks

Establish Credibility

- Amongst peers, research community, funding agencies
- Methods include
  - Write review articles, attend meetings, visits to funding agencies
  - Presentations, workshop mode conferences
  - Review panels, volunteer in societies, white papers
  - Seminar chair, request papers, preliminary results
- New faculty often given special consideration

CAREER DEVELOPMENT WORKSHEET 4

COMMON OBJECTIVES FOR NEW FACULTY

1. Build Network in Community

List 5 Research Peers: 1_____ 2_____
3_____ 4_____ 5_____

List most important conference/workshop you should attend:
research: _____
professional:_____
education: _____

List eight senior professionals who will be asked to write recommendation/evaluation letters:
1_____ 2_____
3_____ 4_____
5_____ 6_____
7_____ 8_____

What is the leading laboratory/group in your field?

_____

CAREER DEVELOPMENT WORKSHEET 4

2. Establish Credibility

List the two best journals in your field:

1._____ 2._____

Title of review article to be written in next five years:

_____

What is the most original idea you are now working on?

What award should you be nominated for in the next five years?

Attitude

- Don’t take yourself or tenure race too seriously.
  - Tenure doesn’t help if you’re dead.
- Lighten up
  - Humor & laughter
  - Bad things happen to all professors – don’t dwell on them or let them get you down.
  - Take the university as it is – reform it later.
- Take care of yourself
  - Eat right, exercise, sleep enough
  - Spend time with “family”
- If you *know* something is right thing to do – do it!

Please take a few minutes to complete our survey

Good Luck!

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