Grant Proposal Development Workshop

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Overview

- Types of Proposals
- Proposal Development Tips
- General Funding Agency Information
- NSF-specific Information
- Mock Panel

Types of Proposals

- **Research**
  - **SIRP**
  - **Multi-investigator**
- **Research Infrastructure**
- **Education**
  - **Curriculum Development**
  - **Educational Innovation**
- **Special Projects, RAPID, EAGER, Travel, Workshops, Postdoctoral Fellowships, etc.**
- **Supplements – standard, REU, RET**
- **SBIR, STTR**

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 workshops
  - Help set future trajectories
- Serve on panels
  - Read lots of proposals
  - Good citizenship

Cindy Brown's Tips (1)

- **Have I done a good job in the first page of explaining what I want to do and why it is important, in a way that the typical reader can understand? this has to be both readable and interesting, and directed to the mission of the funding agency.**
- **Did I spend the right amount of space on the various aspects of what I'm proposing...intro, history, research plan, etc.? And, does it make sense as a narrative, and read well?**
- **Did I reference the right people? particularly likely reviewers**
- **Is my proposal understandable to the probable reviewers? Is it at the right technical level?**
- **Did I show why I am the right person to do this work? (prior results, how this relates to my earlier work)**

Cindy Brown's Tips (2)

- **Did I include a plan to evaluate or assess my results? this is essential for some kinds of proposals**
- **Is there an educational component beyond the usual grad student involvement? (depending on the funding agency) for some agencies, this is a big plus**
- **If there are issues this agency particularly looks at, have I addressed them?**
- **Does my proposal look professional? Well formatted, nice diagrams, correct spelling and grammar**
- **Did I follow all the rules and suggestions in the RFP?**
- **Does my budget make sense in terms of being proportional to the amount of work I'm proposing to do? Did I ask for everything I reasonably could without going overboard?**

Bryant's Tips (1)

- Never submit a paper as a proposal
- Project Description
  - Must propose a new idea
  - Distinguish between research and development
  - Make the research challenges and goals explicit
  - Make your methodology explicit
  - Support your motivation section with at least one good example or application
  - Acknowledge the areas of high and low risk as well as the associated rewards
  - Purpose of a software artifact is to support the research
  - Iterate with non-participating colleagues to get pre-proposal review

Bryant's Tips (2)

- Objectively assess the work of competitors and place in proper perspective ("on the shoulders of giants …")
- Avoid pejorative terms in describing competitor's work
- Cite all of the relevant work
  - journal and conference papers (yes-yes)
  - Textbooks are generally a no-no; monographs okay
- Avoid fallacious arguments
- Be clear that early prototypes and experiments do not indicate that the work has already been done
- Avoid excessive detail. Succinctness gets rewarded.
- Budget your space. A one-quarter-page diagram should replace a page of text

Bryant's Tips (3)

- Avoid such terms as "obvious", "trivial"
- Develop a well-defined evaluation and dissemination plan
  - Include assessment experts if necessary
- Include text on technical merit and broader impacts of your proposed work – why it is good and whom it will impact
- Explain leverage of existing facilities, equipment and other support for the project
- Obtain all relevant letters of support and required documents
- If CAREER develop a research program vs. a research project
- If CAREER develop an education plan

Bryant's Tips (4)

- **Project Summary**
  - **Write it last, spend as much time as you did on the project description**
  - **Get your new idea into the first 50 words**
  - **Give a taut summary of the problem, your research plan and what you hope to achieve**
  - **Must include a succinct description of technical merit and broader impacts**
  - **Iterate many times as the summary is an important bifurcation point**

Agencies and Foundations

- **Federal Agencies**
  - **National Science Foundation (NSF)**
  - **DARPA (DoD)**
  - **NIST (DoC)**
  - **ARO, ONR, AFOSR (DoD)**
  - **NASA**
  - **DoED**
  - **DoE**
- **Private Foundations**
  - **Sloan, Ford, Pew, Keck, HP, Intel, Honda, …**

NSF's Mission

- http://www.nsf.gov/about/glance.jsp

  The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…" With an annual budget of about $6.06 billion, we are the funding source for approximately 20 percent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.

NSF Organizational Structure (1)

- National Science Board
  - Office of the Director (Director)
    - Directorates (Assistant Director)
      - Divisions (Division Director)
        - Programs (Program Officer, Program Director)

NSF Organizational Structure (2)

- **Director's Office (OD)**
  - **Dr. Arden Bement**
- **Directorates**
  - **Biological Sciences (BIO)**
  - **Computer Information Science and Engineering (CISE) – AD: Jeannette Wing**
  - **Engineering (ENG)**
  - **Geosciences (GEO)**
  - **Math & Physical Sciences (MPS)**
  - **Social, Behavioral, Economic Sciences (SBE)**
  - **Education and Human Resources (EHR)**

Office of Cyberinfrastructure

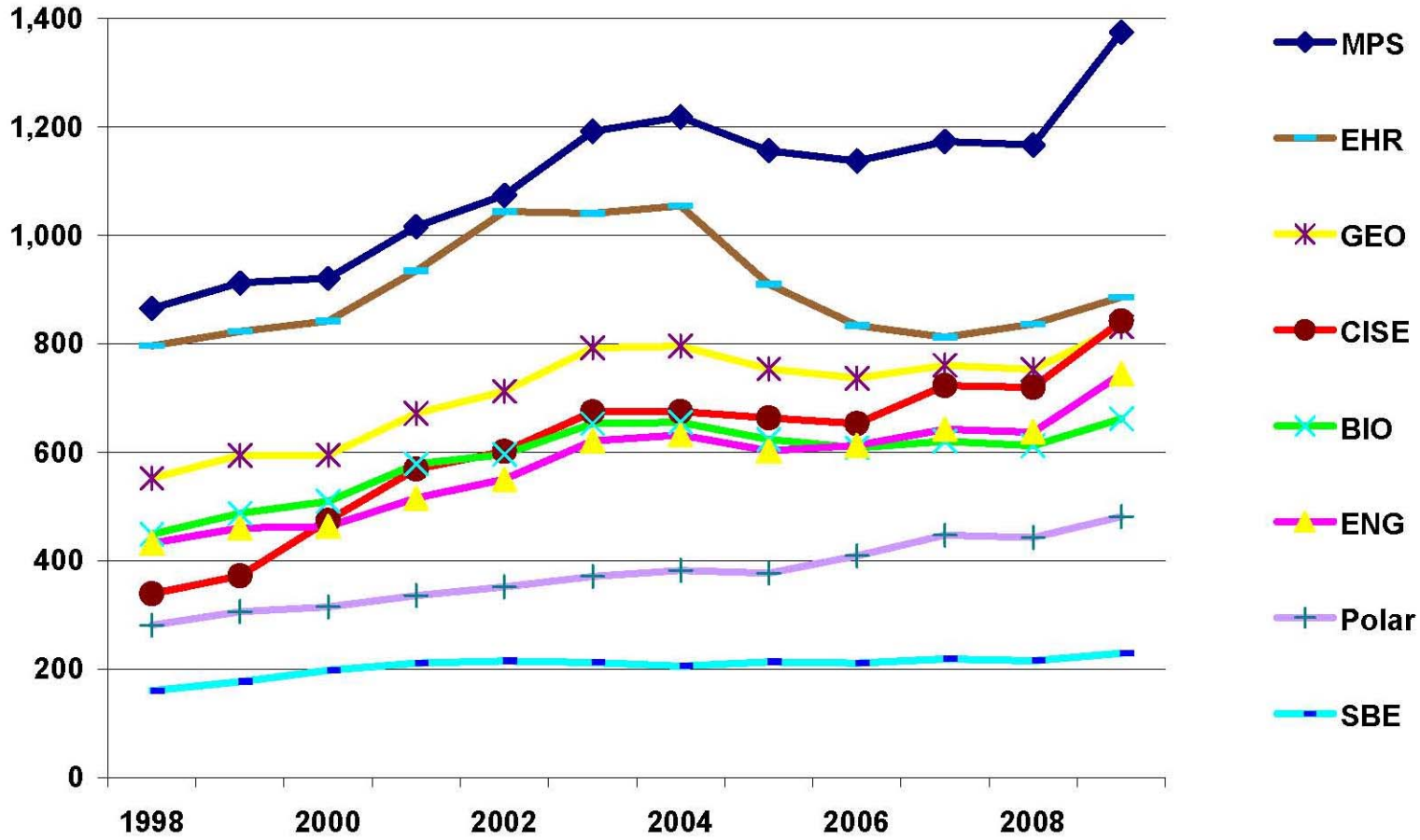
- **In June 2005 the SCI Division of CISE was disbanded and the Office of Cyberinfrastructure was created in the Officer of the Director**
- **Approximately $70M of budget**

NSF and CISE Budgets

- **NSF's budget has grown from about $3B in 1994 to almost $6.06B in 2009**
- **CISE's budget has grown from about $200M in 1994 to about $800M in 2009**
- **The funding rate for NSF has dropped from about 33% in 1994 to about 24% in 2008**
- **The funding rate for CISE has dropped from about 36% in 1994 to about 16% in 2004 and rebounded to about 24% by 2008**
- **Median annual CISE award size has grown from about $72K in 1994 to about $152K in 2004 and receded to about $100,000 in 2008.**

NSF Budget by Directorate, FY 1998-2009

(budget authority in millions of constant FY 2008 dollars)



Source: National Science Foundation data. FY 2009 figures are President's request. CISE includes new Office of Cyberinfrastructure.
R&D and non-R&D components included in directorate budgets.

AAAS

Funding Rates

- **http://dellweb.bfa.nsf.gov/awdfr3/default.asp**

Funding Rate Computation

- **Not well-defined**
- **Supplements**
- **Amendments**
- **Multi-proposal collaborative projects**

NSF Stimulus Package - $3B

- **$2 billion—will go to a combination of what the NSF calls "highly rated research proposals which could not otherwise be funded because of budget constraints, deferred maintenance and capacity upgrades to existing facilities and advancements in cyber-infrastructure."**
- **$400M to MREFC (Major Research Equipment and Facilities Construction)**
- **$300 MRI (Major Research Instrumentation)**
- **$200 ARI (Academic Research Infrastructure)**
- **$100M HER**
  - **$60M Robert Noyce Scholarship Program**
  - **$25M Math and Science Partnerships (MSP)**
  - **$15M new Professional Master's Science Program**

CISE Reorganization

- **CISE reorganized in 2004 in order to address a number of issues:**
  - **Increase in proposals submitted**
  - **Falling funding rate**
  - **Constant staff size**
  - **Proliferation of Programs**
  - **More NSF-wide programs**
  - **New initiatives**

CISE Divisions

- **Computing and Communications Foundations (CCF) (DD: Sampath Kannan) http://www.nsf.gov/div/index.jsp?div=CCF**
- **Computer and Network Systems (CNS) (DD: Ty Znati) http://www.nsf.gov/div/index.jsp?div=CNS**
- **Information and Intelligent Systems (IIS) (DD: Haym Hirsh) http://www.nsf.gov/div/index.jsp?div=IIS**

CCF Programs

- **Core Programs**
  - **Algorithmic Foundations (AF)**
  - **Communications and Information Foundations (CIF)**
  - **Software and Hardware Foundations**
- **CISE Cross-Cutting Programs**
  - **Data-Intensive Computing**
  - **Network Science and Engineering (NetSE)**
  - **Trustworthy Computing**

CNS Programs

- **Core Programs**
  - **Computer Systems Research (CSR)**
  - **Networking Technology and Systems (NetS)**
- **CISE Cross-Cutting Programs**
  - **Data-Intensive Computing**
  - **Network Science and Engineering (NetSE)**
  - **Trustworthy Computing**
- **Education and Workforce Programs**
- **Research Infrastructure Program**

CNS Programs (cont.)

- **Education and Workforce Programs**
  - **ADVANCE**
  - **Broadening Participation in Computing (BPC)**
  - **CISE Pathways to Revitalized Undergraduate Computing Education (CPATH)**
  - **Ethics Education in Science and Engineering (EESE)**
  - **Graduate Research Fellowships Program (GRF)**
  - **Integrative Graduate Education and Research Traineeship Program (IGERT)**
  - **NSF Graduate Teaching Fellows in K-12 Education (GK-12)**
  - **Research Experiences for Undergraduates (REU**

CNS Programs (cont.)

- **Research Infrastructure Program**
  - **CISE Computing Research Infrastructure (CRI)**
  - **Global Environment for Networking Innovations (GENI)**
  - **Major Research Instrumentation Program (MRI)**
- **Additional Funding Opportunities for CNS Community**
  - **Cluster Exploratory (CluE)**
  - **CreativeIT**
  - **Cyber-Physical Systems (CPS)**
  - **Expeditions in Computing**
  - **High-End Computing University Research Activity (HECURA)**
  - **Industry/University Cooperative Research Centers Program (IUCRC)**
  - **Software for Real World Systems (SRS)**

IIS Programs

- **Core Programs**
  - **Human Centered Computing (HCC)**
  - **Information Integration and Informatics (IIF)**
  - **Robust Intelligence (RI)**
- **CISE Cross-Cutting Programs**
  - **Data-Intensive Computing**
  - **Network Science and Engineering (NetSE)**
  - **Trustworthy Computing**

IIS Programs (cont.)

- **Additional Funding Opportunities for IIS Community**
  - **Advanced Learning Technologies (ALT)**
  - **Broadening Participation in Computing (BPC)**
  - **CISE Computing Research Infrastructure (CRI)**
  - **CISE Pathways to Revitalized Undergraduate Computing Education (CPATH)**
  - **Cluster Exploratory (CluE)**
  - **Collaborative Research in Computational Neuroscience (CRCNS)**
  - **CreativeIT**
  - **Expeditions in Computing**
  - **Foundations of Data and Visual Analytics (FODAVA)**
  - **High-End Computing University Research Activity (HECURA)**
  - **Software for Real-World Systems (SRS)**

NSF Wide Programs

- **Cyber-Enabled Discovery and Innovation**
- **Faculty Early Career Development (CAREER) Program**
- **Major Research Instrumentation Program (MRI)**
- **Research Experiences for Undergraduates (REU)**
- **Research in Undergraduate Institutions (RUI)**

NSF Merit Review Process and ARRA FAQ

- http://www.nsf.gov/bfa/dias/policy/meritreview/merit_animation.jsp
- http://www.nsf.gov/news/news_summ.jsp?cntn_id=114483&org=NSF&from=news
- http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf09038

CISE Emphasis Areas

The End