



The US National Science Foundation & Broader Impacts

Workshop on
Research Funding and the Good Life
March 18, 2009

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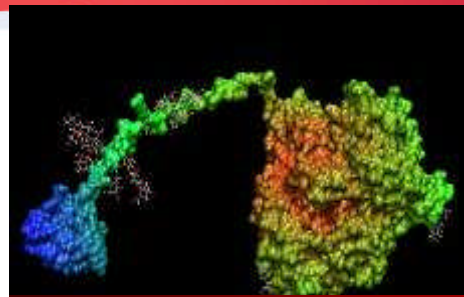
Dr. Ann Carlson: Senior Staff Associate, IRM



Astronomy



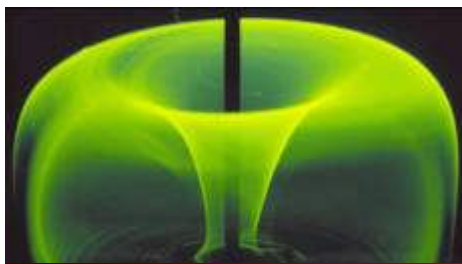
Biology



Computing



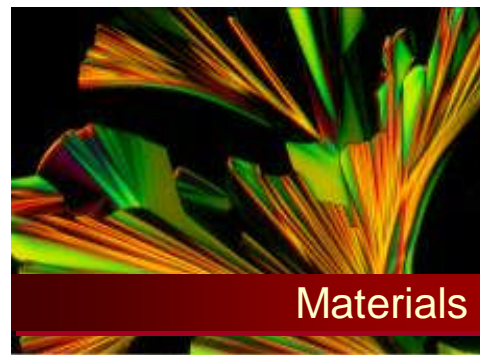
Earth & Environment



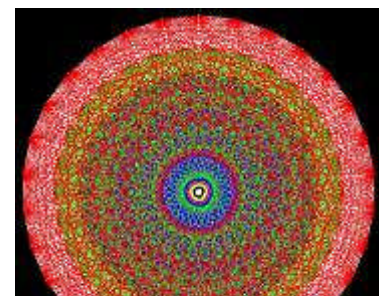
Engineering



Education



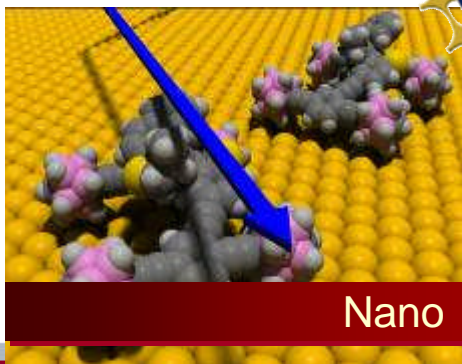
Materials



Mathematics



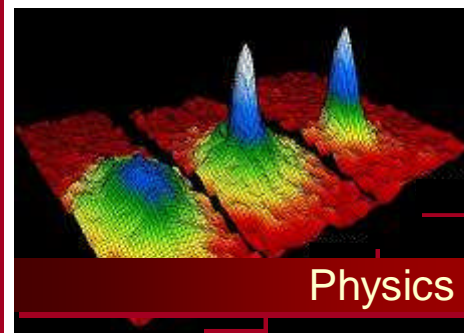
And so much more!



Nano



People & Society



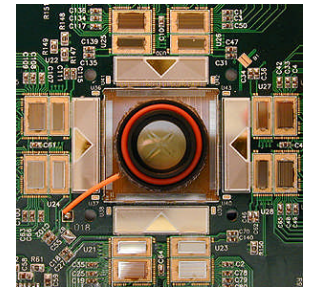
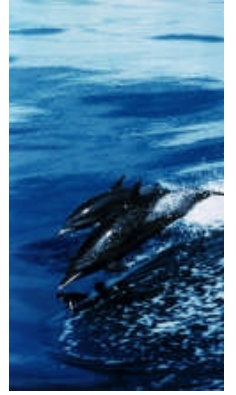
Physics



Polar

NSF Responsibilities

- Research across *ALL* core disciplines plus *interdisciplinary* and *international* research
- Research facilities, infrastructure and instrumentation
- Undergraduate and graduate education—research experiences, fellowships and traineeships
- K-12 Science & Math education
- Informal education—public understanding
- Science & Technology Indicators



NSB Vision: NSF Strategic Plan

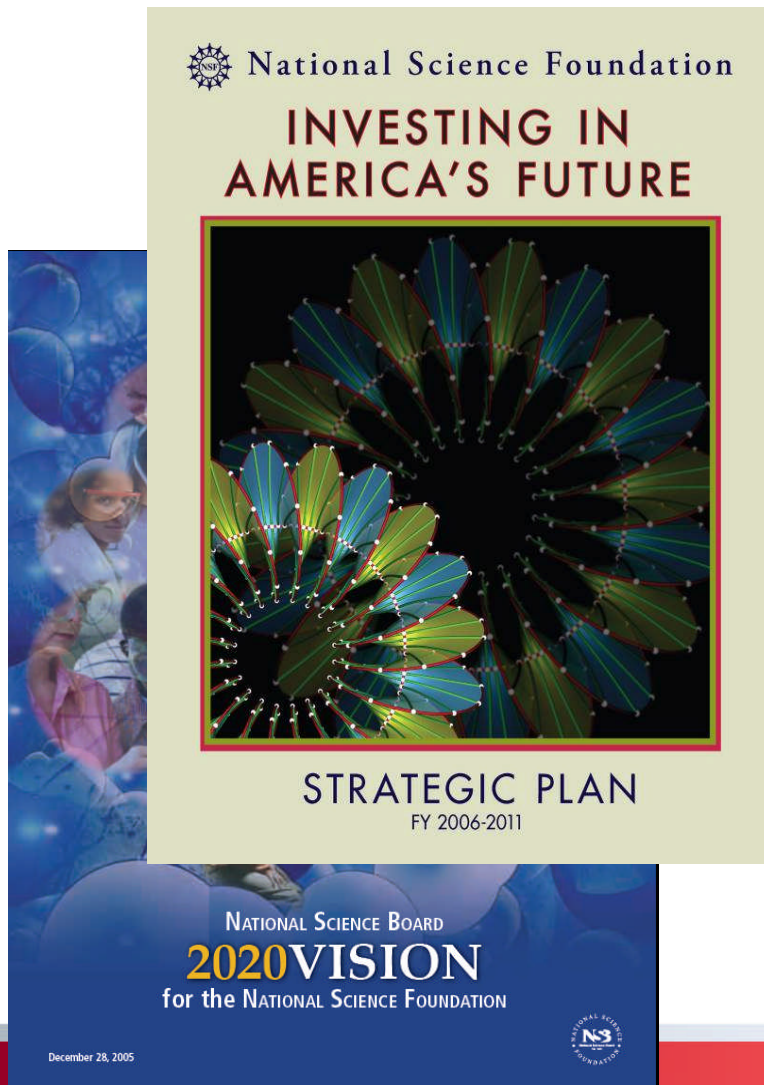
Catalysts of Change

Both:

- Present NSF Vision & Mission

Strategic Plan:

- Provides a context for planning
- Outlines NSF Core Values
- Defines Strategic Goals and Performance Objectives
- Outlines basis for evaluation



Goals of NSF Merit Review

- **Support the best possible fundamental research & education in all fields of science and engineering**
- **Demonstrate responsible stewardship of public funds through emphasis on broader impacts**



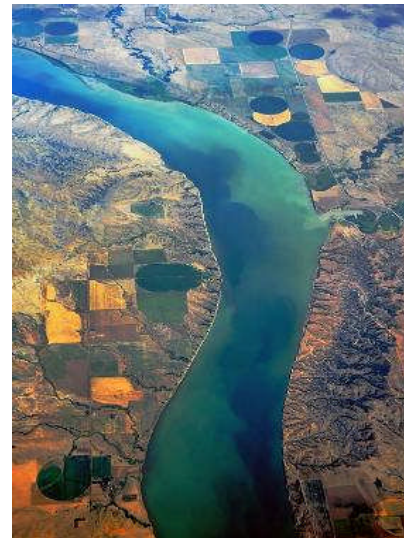
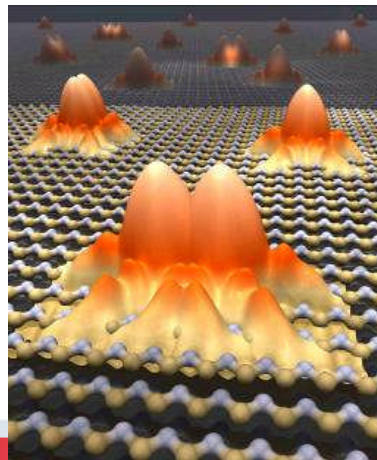
One Year at NSF

- **More than 40,000 proposals received**
- **More than 10,000 new grants and 20,000 renewals**
- **Approx. 50,000 reviewers conduct 250,000 reviews**
- **1,400 Employees: ~ 40% of NSF Program Officers are “rotators” –scientists, engineers, educators**
- **93-95% of funds-out the door!**



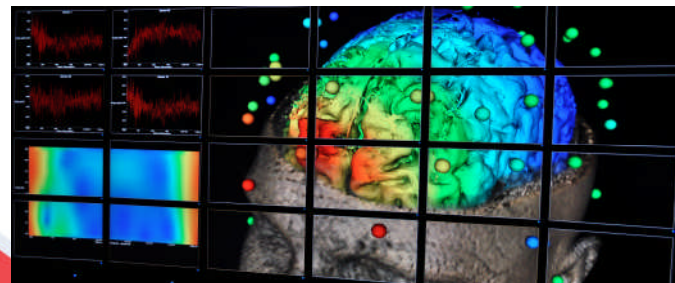
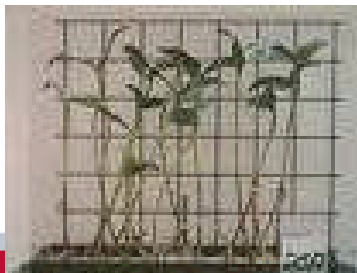
NSF Merit Review Criteria

- **NSB Approved Criteria include:**
 - **Intellectual Merit**
 - **Broader Impacts of the Proposed Effort**



Intellectual Merit

- **Potential considerations include:**
 - **How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?**
 - **How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work)**



Intellectual Merit (Continued)

- **Potential considerations include:**
 - **To what extent does the proposed activity suggest and explore creative, original or potentially transformative concepts?**
 - **How well conceived and organized is the proposed activity?**
 - **Is there sufficient access to resources?**



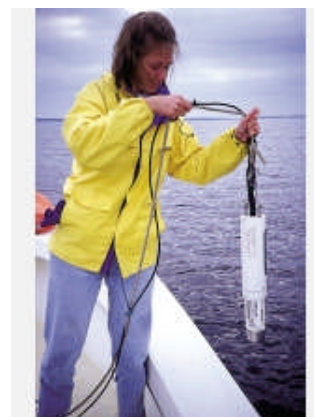
Broader Impacts

- **Potential considerations include:**
 - **How well does the activity advance discovery and understanding while promoting teaching, training and learning?**
 - **How well does the activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic)?**
 - **To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?**



Broader Impacts (Continued)

- **Potential considerations include:**
 - **Will the results be disseminated broadly to enhance scientific and technological understanding?**
 - **What may be the benefits of the proposed activity to society?**






Electronic Submission of Proposals and reviews

FastLane:Proposal Review | NSF FastLane - Microsoft Internet Explorer provided by National Science Foundation

File Edit View Favorites Tools Help

Back Search Favorites

Address <https://fl.demo.nsf.gov/cgi-bin/ASReviewMain> Go

**FastLane**
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Proposal Review

National Science Foundation (NSF) seeks to support the most meritorious research whether basic or applied, to meet its statutory responsibilities. Reviews play a key role in the NSF's evaluation of research proposals. Please provide **both** written comments as well as summary rating on this Proposal, using the [Proposal Evaluation Criteria](#). Please also see [Conflicts of Interest](#), [Confidentiality of Proposals and Peer Reviews](#), and [Privacy Act and Public Burden Statements](#).

Work in Progress

Information on Proposal Number: 0600020
Principal Investigator's Name: **Dan Sullivan**
Institution: **Michigan State University**
Title: **Nano-Technology Research**

Please provide your e-mail address. So, cognizant NSF Program Officer can contact you regarding any questions he/she might have about your review.

Please check this box if you want to receive an e-mail copy of your review.
Note: As with any form of electronic communication, NSF cannot guarantee privacy of the e-mail message during its transmission.

Rating Section

I am declining to review this proposal.
 I am giving this proposal no rating.
 I am rating this proposal (Please check rating below).

Overall Rating

Excellent Outstanding proposal in all respects; deserves highest priority for support.
 Very Good High quality proposal in nearly all respects; should be supported if at all possible.
 Good A quality proposal, worthy of support.
 Fair Proposal lacking in one or more critical aspects; key issues need to be addressed.
 Poor Proposal has serious deficiencies.

What is the intellectual merit of the proposed activity?

Intellectual Merit:
The proposal plan to understand the multifaceted changes that occurred in Yucatec Maya society in the transition from the Late Postclassic period to the Colonial period from a multiscale perspective: the household, the village and the inter-village or regional level. The proposer highlights how, despite the importance

What are the broader impacts of the proposed activity?

Broader Impacts:
I found two main major impacts in this proposal: 1) the idea of understanding a "general" historical process as the Colonization of Mexico, trying to "deconstruct" it on a regional perspective, fits well into the broader anthropological stream that rejects Colonialism as a monolithic process and enables a more nuanced

Summary Statement

Summary Statement
Overall a solid proposal that, addressing both material culture as well as documental analysis, will benefit the understanding of a historical period still poorly studied in the region.

Other Suggested Reviewers (Optional, Max. Characters: 480):

None.

Conflict of Interests

If you have an affiliation or financial connection with the institution or the person submitting this proposal that might be construed as creating conflicts of interest, please describe those affiliations or interests in the box below. Regardless of any such affiliations or interests, we would like to have your review unless you believe you cannot be objective. If you do not describe conflicts of interest in the box below we shall assume that you have no conflicting affiliations or interests.

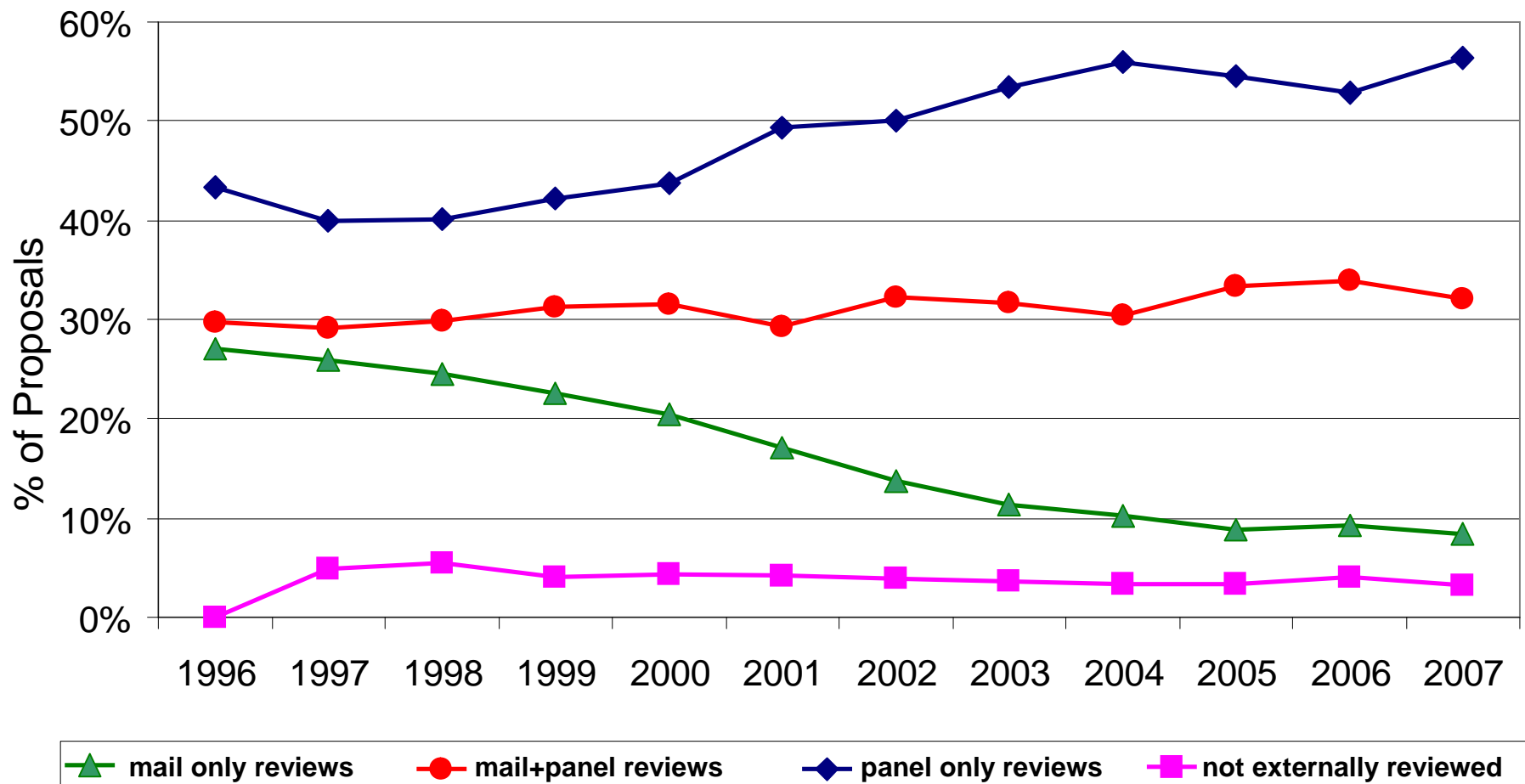
Conflicts of Interest Text (Optional)

None

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NSF Review Methods



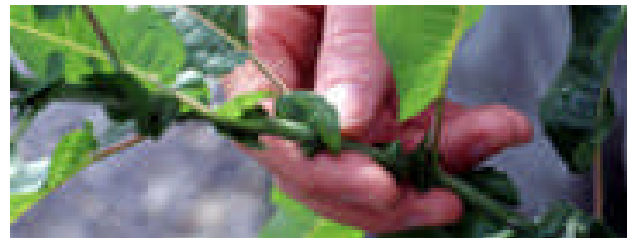
Representative Activities Document

- **Developed to highlight the importance of the *Broader Impacts* criterion and to provide specific examples of activities designed to satisfy this criterion**
 - **It is expected that project activities related to *Broader Impacts* will be of the same caliber as those addressing the *Intellectual Merit* criterion**
 - **They should be based on good scholarship, and be designed to achieve clearly stated goals and metrics, while possessing the appropriate expertise and resources available for implementation**
- **The activities identified are not intended to be exhaustive, nor is any particular activity relevant to all proposals**



Representative Activities Document (Continued)

- **Proposers can draw from these activities, but are urged to be creative in their approaches to demonstrating the broader impacts of their projects as well as discuss ideas with the NSF program office**
- **Document is modified, when necessary, to incorporate additional representative activities**
- **NSF Directorates and Divisions have issued “Dear Colleague” Letters to highlight relevant activities for their specific disciplines**



Selection of Reviewers

Optimally, reviewers should have:

- **Special knowledge of the science and engineering subfields involved in the proposals to be reviewed**
 - **To evaluate competence, intellectual merit, and utility of the proposed activity**
- **Broader or more generalized knowledge of the science and engineering subfields involved in the proposals to be reviewed**
 - **To evaluate the broader impacts on the field of the proposed activity**



Selection of Reviewers (Continued)

Optimally, reviewers should have:

- **Broad knowledge of the infrastructure of the science and engineering enterprise, and its educational activities**
 - **To evaluate contributions to societal goals, scientific and engineering personnel, and distribution of resources to organizations and geographical areas**
- **To the extent possible, diverse representation within the review group**
 - **To achieve a balance among various characteristics**
 - **Important factors to consider include: type of organization represented, reviewer diversity, age distribution and geographic balance**



Role of the Peer Reviewer

- Review and consider all proposal materials
- Make independent written comments on the quality of the proposal content
- Each proposal is reviewed by at least *three* individual peer reviewers



Role of the Peer Review Panel

- Discuss the merits of the proposal with other panelists who reviewed the proposal
- Write a summary proposal review based on discussion
- Make a panel recommendation to NSF on whether the proposal should be funded
- *Some panels may be supplemented with ad hoc reviewers if additional expertise is needed*



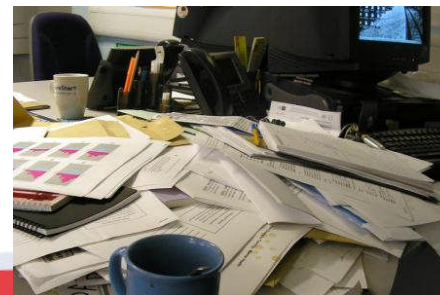
Funding Decisions

- **The peer review panel summary provides:**
 - **Review of the proposal and a recommendation on funding**
 - **Feedback (strengths and weaknesses) to the proposers**
- **NSF Program Officers make funding recommendations guided by program goals and portfolio considerations**
- **NSF Division Directors either concur or reject the program officer's funding recommendations**
- **NSF's Grants and Agreements Officers make the official award - as long as:**
 - **The institution has an adequate grant management capacity**
 - **The PI does not have overdue annual or final reports**
 - **There are no other outstanding issues with the institution or PI**



Reasons For Funding A Competitive Proposal

- Likely high impact
- PI Career Point (tenured?/“established”/“young”)
- Place in Program Portfolio
- Other Support for PI
- Impact on Institution/State
- Special Programmatic Considerations (CAREER/RUI/EPSCoR)
- Diversity Issues
- Educational Impact
- “Launching” versus “Maintaining”



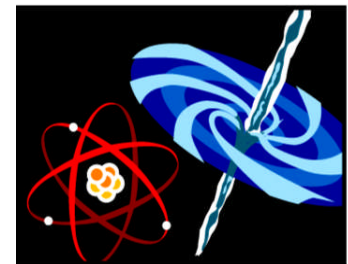
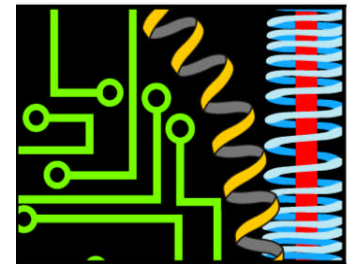
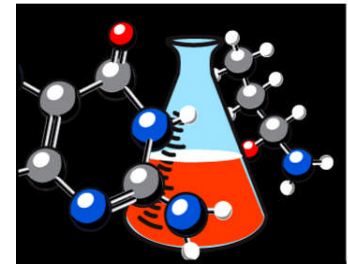
Reviewing Processes & Outcomes

- **Program Officers evaluate projects and identify outcomes**
- **Committees of Visitors: Every 3 years, perform detailed analysis and review of program process and outcomes**
- **Advisory Committee on Government Performance and Results Act (GPRA) Performance Assessment**
 - **Annual evaluation of outcomes across NSF on the basis of strategic goals: Discovery, Learning, and Research Infrastructure**
 - **Select sample of NSF Highlights for report to the Director/NSF**
 - **Assesses outcomes—both intellectual merit and broader impacts**
- **Also**
 - **Directorate Advisory Committees**
 - **Annual merit review reports to National Science Board**
 - **External Evaluation of Stimulus Funded Programs**



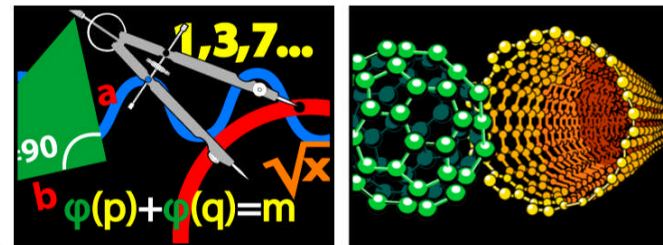
NSF Highlights

- Annual collection research and education outcomes
- Program officers distill the accomplishments from their PIs and programs
 - Asked to identify both discoveries AND impacts
- Used for budget advocacy and public information as well as for program review



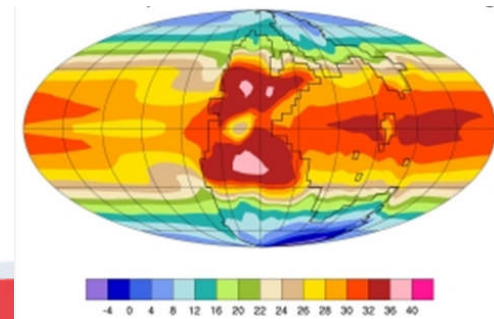
Dissemination of Research Results

- NSF Website: <http://nsf.gov/discoveries/>
- Annual Budget Request to Congress
- Annual Performance Report (FY 2008 Annual Performance Report and FY 2008 Citizens' Report: <http://www.nsf.gov/about/performance/>)
- PIs will write brief reports of their accomplishments for publication on [Research.gov](http://www.research.gov) (America Competes Act requirement)



Summary: Broader Impacts at NSF

- A decade of “intellectual merit” and “broader impacts” – where are we now?
- Resistance to “broader impacts” – philosophical or generational?
 - Culture change embodied in “stewardship”
- How does our community understand “broader impacts” – is there a hierarchy?
- Is NSF moving away from V. Bush and toward Pasteur’s quadrant?



NSF Mission

- **“The Government should accept new responsibilities for promoting the flow of scientific knowledge and the development of scientific talent in our youth”**
 - **Science, The Endless Frontier, 1945**
- **NSF Act of 1950: Promote basic research and education in the math, physical, medical, biological, engineering and other sciences**

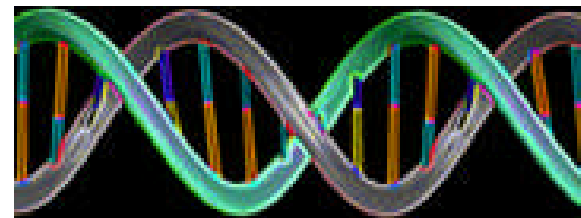
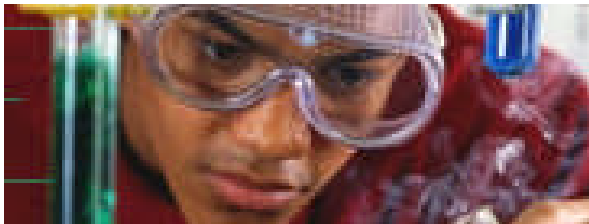


National Science Foundation
WHERE DISCOVERIES BEGIN



NSF Vision

**Advancing discovery, innovation
and education
beyond the frontiers of current
knowledge, and empowering future
generations in science and
engineering**



National FY 2009 R&D Priorities

- **Homeland Security**
- **Energy & Climate Change**
- **Advanced Networking & IT**
- **Nanotechnology**
- **Complex Biological Systems**
- **Environment**
- **Science of Science Policy**



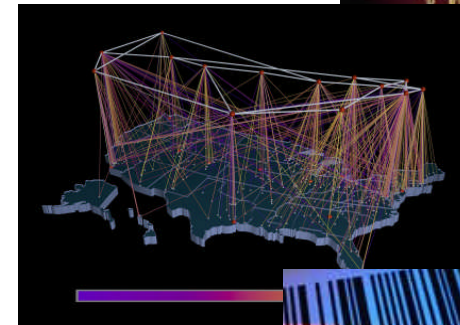
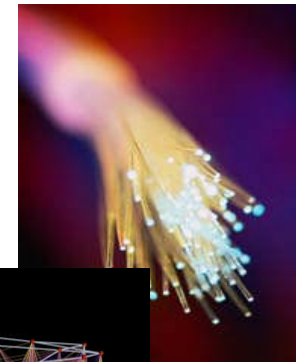
Innovation Resulting from NSF-Funded Research

Innovation

The Internet
Web Browser
Bar Codes
Fiber Optics
Routers
MRI
Doppler Radar
Speech Recognition
Nanotechnology
Computer Aided Design

Funder

DARPA/NSF
NSF
NSF
NSF
NSF
NIH/NSF
NSF
NSF/DARPA
NSF
NSF/DARPA



The background of the slide is a deep space image. It features a dense field of stars in various colors, including blue, white, and yellow. In the center, there is a prominent spiral galaxy with a bright core. In the bottom left corner, there is a single, very bright yellow star with a four-pointed diffraction pattern.

***“The only way to discover the limits of
the possible is to go beyond them
...into the impossible.”***

Arthur C. Clarke