The National Science Foundation Open Government Plan 2.0

April 2012

(THIS PAGE INTENTIONALLY LEFT BLANK)

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

The National Science Foundation (NSF) is committed to meeting President Obama's goal of transparency as specified in the January 21, 2009, memorandum: Transparency and Open Government. The Office of Management and Budget (OMB) sent a memorandum to the heads of executive departments on December 8, 2009, directing specific actions to be executed to implement the principles of transparency, participation and collaboration. In March 2011, the administration announced that agencies make available on their websites: congressional testimony; agency reports to Congress required by statute and staff directories.

Since its creation in 1950, NSF has viewed openness and transparency as critical to achieving the agency's mission: "To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense (NSF Act of 1950)." Consequently, the agency has built a strong foundation of openness policies and practices that guide its research and education activities. NSF has always been an open agency making all of its data, within the constraints of confidentiality and privacy, openly available via its website. New technologies, many of which received their basic funding from NSF, now provide the means for the agency to take these openness practices to the next level and into the 21st century.

In response to the OMB memorandum, NSF created an Open Government Plan (Vers. 1.0) and published it on the agency's Open Government web page in April 2010. The plan described how NSF planned to "improve transparency and integrate public participation and collaboration into its activities." This revised NSF Open Government Plan (2.0) complements the NSF FY2011 – 2016 Strategic Plan[1], *Empowering the Nation Through Discovery and Innovation,* which identifies five core values: visionary, dedicated to excellence, learning and growing, broadly inclusive, and accountable.

The key principle being applied in executing the elements of the NSF Open Government Plan is: *Unless shown otherwise, the default position shall be to make NSF data and information available in an open machine-readable format.*

This updated version of the plan (April 2012) is the result of NSF's continued commitment to open government, and reflects the intent to revise and improve the original plan to achieve an "all green" rating awarded to agencies that meet every requirement under the administration's Open Government Directive. To ensure steady progress, NSF welcomes comments and suggestions on this version of its Open Government Plan, at opengov@nsf.gov. NSF, from its senior management through the entire Foundation staff, is committed to the principles set forth in this plan. Indeed, this is reflected in the NSF Strategic Plan for FY2011-2016 where it states: *NSF is committed to the principles underlying open government including*

[1] http://www.nsf.gov/news/strategicplan/index.jsp

transparency, participation, and collaboration, and to translating this commitment into action.[2]

[2] NSF Strategic Plan for Fiscal Years (FY) 2011-2016, Section V. Strategic Goals and Performance Goals, Perform as a Model Organization)

II. NSF OPEN GOVERNMENT IN CONTEXT

Open Government Directive: Overview

In one of his first actions after taking office, President Obama issued a memorandum stating the administration's commitment to "creating an unprecedented level of openness in Government." The key principles of open government are transparency, public participation, and collaboration:

> ***Transparency*** *promotes accountability by providing the public with information about what the Government is doing.*
>
> ***Participation*** *allows members of the public to contribute ideas and expertise so that their government can make policies with the benefit of information that is widely dispersed in society.*
>
> ***Collaboration*** *improves the effectiveness of Government by encouraging partnerships and cooperation within the Federal Government, across levels of government, and between the Government and private institutions.*

On December 8, 2009, the Office of Management and Budget issued M-10-06, the Open Government Directive (OGD), and requiring agencies to take specific steps toward the goal of creating a more open government. The directive specified a timetable for agencies to complete actions such as publishing in an open format at least three high-value data sets and creating an Open Government web page. In March 2011, the administration announced that agencies shall make available on their websites: Congressional testimony; agency reports to Congress required by statute and staff directories.

NSF demonstrated its commitment to the Open Government initiative with the creation of a new position, the Chief Technology Officer (CTO), whose duties include serving as the Senior Accountable Official (SAO) for NSF's open government activities. The CTO is located in the Office of the Director, is a member of NSF's Senior Management Advisory Roundtable (SMART) and chairs the NSF Open Government Directive Working Group (OGD_WG). In that capacity, as-needed reports are made to SMART and the Office of the Director on matters related to NSF open government, and related activities such as prizes and challenges.

NSF met the OGD's January 22, 2010, deadline for identifying and publishing online at least three high-value data sets in Data.gov. NSF published four high-value data sets by that date (refer to Appendix 2 for a complete listing).

NSF also met the February 2010, deadline for launching an open government web page (http://www.nsf.gov/open). The page serves as the gateway to NSF open government activities and, when it was launched, it included the use of a web platform provided by the General Services Administration to solicit public and staff input on NSF's Open Government Plan. That public engagement activity using the IdeaScale tool ran from February 6-March 19, 2010.

On April 7, 2010, NSF published the NSF Open Government Plan (Vers 1.0): http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf10049.

The NSF Open Government Plan is a roadmap for the agency's efforts to:

- Improve transparency through identifying and making available to the public high value data;
- Expand opportunities for public participation and better integrate public input into our programs and policies; and
- Seek out new or expanded opportunities for collaborations with other agencies throughout government and with private institutions through public-private partnerships.

NSF provided the public with an opportunity to comment on Ver. 1.0 of its plan and now encourages the public to provide comments and suggestions about NSF's Open Government Plan 2.0 via opengov@nsf.gov.

NSF and NSB: Organizational Structures and Governance

NSF is an independent federal agency created by Congress in 1950. The NSF mission is:

"To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes. (NSF Act of 1950)"

NSF is **the only federal** agency whose mission includes support for all non-medical fields of fundamental science and engineering. With a budget of approximately $7 billion, NSF is the major source of federal funding for research in areas such as mathematics, computer science and the social sciences, in addition to providing approximately 20 percent of all federal funding in basic research. NSF funds research and education in most fields of science and engineering, and agency support goes to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the U.S. In 2011, NSF processed over 51,000 proposals that resulted in over 11,000 awards supporting over 275,000 U.S. scientists, engineers, educators and students at universities, laboratories and field sites all over the United States and throughout the world.

NSF leadership has two major components: a director, who oversees NSF staff responsible for program creation and administration, merit review, planning, budget and day-to-day operations; and the 24-member National Science Board (NSB), composed of eminent individuals who meet six times a year to establish the overall policies of the agency. The director and all board members serve six-year terms. Each of them, as well as the NSF deputy director, is appointed by the U.S. president and confirmed by the U.S. Senate. At present, NSF has a total workforce of approximately 2,100 at its Arlington, VA, headquarters, including approximately 1,400 career employees, 200 scientists from research institutions on temporary

duty, 450 contract workers, and the staff of the NSB office and the Office of the Inspector General.

NSF's program staff is organized into the following directorates and offices supporting science and engineering research and education:

Biological Sciences (BIO)	Computer and Information Science and Engineering (CISE)
Engineering (ENG)	Geosciences (GEO)
Mathematical and Physical Sciences (MPS)	Social, Behavioral and Economic Sciences (SBE)
Education and Human Resources (EHR)	Office of Polar Programs (OPP)
Office of Integrative Activities (OIA)	Office of International Science and Engineering (OISE[3])
Office of Cyberinfrastructure (OCI)	Office of Integrative Activities (OIA)

An NSF assistant director or an office head, as appropriate, leads each of these NSF organizational units. The Office of the Director is responsible for executive, business and administrative management functions. The Office of the Director includes the Office of Diversity and Inclusion, the Office of the General Counsel (OGC), and the Office of Legislative and Public Affairs (OLPA). Two additional administrative offices are the Office of Budget, Finance and Award Management and the Office of Information and Resource Management (OIRM). These organizational units of NSF are devoted to financial management, award processing and monitoring, IT, human resource management, outreach, and other functions.

The NSB is charged with establishing NSF policy. The board's 24 members are appointed by the President and confirmed by the Senate. The NSF Director is an *ex officio* member. Members serve six-year terms and one-third of the Board is appointed every two years. NSB members are drawn from industry and universities, and represent a variety of science and engineering disciplines and geographic areas.

The Office of the Inspector General (OIG) provides independent oversight and is responsible for promoting efficiency and effectiveness in agency programs and operations, and for preventing and detecting fraud, waste, and abuse. By statute, the NSF OIG is independent from the agency, with the Inspector General reporting directly to the NSB and Congress.

NSF Open Government Directive Working Group

In January 2010, NSF created an internal NSF Open Government Directive Working Group (OGD-WG) to address the OGD. This group, which met regularly, comprised individuals from across the Foundation and was created to develop and help implement NSF's Open Government Plan Ver. 1.0.

[3] OISE has offices in China, France and Japan

At present the NSF OGD-WG consists of:

- the OGD Senior Accountable Official (NSF CTO), Chair
- representative from the Office of the General Counsel
- the Chief Information Officer
- the Chief Financial Officer
- representative from the Office of Legislative and Public Affairs
- representative from the Office of Budget, Finance and Award Management
- representative from the Office of Information and Resource Management;
- representative from the National Center for Science and Engineering Statistics, Directorate for Social and Behavioral Sciences

The group is supplemented by other NSF staff as needed.

The NSF OGD-WG developed an implementation plan, with then near-term activities selected for realizing NSF open government activities. All were successfully accomplished. These have been updated in 2011 and 2012, with the most recent milestones shown below:

Date	Action
30Sep11	Identify new NSF Flagship Initiative
30Sep11	Create NSF's inaugural major Prize/Challenge
1Oct12	Broaden list of products acceptable as citable in proposal submissions
30Sep13	Establish policies for public access to high-value data and software in at least two data-intensive scientific domains.

Key Stakeholders

The NSF stakeholders consist of:

- the American public
- academic institutions: graduate/undergraduate colleges and universities, two-year and community colleges, K-12 schools
- the faculties in the above institutions
- the students in the above institutions
- not-for-profit institutions such as: aquariums, zoos, museums
- businesses conducting science and engineering research
- the news media (as a conduit to the public)
- NSF staff
- state and other government agencies

The informational needs of these stakeholders consist of being informed of funding opportunities available through the NSF as they develop; information on awards

made; results of studies, reports and workshops supported by the NSF; results of meetings and various evaluation reports; and the discoveries, breakthroughs and other outcomes of NSF-supported research and education and their impact on society.

III. NSF STRATEGIC PLAN AND THE OPEN GOVERNMENT DIRECTIVE

Overview of the NSF Strategic Plan and Key Principles

In 2011, NSF published its new strategic plan: *NSF FY2011-2016 Strategic Plan*[4] which identified five core values: visionary; dedicated to excellence; learning and growing; broadly inclusive; and accountable. Broadly Inclusive and Accountable are particularly germane to the Open Government Directive. As stated in the NSF Strategic Plan:

> ***Broadly Inclusive:*** *seeking and accommodating contributions from all sources while reaching out especially to groups that have been underrepresented; serving scientists, engineers, educators, students and the public across the nation; and exploring every opportunity for partnerships, both nationally and internationally.*
>
> ***Accountable:*** *operating with integrity and transparency, and maintaining quality in administration, management, and oversight.*

Clearly, these core values are consistent with the open government goals of transparency (Accountable), participation (Broadly Inclusive) and collaboration (Broadly Inclusive). As a result, incorporating the open government directive into the NSF "DNA" was relatively straightforward.

The NSF FY2011-2016 Strategic Plan states NSF's vision as:

> *NSF envisions a nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education.*

This vision is supported by three interrelated strategic goals: Transform the Frontiers, Innovate for Society and Perform as a Model Organization:

> ***Transform the Frontiers*** *- emphasizes the seamless integration of research and education as well as the close coupling of research infrastructure and discovery.*
>
> ***Innovate for Society*** *- points to the tight linkage between NSF programs and societal needs, and it highlights the role that new knowledge and creativity play in economic prosperity and society's general welfare.*
>
> ***Perform as a Model Organization –*** *emphasizes the importance to NSF of attaining excellence and inclusion in all operational aspects.*

[4] http://www.nsf.gov/news/strategicplan/index.jsp

Open government activities more readily enable NSF to engage stakeholders and keep them informed about agency initiatives, directions and accomplishments. The key principle that will be applied in executing the elements of the NSF Open Government Plan is: *to maximize information that will be made available within the constraints of confidentiality and privacy concerns. Unless shown otherwise, the default position shall be to make NSF information available in an open machine-readable format.* The NSF is committed to publishing its data and information in machine-readable form and seeking public input and review on a regular basis.

That key principle is complemented by the agency's commitment to maintaining an open and active dialog with the public at large and with the various NSF stakeholders, and encouraging all NSF staff to actively participate in open government activities.

Out of Scope

Previous versions of NSF's Open Government Plan stated that open access to digital data created as a result of NSF investments were considered out of scope. However, this has changed in FY2012. NSF has identified open access to digital data as its flagship activity.

However, the issue of public access to scholarly publications, while related to the issue of open access to digital data, is outside the scope of NSF's new flagship initiative. It is a topic with which NSF is actively engaged in various forums and the agency will continue to pursue this topic area consistent with its commitment to openness.

<u>Open Government Strategic Goals and Outcomes</u>

This Open Government Plan serves as the roadmap to improve transparency and better integrate public participation and collaboration into NSF's core mission, thereby enabling NSF to become more innovative and efficient. NSF has a long history of making its data readily available to the public via its website and other means, and the agency shall continue to do so. NSF has made and shall continue to make its data and information available in machine-readable form or in more innovative and productive ways to further enhance NSF's openness.

NSF's open government strategic goal recognizes the importance of increased public awareness and appreciation of NSF's mission and the agency's contributions to the American citizenry. This will be accomplished by providing data that inform the public about: national scientific priorities; NSF funding opportunities; NSF awards made; Freedom of Information Act (FOIA) results; science and engineering advances generated with NSF support; and statistical data related to funding and funding outcomes, as well as data on the state of science and engineering education, to name a few.

IV. OPEN GOVERNMENT OPPORTUNITIES AND STRATEGIES

Transparency Initiatives and Prioritization

Responsibility for ensuring transparency at NSF rests with the NSF Open Government Directive Working Group (OGD-WG) and with the NSF Senior Management Advisory Roundtable (SMART). The OGD-WG meets on an as needed basis, recognizing that the agency's default position is that all data and information will be made available consistent with confidentiality and privacy constraints. The OGD-WG will continue to inventory data collected or generated by NSF, building on the eGov content inventory, found at http://www.nsf.gov/policies/egov_inventory.jsp, and records retention schedule, found at http://www.nsf.gov/policies/records/index.jsp. NSF will continue to provide opportunities for its stakeholders and the public to determine which datasets are high-value data collections. NSF will then prioritize the conversion to open formats, based on stakeholder and public interest.

The table below shows the list of datasets, and their expected publication dates.

Date	Description
30April12	Science and Engineering Digest
30April12	Science and Engineering Indicators State Data Tool
30May12	Interactive digest covering important trends in doctoral education
30May12	NSF Graduate Research Fellowship Award Recipients thru FY2011
30May12	NSF Graduate Research Fellowships Honorable Mention thru FY2011
30Jun12	Science and Engineering Indicators 2012
30Jun12	Early and Later Career Funding Rates for FY2011
30Jun12	Funding Rate by Principal Investigator for FY2011
30Jun12	NSF Average Dwell Time by Directorate for FY2011
30Jun12	NSF Budget History by Account updated with FY2011 data
30Jun12	NSF State Obligations per Fiscal Year thru FY2011
30Jun12	NSF Obligations for Top 200 Institutions 10 Year Trend thru FY2011
2nd Quarter, 2012	Revised award search mechanism (beta release)
30Jan13	Digest covering women, minorities and persons with disabilities in science and engineering
As available	FOIA Reports for 2012 and beyond

Openness is an inherent part of NSF culture. As a result, NSF does not have any issues with what should be "open", since all NSF data and information are openly available within the constraints of confidentiality and privacy concerns. The "challenge" is in determining which of all of the already available open data is of sufficiently high value to warrant converting from existing formats to machine-readable formats such as comma-separated values (CSV), extensible markup

language (XML) or other accepted open formats specified in the open government directive. The strategy shall therefore be, to prioritize among these items using their potential as high-value data as the principal criteria as well as requests from the public. FOIA reports, award data and spending data continue to receive the most interest from the public and therefore are considered of high value.

As noted earlier, NSF makes public a wide variety of agency information via the NSF website: www.nsf.gov. This includes: National Science Board meeting announcements and meeting minutes; NSF solicitations; NSF funding trends data; NSF budget information; NSF-related statistical information; lists of publications available for download; award and funding information; minutes from the various directorate, office and NSF-wide advisory committees; Committee of Visitor reports for the various directorates and offices; an Events calendar; texts of speeches given by the NSF Director and Deputy Director, a list of NSF-related congressional hearings, news releases and media advisories, factsheets about NSF programs and priorities, feature articles, audio podcasts and videos about NSF-supported research results, and the NSF Multimedia Gallery providing images and other visual media for educational and informational use. These, and other items, constitute materials for consideration in the context of the open government directive.

To further enhance transparency, NSF is actively supporting and participating in key government-wide open government-related initiatives to provide the public with insight into NSF-funded research, spending and investments. These initiatives include:

- **Data.gov** – Provides the public with easy access to NSF data in open and machine-readable formats. The original datasets made available at the initiation of the NSF open government activity continue to be updated and maintained as new data become available (e.g. FOIA, Science and Engineering Indicators, etc.) NSF also offers easy, application-driven access to additional NSF data, such as important statistics regarding employment and education information for scientists and engineers, trend information across science and engineering indicators, and key information about NSF-funded grant awards, through three simple-to-use tools. Additionally, NSF continues to look for opportunities to provide additional high-value data through Data.gov based on input received from the public and NSF staff.

  NSF shall continue to provide high-value datasets/tools via Data.gov and on its website during 2012 and beyond. The Science and Engineering Indicators dataset has been expanded to include:

  1. **Science and Engineering Indicators State Data Tool**
     http://www.nsf.gov/statistics/seind12/c8/interactive/

  The State Data Tool allows for interactive visual exploration of 58 state indicators covering the role of science and technology (S&T) in state and regional economic development. It covers state trends in S&T education, the employed workforce, finance, and research and development. The tool

allows for in-depth exploration of a single indicator, comparisons of multiple indicators, and the ability to customize the graphics. Exploring a single indicator can be done using "Table," "Chart" or "Map" view. Comparisons of indicators can be done across states or across years. The tool contains up to 20 years of data when data are available and comparable.

2. **Science and Engineering Indicators (SEI) Digest**
   http://www.nsf.gov/statistics/digest12/

   The United States holds a preeminent position in science and engineering (S&E) in the world, derived in large part from the nation's long history of public and private investment in S&E research and development (R&D) and education. Investment in R&D, science, technology and education correlate strongly with economic growth, as well as the development of a safe, healthy, and well-educated society. The SEI Digest highlights key trends and data points and provides an interactive introduction to the types of data and information available in *Science and Engineering Indicators 2012.*

- **USASpending.gov** - Provides financial transparency, at the transaction level, into NSF financial assistance, including grants and contracts. Through this resource, the public can view key details about NSF awards and contracts for free in compliance with requirements set by the Federal Funding Accountability and Transparency Act of 2006. NSF has actively supported USASpending.gov and its mission since its inception and was the first agency to accurately match 100 percent of major investment contracts to USASpending.
- **Federal IT Dashboard** (http://www.itdashboard.gov/) - Offers insight and transparency into NSF's IT portfolio as a whole, as well as into the significant individual technology investments that are critical in supporting NSF's mission and work. Through the IT Dashboard, the public can view plain language descriptions and comprehensible ratings for NSF technology investments, including ratings on tracking to cost and schedule, evaluation of the investment by the Foundation's CIO, and an overall rating for the investment based on a combination of the other three ratings. The dashboard also offers information on how NSF technology investments align with the Foundation's mission and an objective outlined in the strategic plan, and provides, and provides clear performance indicators for evaluating whether investments are meeting their targets. Additionally, the Dashboard offers easily accessible links to investment Exhibit 300s, offering the public a transparent view of NSF investments at the granular level.
- **Recovery.gov -** Provides a central, online location for taxpayers to track NSF spending and activities related to the American Recovery and Reinvestment Act (Recovery Act) of 2009. Easily accessible, high-value NSF information available through Recovery.gov includes summaries of overall Recovery Act spending with progress tracked weekly, detailed weekly financial reports,

and descriptions of NSF's Recovery Act plans, including overarching goals for Recovery Act funds and an accountability plan.

In support of these initiatives, NSF has made data easily accessible to the public in machine-readable and open formats that can easily be shared via a variety of mechanisms (email, Facebook, Twitter, etc.), printed, or downloaded for use with data mining and extraction tools. Additionally, mechanisms are provided to allow the public to provide feedback, share their assessments of the quality of information available, and make suggestions for additional NSF information they would like to see made available.

Keeping the Public Informed

Research.gov

While increasing transparency through government-wide open government-related initiatives, NSF has also proactively identified and developed additional opportunities for improving transparency to the research community and the public. Prime examples of this are evident in Research.gov (www.research.gov) and its services.

Research.gov is an NSF-led, multi-agency community driven solution that gives the general public, the scientific community, and congressional staff easy and transparent access to key information and services from multiple agencies in one location. Through services, such as Research Spending and Results, Project Outcome Reports for the General Public and Science, Engineering and Education (SEE) Innovation, NSF is leveraging Research.gov to improve clarity into federally funded research and outcomes.

Research Spending and Results provides the public with information about how NSF and the National Aeronautics and Space Administration (NASA) research grant award dollars are being spent, what research is being performed, and how the outcomes of the research are benefiting society. Research Spending and Results provides the high-value detail about research awards that the public and the research community have requested, such as abstracts (descriptions of the planned research scholarly journals that have published the research). Information available through Research Spending and Results is provided in machine readable formats (XML, CSV, and Excel) and is updated nightly to ensure the public is receiving current information in a timely manner.

The Project Outcomes Report (POR) for the General Public is written in plain language, and provides clear insight into the results and broader impacts of NSF-funded research and education. The America COMPETES Reauthorization Act of 2010 requires these reports to be made available to the public in a timely manner and in electronic format. These reports, which provide snapshots of the outcomes at the end of an award, are authored by the researchers, providing the public with first-person accounts from the individuals on the forefront of scientific discovery.

The reporting tool also provides the capability to include images to accompany reports and the ability for investigators to add to the report over time, so information about the broader, future impacts of the research can easily be made available. Within 24 hours of submission, reports are made available for the public to view online through Research Spending and Results.

Online feedback mechanisms enable the public to provide input regarding the quality and comprehensibility of the POR to NSF. NSF will then use this feedback to develop outreach and training materials to help researchers improve and better target the information included in their reports to the general public. NSF will also develop outreach materials that encourage researchers to continue adding to their reports after initial submission in order to provide the public with a comprehensive, robust view of the impacts of the research.

Science, Engineering & Education (SEE) Innovation

Launched in 2010, NSF's Science, Engineering & Education (SEE) Innovation website (www.research.gov/seeinnovation) provides transparent, open access to information about the outcomes and impacts of NSF-funded research and education activities. The site features a breadth of NSF activities, and spotlights investment outcomes that benefit the larger society, in addition to advancing science and engineering. Featured content includes NSF-funded project highlights written in non-technical language; descriptions of major research infrastructure (including centers, facilities, observatories, and research vessels); and easily accessible funding summaries, award details, and lists of recent awards and award abstracts. The funding and award information can be sorted by U.S. states and territories, along with information about "people of distinction" in each state/territory. Target audiences for SEE Innovation are federal, state and local public policy makers, science-related organizations, industries with research and development (R&D) components, and the general public. Input from these groups was sought as part of the site development and rollout process.

Individually, these three Research.gov services: Research Spending and Results, Project Outcomes Reporting, and SEE Innovation, provide valuable insight into NSF-funded projects and their outcomes, but they are also designed to marry seamlessly with each other to provide the public with a clear, comprehensive picture of NSF awards. Additionally, the information provided through these services is just the beginning. NSF is continuously soliciting feedback from the science and engineering community and the public on additional information they would like to see made available through these services and Research.gov.

Public Outreach and Participation

In 2012, NSF continues to further develop and enhance its OneNSF initiative that was launched in 2011. Supporting fundamental research and education, OneNSF's goal is to maximize NSF's impact by being even more responsive, leveraging resources at all levels and providing leadership in the context of advancing scientific

knowledge, science, technology, engineering and mathematics. One of OneNSF's tenets is "openness and excellence through continuous improvement and innovation driven by the creativity, teamwork and integrity of the NSF workforce." This is clearly consistent with the open government directive principles of transparency (openness) and collaboration (teamwork) and as a result demonstrates one way NSF is embedding the principles of open government into its day-to-day operations. The principle of collaboration can be seen in OneNSF activities such as the Innovation Corps (I-Corps). a program that seeks to encourage and support the transition of research into useful technologies, products and services; Science Across Virtual Institutes, an innovative concept to foster international science collaboration through virtual institutes that connect researchers with common interests and goals; the Career-Life Balance Initiative, a set of forward-looking policies and practices to help increase the placement, advancement and retention of women in STEM disciplines and; Science, Engineering and Education for Sustainability (SEES), investments that address the intersection of the environment, energy and society. As improved internal teamwork and communication materialize and mature, it is expected that this will result in increased opportunities for further engagement with NSF stakeholders, including the public.

NSF's task of identifying and funding work at the frontiers of science and engineering is not a "top-down" process. NSF principally operates from the "bottom up," keeping close track of research in the United States and around the world, maintaining constant contact with the science and engineering community to identify ever-moving horizons of inquiry, monitoring which areas are most likely to result in spectacular progress and choosing the most promising people to conduct research and enhance education and learning.

Participation and citizen engagement are at the core of the way NSF conducts its business and fulfills its mission. One of the cornerstones of NSF's success is its merit review process. In making award decisions, NSF collects over 280,000 reviews per year from experts in the science and engineering community. Subject matter experts drawn from the science and engineering academic and private-public communities provide these reviews. NSF Program Officers draw on the expert insights provided in these reviews to make informed decisions about the most promising projects to fund. Consistent with the open government principle of participation, NSF is constantly striving to increase both the size and diversity (gender, disabilities, ethnic, geographic, race, institutional, etc.) of the pool of reviewers to ensure that the merit review process benefits from broad input provided by individuals with a wide range of perspectives. This merit review process, recognized as a "gold standard" internationally, continues to be a key element of NSF's public outreach and participation activities.

In December 2011, the NSB released a report, *National Science Foundation's Merit Review Criteria: Review and Revisions*, on the merit review criteria. The report's

recommendations were the result of a thorough examination by NSB's Task Force on Merit Review. In looking at the effectiveness of the two merit review criteria (intellectual merit and broader impacts), the task force solicited and received input from several stakeholder groups, both inside NSF and external to the agency, involving several thousand individuals. Based on the task force's analyses and recognizing the provision in the America COMPETES Reauthorization Act of 2010 mandating the retention of the Broader Impacts criterion, the NSB determined that the two current Merit Review Criteria remain appropriate for evaluation of NSF proposals and should be retained. The NSB report provided three principles governing NSF's approach to using the merit review criteria and guidance addressing issues associated with implementation. Responding to the NSB report, NSF established a Merit Review Criteria Working Group to develop implementation actions for consideration by senior management. Comments are being sought from the internal community and from the leaders of universities, colleges and other NSF grantee organizations. In April 2012, NSF plans to publish a notice in the Federal Register, giving the public an opportunity to provide comments on proposed changes.

NSF's approach to soliciting input and feedback from the scientific community and the public has always been "early and often." To support this approach, NSF provides a variety of mechanisms both proactive (where the public can actively contact the Foundation) and direct (NSF reaches out directly to share information and solicit input), for the community and the public to interact with the agency and provide feedback. Examples of proactive forums the Foundation is employing to engage the public and the academic community and solicit their input include:

- **Prizes/Challenges –** During 2011, NSF kicked off its inaugural prize/challenge activity: US Ignite. US Ignite seeks to spark the development of next generation applications in areas of national priority -- health, education, energy, advanced manufacturing, transportation, and public safety -- on an ultra high-speed deeply programmable (allowing new internet architectures not requiring use of Internet protocols) and sliceable (isolated resources running in parallel) network. The result will be the development and deployment of applications that would not be possible on today's Internet. A two-phased approach is anticipated consisting of an Ideation competition seeking to collect as many great ideas as possible within the US Ignite context; and an Application Competition that will build on the ideation competition. It is expected that these competitions will be executed during 2012.

- **Feedback email aliases –** NSF has multiple email aliases that the public and research community can use to reach out to the Foundation with questions or provide feedback on a variety of topics. These include NSF policy (policy@nsf.gov), NSF services (info@nsf.gov and feedback@research.gov), NSF's participation in Open Government (opengov@nsf.gov) and more

Feedback and inquiries received through online feedback mechanisms are monitored and suggestions are compiled for review and consideration. NSF representatives respond directly to inquiries received through feedback aliases and questions that appear frequently are incorporated into "Frequently Asked Questions" documents, which are posted online and distributed during outreach activities.

These online feedback mechanisms are complemented by a variety of interactive forums for direct outreach to the academic community, the public, and NSF staff to promote citizen participation. NSF frequently promotes awareness and provides updates about the agency, its policies and initiatives, and the information and services it provides to the research community through presentations and exhibit booths at key outreach events, such as meetings and conferences held by research administration associations and at other meetings of NSF's core science and engineering community (for example the Federal Demonstration Partnership, the National Council of University Research Administrators, and the Society of Research Administrators).

Additionally, NSF holds twice yearly Grants Conferences around the country to provide an opportunity for smaller academic institutions to learn more about the agency and its programs. The agency also sponsors "NSF Day" workshops focused on pre-award topics and targeted at junior faculty and others beginning a research career.

In addition to in-person outreach, NSF interacts directly with the research community and public through online outreach mechanisms. One example of this activity are the periodically held SRA International webinars[5]. Webcasts allow NSF to share key information and updates with a broad audience and also provide the opportunity for viewers to interact directly with the Foundation through email or phone call inquiries, which are answered on air.

Providing live webcasts of meetings was one of the more popular requests NSF received during the original OpenNSF public dialog, and NSF has identified which of its meetings would be of greatest interest to the public. The NSB began webcasting its meetings in 2011. NSF has increased its use of video teleconferencing for public outreach. To engage the community on NSF systems and services, NSF offers WebEx and videoconferences for training. These training sessions allow institutions and individuals at locations all across the country to easily and conveniently learn about the Foundation first-hand.

In order to ensure that NSF staff members are armed with the background needed to disseminate information to the research community and the public about participation opportunities, NSF fosters a culture of education. The Foundation holds interactive outreach activities to educate staff, such as town halls, "brown bags", and demonstrations, and provides detailed information online about

[5] www.srainternational.org

participation opportunities and NSF initiatives (such as Open Government efforts) in forums that are accessible to all staff.

Each of the research directorates and offices has an advisory committee whose membership is drawn from the academic and public-private sector communities. Each advisory committee meets twice a year. The membership represents the stakeholders of the particular directorate or office, or it might span several directorates and offices. Advisory committee task forces usually meet on a more frequent basis, complementing the twice-yearly meetings.

For example, the NSF-wide Advisory Committee for Cyberinfrastructure (ACCI) recently gathered input from the researchers, industry and educators that use cyberinfrastructure. The ACCI established 6 Task Forces and has asked them to address long-term cyberinfrastructure issues. By incorporating webcasts, video telecoms, wikis and document-sharing technologies, the task forces explored, discussed and generated a collection of recommendations and ideas that are being used by the NSF in developing new programs and/or guiding existing activities. The impact of this particular activity can be found in NSF's FY2013 CyberInfrastructure Framework for 21st Century Science and Engineering (CIF21), a major initiative that incorporated many recommendations from that task force.

An additional resource is the NSB. The board and its advisory committees were presented the NSF Open Government Directive Plan in late 2010, soliciting from them additional ideas and approaches on how to even further increase NSF's transparency, collaboration and participation activities. It is anticipated that the current version of the plan will be presented to the NSB subsequently.

The NSB also creates task forces consisting of NSB members and complemented by additional staff. These task forces, which meet on a more frequent basis than the full board, are constituted as necessary to enable the NSB to execute its due diligence. For example, in September 2010, the NSB initiated a Task Force on Data Policies whose charge was to "…the further refinement of NSF data policies to address key challenges and outline possible options to more effectively use digital research data to meet the mission of NSF." A final report[6], Digital Research Data Sharing and Management, was published in December 2011, and the next step in the process is to seek public comment. The final report's conclusion includes this statement: "NSF must be prepared to meet the accessibility and management challenges that the proliferation of digital research data poses."

Another action in the area of public outreach and participation involves NSF staff. Members of the NSF Senior Executive Service are being encouraged to include a "stretch" goal in the area of the open government directive. In addition, as members of NSF staff travel around the country giving presentations and participating in events, they are being encouraged to present NSF's interest in the open government directive and seek active participation and input from the public.

[6] http://www.nsf.gov/nsb/publications/2011/nsb1124.pdf

NSF Collaboration Activities and Agency Partnerships

Collaboration is not new to the NSF. Collaboration is intrinsic to NSF's culture and the way that the agency conducts its business. NSF encourages both inter- and intra-Foundation collaboration initiatives. NSF is actively engaged in activities that involve collaboration with other agencies and citizens, as well as across NSF organizations. Examples of this are evident through NSF's partnerships with the science and engineering community and agencies on Research.gov, and through the use of technologies that promote collaboration among NSF staff and through the OneNSF initiative.

NSF partners with other federal agencies in numerous research and education programs and provides a list of these agency partnerships, arranged alphabetically by program title, on the NSF website, at http://www.nsf.gov/about/partners/fedagencies.jsp. The agency has added a link to this list from the NSF Open Government page (http://www.nsf.gov/open/). NSF updates the list twice a year, each June and December.

The various NSF directorates and offices are encouraged to develop programs that span divisions within directorates, that span across directorates and offices that cooperate with activities taking place at other federal agencies or the private commercial sector and finally, that establish international relationships. Examples of 2012 NSF-wide activities include CyberInfrastructure Framework for 21st Century Science and Engineering (CIF21) and Science, Engineering and Education for Sustainability (SEES). CIF21, targeted to provide a comprehensive, integrated, sustainable, and secure cyberinfrastructure, has participation from every programmatic directorate and office within NSF. SEES is a cross-Foundation collaboration that is addressing the challenges of creating a sustainable human future. In addition to cross-Foundation collaboration, SEES has participation from the U.S. Department of Agriculture (USDA), the Department of Energy, the U.S. Geological Survey (USGS), and the National Aeronautics and Space Administration (NASA). There are also international partners: the Chinese National Natural Science Foundation and the State of Sao Paulo Research Foundation (FAPESP) of Brazil.

NSF provides high-performance computational resources to other federal agencies via the XSEDE[7] (previously TeraGrid) resource, with 50 percent of that resource being utilized by agencies such as the National Institutes of Health (NIH), the Department of Energy, NASA, the National Oceanic and Atmospheric Administration (NOAA), and the Department of Defense.

NSF co-chairs the interagency Networking and Information Technology Research and Development (NITRD) program (http://www.nitrd.gov/). Chartered by Federal law, the NITRD program is the primary mechanism by which the Government coordinates its unclassified networking and information technology (IT) research and development (R&D) investments. Thirteen federal agencies, including all of the

[7] eXtreme Science and Engineering Digital Environment(XSEDE): www.xsede.org

large science and technology agencies, are formal members of the NITRD Program. These agencies work together to develop a broad spectrum of advanced networking and IT capabilities for federal missions; U.S. science, engineering, and technology leadership; and U.S. economic competitiveness. The NITRD efforts increase the overall effectiveness and productivity of Federal networking and IT R&D investments, leveraging strengths, avoiding duplication, and increasing interoperability of networking and IT R&D products. NSF program officers participate in each of the NITRD program Component Areas (PCAs). An Interagency Working Group (IWG) or a Coordinating Group (CG) of interagency program managers guides the work of each PCA. These groups meet monthly to coordinate planning and activities of the multiagency projects in their specialized research areas. In addition, PCAs hold workshops to solicit input from their respective stakeholder communities.

NITRD is also the home for various senior steering groups' activities, of which there are currently four: Big Data; Cyber Security and Information Assurance; Health Information Technology; and Wireless Spectrum. The Big Data Steering Group, co-chaired by NSF, announced a joint solicitation with other federal agencies (various institutes of the National Institute of Health) in March 2012 to fund research in this highly important area as data intensive science continues to dominate scientific inquiry.

An example of an NSF collaboration with the private sector is Innovation Corps (I-Corps), begun in 2011 under the OneNSF framework. I-Corps was developed in recognition of the need to create a bridge between research that has reached a level of maturity and potentially new products. I-Corps is another NSF agency-wide activity, and it is also being co-funded by two private Foundations: Deshpande Foundation and the Kauffman Foundation.

In addition to SEES and other previously mentioned international collaborations, NSF's Office of International Science and Engineering (OISE) spearheads international collaboration initiatives. A recent example is NSF's Science Across Virtual Institutes (SAVI), which recognizes that STEM exists all over the world and seeks to establish mechanisms to enable scientists from around the globe to interact. Virtual institutes are being established to connect researchers with common interests and goals.

<u>Staff Collaboration Tools</u>

NSF is actively pursuing an increased use of technologies supporting virtual participation in meetings with its stakeholders. Live webcasts are allowing NSF staff to participate in reviews of directorate and office programs, while other live webcasts that are available outside NSF bring program managers together with potential grantees.

In January 2011, the NSF director kicked off NSF's IdeaShare, an interactive electronic forum meant to solicit innovative ideas from NSF staff. The forum uses the IdeaScale platform. The concept is to "… gather our collected wisdom into a

resource for solving current problems and tackling new challenges." Ideas are being provided on any topic and there also have been a number of ideation campaigns to address specific challenges, including how to foster career/life balance at NSF, how to improve business processes and practices, and how the agency can exemplify the OneNSF vision.

Government-Wide Data Standardization

- **Award Notice Cover Sheet Data Dictionary** - In March 2011, grant-making agencies began updating draft policy for inclusion in Title 2 of the Code of Federal Regulations (2 CFR), Part 40, Overview of the Award and Supporting Documents. As part of this effort, the group identified the need to establish and define a set of standard data elements that would comprise the award notice cover sheet for all federal grant-making agencies. The following agencies were represented in the subgroup: Department of Interior, Environmental Protection Agency, Department of Health and Human Services (NIH and Health Resources and Services Administration), Department of Housing and Urban Development, National Endowment for the Arts, NSF, and USDA. The purpose of the dictionary is to ensure consistent implementation of the award notice cover sheet at the data level in federal electronic systems, resulting in improved data integrity for reporting and information sharing.
- **Research Performance Progress Reports** – Coming in 2013, the new standard reporting format enables NSF awardees to prepare and submit final, annual, and interim progress reports for research and research-related projects using the new government-wide format. A cross-agency group of policy, program and technology representatives from NSF, USDA/NIFA, NIH, Department of Defense, Department of Energy, and Department of Education drafted the data dictionary and XML schema.
- **Federal-Wide Researcher Profile Project** – Seeking to reduce administrative burden on researchers, government and federal grant submission and reporting requirements; to enable discovery about researcher expertise and; to allow researchers to describe their contributions in their own language. This activity is being executed by the Science Experts Network Curriculum Vitae (SciENCV) (http://rbm.nih.gov/profile_project.htm) under the auspices of the Federal Demonstration Partnership and involves DOE, EPA, EOP, NIH, NSF, OMB, USDA.

Research.gov

For many years, NSF has worked closely with the research community, gathering input to guide the direction of NSF's innovative technology solutions in support of NSF's mission and the research community's needs. NSF's approach to developing, updating, and improving the Research.gov website has been no different. NSF's active collaboration and partnership with the research community is evident through Research.gov's service delivery model. New Research.gov services are

identified and prioritized based on input received from the research community. When implementing new services, NSF collaborates with individual and institution volunteers from the community who pilot new services and provide feedback and input on their experience. These collaborations allow the Foundation to ensure that Research.gov services meet the needs of the community before being broadly released.

As part of the Research.gov effort, NSF has established collaborative partnerships with other federal research agencies, making information from multiple federal agencies available to the public and the research community in one location. Research.gov offers the research community and the public key information and services for NSF, the National Aeronautics and Space Administration (NASA), and the USDA's National Institute for Food and Agriculture/NIFA. These partnerships, which were initiated by NSF and established through Memoranda of Understanding, provide a shared platform for the research community to do business with agencies that have a common mission and business model. This collaboration provides the opportunity for agencies to work together to consolidate information resources, improve access to information about federally funded research, and implement government-wide standards. Examples of this on Research.gov include:

- **Policy Library** - Offers the research community, the public, and federal agencies consolidated access to government-wide and agency-specific policies, guidelines, and procedures for NSF and partner agencies in one location. The Policy Library also provides a visible location for notifying the public about draft government-wide and agency-specific policies available for review and comment in the Federal Register. Grantees and the public can sign up for email alerts or RSS feeds to keep informed of newly enacted polices and regulations, can connect to additional sites for more information on federal grants policy and regulations, and can search and filter policy information by topic area, policy type, policy/procedure manual, or keyword.
- **Research Spending and Results** –Displays information, available to the public, about how NSF and NASA grant award dollars are being spent, what research is being performed, and how the outcomes of the research are benefiting society. NSF data is available for grant awards from 1994 to the present, and NASA data is available for grant awards from 2007 to the present. More specific details are also available, including the location (including congressional district) of the entity receiving the award. As part of the Research Spending and Results service, Principal Investigators of NSF-funded projects now also create for the public a project outcomes report that demonstrates the intellectual merit and broader impacts the project.
- **Science, Engineering & Education (SEE Innovation)** – Offers publicly available information about NSF investments at the forefront of science, engineering, and education. This service demonstrates how tax dollars are being spent by NSF to fund research and how the outcomes of NSF-funded research benefit the public; profiles "People of Distinction" to feature exceptional members of the science, engineering, and education

communities; and provides asset summaries to show how NSF-funded centers, facilities, networks, telescopes, and observatories have enabled large-scale research and discovery; and allows grantees and the public to find information by scientific area of interest and geographic location (state or congressional district).

- **Federal Financial Report** – As of January 2012, Research.gov is using the government-wide standard form for grantees to prepare and submit financial reports. The Research.gov FFR service reduces administrative burden (especially for institutions with one NSF grant), makes new awards and awards with canceling appropriations easier to identify, and incorporates a user-friendly design that improves the capability to download and upload the FFR, to use filters to view certain types of awards, and to access web-based forms that are pre-populated with organizational and grant information. NSF is interested in offering this service for use by other agencies in the future.
- **InCommon and Application Submission Web Service** – In order to better meet the needs of and reduce the administrative burden on those doing business with NSF, Research.gov now offers InCommon, an identity management service, and Application Submission Web Services, a grant application submission service. InCommon, which was developed by an NSF-funded research project, is offered by the InCommon Federation, a non-profit organization. If an institution is part of the InCommon Federation, its researchers and sponsored programs offices may use their institutional IDs and passwords to access Research.gov. The Application Submission Web Service allows institutions to use their own systems to prepare and submit grant applications to NSF, allowing researchers to use a system they are familiar with while still providing a seamless submission process and complying with all relevant research and data standards used across the government.

Currently, NSF is developing additional Research.gov services that will fulfill demand in the research community. As with previous services, initial business requirements are being gathered from volunteering individuals and institutions throughout the research community, and their input is being incorporated into the design of these services. Throughout the process of designing and implementing new services, NSF will continuously seek feedback from members of the research community by speaking with them at events and conferences, encouraging them to contact NSF at the feedback@Research.gov email, and discussing with them during the feedback/question and answer portion of all Research.gov webinars. NSF also encourages interested individuals or institutions to participate in pilot programs that test new or improved services. NSF uses this feedback, along with lessons learned from past service implementations, to ensure that services are designed and rolled out such that they are consistent with government-wide standards, are reducing the administrative burden on researchers and institution staff, and are addressing the dynamic needs of the research community on the cutting edge of scientific advancement and the public who want to know about that research.

In addition to partnering with individuals and institutions on service development, NSF actively promotes awareness about and participation in Research.gov. NSF also gives institutions and the research community the opportunity to participate in the improvement and advancement of Research.gov, and to interact meaningfully and frequently with NSF staff about Research.gov. For example, NSF recently initiated a Research.gov webinar series that allows members of the research community to learn about Research.gov services, interact in real-time with NSF staff, ask questions, and provide feedback, without having to travel. Individual or institution-specific webinars are also available at any time to any individual or institution. Other outreach channels include online fact sheets, demos, and conferences or events that educate stakeholders about the research mission, Research.gov, and its services. Additionally, NSF collaborates with research associations to raise awareness within the community of new Research.gov services. For example, Research.gov speaks at meetings of these associations to keep their members abreast of progress, collect feedback, answer questions, and explain how Research.gov is using previously collected input to inform the future of the website.

NSF recognizes the value of collaboration at these various scales of activity and shall continue to explore new and innovative methods of engaging the public and the research community in ways that enhance the NSF mission, support the science, engineering and education communities, and generate value to the American public.

Records Management

NSF is dedicated to a transparent approach to records management by maintaining thorough, accessible electronic records of agency business. One way that the agency offers clear insight into its electronic management processes is by posting its records retention schedule on the Foundation web site (http://www.nsf.gov/policies/records/index.jsp), making the information easily accessible to any member of the public. The schedule uses plain language to describe the different types of records that NSF is required to retain and the period for which they are retained. The NSF website provides the public with detailed information for accessing the different types of records, such as step-by-step instructions for submitting Freedom of Information Act (FOIA) requests. NSF is also actively identifying and leveraging opportunities to make records that do not contain sensitive or personally identifiable information readily available to the public. Records such as press releases, transcripts of speeches, testimony delivered at congressional hearings and publications are already made available to the public through the Foundation website.

NSF has received approval from the National Archives and Records Administration (NARA) for electronic archival of NSF's permanent records (in addition to non-permanent records), such as records of grant awards that have been made by the Foundation. To support this, NSF has implemented a commercial-off-the-shelf electronic records management (ERM) solution, which will allow the Foundation to make records management more efficient by automating many of the related

processes. For example, the Foundation will no longer need to spend valuable time and resources preparing and storing paper records or shipping them to NARA.

The ERM system will integrate with other NSF systems to electronically pull and store retired records and then prepare and transmit the records quickly and seamlessly to the NARA Electronic Records Archive (ERA) when they are ready for permanent archival. Additionally, the ERM system provides key features, such as automatic notifications for when records are ready to be retired, which will help increase the timeliness of award records retirement and archival.

NSF is also actively exploring opportunities to leverage the ERM system to further increase transparency to the public. For example, NSF is looking into the feasibility of providing records information through electronic reading rooms. Historically, to view NSF records, the public has had to either physically visit the Foundation or be sent copies of the records through the mail, both of which can take time and may result in indirect (e.g., travel costs) or direct (e.g., mail and copying costs) costs to the requestor. Additionally, before records could be made available, the records also had to be manually redacted to remove sensitive information, a time-consuming process. Through electronic reading rooms, members of the public could access and view requested records quickly and easily at no cost to them from anywhere in the country. Features available through these reading rooms could also be leveraged to automatically redact sensitive information, decreasing the amount of time and resources spent preparing records for public viewing. NSF will look at best practices from across the federal government and research opportunities such as those to identify the most appropriate and effective ways to leverage this technology for the ultimate benefit of the public.

OTHER OPEN GOVERNMENT ACTIVITIES

Freedom of Information Act (FOIA)

NSF has a long tradition of making its FOIA responses openly available and accessible to the public. FOIA requests are received electronically – either directly to the NSF FOIA Officer or via the FOIA@NSF.gov alias. FOIA data are currently available at http://www.nsf.gov/policies/foia.jsp covering the fiscal years 1998 through 2011 inclusive and are available in DOC, HTML, PDF and TXT formats. During 2011, FOIA information covering the period FY1998-FY2011 was made available via www.data.gov and http://www.nsf.gov/open/. The plan calls for NSF to continue to keep FOIA information up-to-date at these sites.

The NSF Office of General Counsel (OGC) corresponds electronically with FOIA requesters and recognizes the need for an open and active dialog with the NSF Chief FOIA Officer. In addition, the OGC is a member of the Chief Information Officer's (CIO) Security and Privacy Working Group as well as attends CIO council meetings on behalf of the CIO.

Congressional Requests for Information

Congressional requests for information typically are addressed to the NSF Director in the Office of the Director (OD). They are then assigned by the Congressional Affairs Group to the organizational unit within NSF that has the necessary background and information consistent with providing a cogent response. The assignment is made with a timeframe as to when the response is required, and then the response is sent to the requester following necessary clearance processes.

In keeping with the administration's statement for Sunshine Week in March 2011, NSF has developed a new web page for Reports to Congress (http://www.nsf.gov/about/congress/nsf-congress-reports.jsp) that provides links to agency reports that are required by statute. There is a link on the NSF Open Government page to the Reports to Congress page.

Public Affairs

The Office of Legislative and Public Affairs (OLPA) advances NSF's mission "to promote the progress of science…" through strategic communications aligned to the Foundation's objectives. OLPA employs a wide variety of tools and techniques to engage the general public and key audiences including Congress, the news media, state and local governments, other federal agencies, and the research and education communities.

Examples of tools and techniques used to engage NSF's audiences include the following:

News From the Field

By partnering with public information officers at research institutions, NSF provides links to selected news releases from universities, colleges and other NSF-funded institutions. Many of these items are selected to appear in the NSF.gov home page news banner. These News From the Field items bring together in one place a larger number of the discoveries made possible by NSF support. The public can receive automatic updates via an RSS feed or GovDelivery alert notification. With more than 4,800 news items published and the number increasing each day, News From the Field greatly enhances the public's ability to learn about the results of taxpayer-supported research. See http://www.nsf.gov/news/news_list.cfm?nt=12 for News From the Field.

International Science and Engineering Visualization Challenge

Visuals can communicate research results and scientific phenomena in ways that mere words cannot. As the need to increase science literacy grows more urgent, illustrations can provide immediate and influential connections between scientists and other citizens, and may be the best hope for nurturing popular interest. For these reasons, NSF partnered with the journal *Science* to create the "International Science & Engineering Visualization Challenge." The competition seeks to encourage

and expand the participation of people engaged in communicating science, engineering and technology for education and journalistic purposes. Judges appointed by NSF and *Science* select winners in each of five categories: Photography, Illustrations, Informational Posters and Graphics, Interactive Games, and Videos. The winning entries appear in a special section in *Science* and *Science Online*, and on the NSF website. One of the winning entries is featured on the cover of *Science*, and each winner receives subscriptions to *Science* and *Science Online* and a certificate of appreciation. The challenge has resulted in a growing library of award-winning visualizations available for use by teachers, students and the public. The competition's first winners were announced in 2003, and the most recent winners were announced in 2011. The competition accepted entries online for the first time in 2011, with entries submitted via the challenge.gov website. Judging rounds typically take place in October, and once the entries have been narrowed to the Top 50, the public is invited to vote for its favorites. The entries that receive the most public votes in each category are named the People's Choice winners. The 2012 competition opens on May 31, 2012. See http://www.nsf.gov/news/special_reports/scivis/index.jsp for the International Science and Engineering Visualization Challenge or http://challenge.gov/NSF/209-international-science-engineering-visualization-challenge.

NSF Multimedia Gallery

NSF maintains a collection of illustrations, photos, animations, videos and audios covering all areas of science and engineering that the agency supports. Content for the NSF Multimedia Gallery (MMG) consists of works created by staff and contractors (as works for hire), and also works contributed by others outside of the agency who have granted NSF permission to make their materials available for educational and informational purposes. To date, the MMG collection includes more than 3,330 images and video and audio files. See http://www.nsf.gov/news/mmg/ for the Multimedia Gallery.

Science360.gov: The Knowledge Network

NSF launched Science360.gov: The Knowledge Network as a multimedia web portal devoted to all things scientific, technological and engineering. The current site is rich with news, audios and videos, and it offers visitors a wide range of content that spotlights research and engineering advances and communicates the significance of science and engineering in our daily lives. The site is home to Science360 Radio, an Internet stream featuring continuous audio programming that is available 24 hours a day, 7 days a week. Science360 Radio offers 125 shows and podcasts, plus additional programming such as news and documentaries, from NSF and external contributors such as Scientific American, Discovery, Nature and NPR. The Science360 site also features an extensive collection of videos, both individual programs and video series such as "Science of NHL Hockey," "Science in Action," "Changing Planet," "Chemistry Now," "The Field Revealed," and "Innovators." More than 100 contributors, including universities and U.S. and international agencies, have given NSF more than 1,000 videos. The website also provides a link to the

Science360 News Service, a compilation of news gathered from wherever science is happening, including directly from scientists, college and university press offices, popular and peer-reviewed journals, dozens of NSF science and engineering centers, and funding sources that include government agencies, not-for-profit organizations and private industry. The news service's podcasts, videos, images and news briefs are distributed as daily updates to subscribers.

Appreciating the fact that today's citizenry are very mobile, NSF has developed free apps to extend the reach of Science360 into the mobile world. The Science360 Radio apps for iPhone and Android devices, allow people to listen anytime, anywhere. The Science360 for iPad app provides easy access to engaging science and engineering videos and images produced by NSF and its partners or gathered from NSF-supported scientists, colleges and universities and centers, and also breaking stories about scientific discoveries by NSF-supported researchers. The Science360 for iPad app has been downloaded more than 500,000 times. The Science360: The Knowledge Network website is found at http://science360.gov/files; Science360 Radio is located at http://science360.gov/files. Information about the Science360 for iPad app, including how to download it for free, is available at http://science360.gov/ipad/.

V. NSF OPEN GOVERNMENT INITIATIVES

Social Media Tools

NSF's commitment to utilizing social media can be seen in the multi-faceted approach it has undertaken in order to remain engaged with its stakeholders and with citizens. NSF has established a Facebook page (http://www.facebook.com/US.NSF) to connect with others interested in science and engineering, and to engage in dialogs with the public about NSF's activities. NSF's Facebook presence has more than 25,000 "fans" (people who have indicated they like the site). NSF also has a YouTube site (http://www.youtube.com/user/VideosatNSF) where science-themed videos are available for viewing and comment. NSF launched a Flickr site (http://www.flickr.com/photos/nsf_beta) that makes available research and education photos and illustrations for others to use to illustrate science and engineering topics. In addition, NSF has a number of Twitter feeds, including the main NSF feed (http://twitter.com/NSF) to extend its communication and outreach activities. The NSF Twitter feed has attracted more than 235,000 followers. A complete list of NSF's social media activities may be found at http://www.nsf.gov/social/ . To guide NSF's further use of social media, the agency established a Policy for Social Media Use in January 2011. Finally, NSF also uses Wikis, for example, the NSF BIO Directorate is using a wiki to engage their principal investigators to provide ideas for tools and resources that could be used by their community.

Flagship Initiative

NSF funds basic research and so it is totally consistent and appropriate that NSF flagship activities include research associated with that activity that can contribute to the open government directive.

The flagship initiative associated with NSF Open Government Plan Vers. 1.0 was Science and Technology for America's Reinvestment: Measuring the Effect of Research on Innovation, Competiveness and Science (STAR METRICS). STAR METRICS, a multi-agency, multi-university venture that measures the impact of science and engineering investment in economic growth, workforce outcomes, scientific knowledge and social outcomes[8]. NSF's STAR METRICS participation under its flagship activity concluded in a pilot study. NSF will continue to participate and contribute to STAR METRICS during 2012 and beyond as STAR METRICS enters its Phase 2 activities under NIH's leadership.

[8] http://sites.nationalacademies.org/PGA/fdp/PGA_057189.

Open Data Access

NSF has identified a new flagship activity beginning in FY2012, directly embracing transparency and openness: open access to digital data created as a result of federal agency research investments. Indeed, access to the digital data produced by the NSF-funded research community was the most popular request collected during NSF's initial Open Government engagement activity with the public via IdeaScale on what data would be considered most highly valuable.

Open access, or sharing, of digital data generated by the principal investigators being funded by NSF is an issue that both the NSF and the NSB are currently actively exploring through NSB's Task Force on Data Policies and NSF's Data Working Group, and additionally, through participation in OSTP's Public Access to Digital Data Resulting From Federally Funded Scientific Research Working Group. One of the recommendations coming from the NSB's Data Policy Task Force report is "…establish data sharing and management practices that align with NSF data policies." Finally, this is an issue of interest not only to NSF but also to other research funding agencies, in addition to being an international issue as countries attempt to tackle this area.

Identification of public data access as NSF's Flagship open government activity was principally motivated by the importance of this issue. The large data public access stakeholder community (principal investigators, libraries, publishers, institutions, etc.) coupled with international and other constraints all combine to make this a challenging and game-changing topic to address.

NSF's Award and Administration Guide Chapter VI.D.4 contains the agency's current policy on Dissemination and Sharing of Research Results. The overarching expectation is that NSF grantees will share their data with other scientists and will submit their findings for publication. The specific policy may be found at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

It is critical that research data, regardless of the funding source, be properly managed, curated, standardized, citable, easily shared and made discoverable by others. This is important as building on today's scientific findings is a key step in the scientific method and contributes to enabling new science in the future. In FY2011, NSF took an initial step to its public data access goal when it required all new proposal submissions to NSF to contain a data management plan. Submissions that fail to include a data management plan are rejected. Data management plans are reviewed during NSF's merit review process. As of January 31, 2012, over 50,000 proposals with data management plans have been submitted. NSF maintains links to additional data-sharing requirements and guidance from directorates, offices and programs at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp.

NSF's flagship initiative will complement these activities, possibly creating candidate mechanisms for the dissemination and long-term stewardship of the results of unclassified research, including digital data and peer-reviewed scholarly publications, supported wholly or in part by public funds.

To further encourage NSF principal investigators to openly share data, NSF is looking to accept listing citable datasets and software in addition to publications when principal investigators list their five significant accomplishments in submitted proposals. NSF already has activities in the open data access space, for example NSF's Biological Sciences Directorate (BIO) is piloting open data access activities for the biology community as represented in its NSF-funded iPlant and DataDryad[9] efforts. NSF's Mathematical and Physical Sciences (MPS) Directorate is exploring, via a pilot, use of data repositories that could be used in support of open access.

Other Initiatives

Merit Review

NSF's merit review process is considered the "gold standard" for ensuring that proposals are reviewed in a fair, competitive, transparent, and in-depth manner. Ever seeking to improve, and looking to exploit technological advancements, NSF has embarked on exploring promising options that can be used to complement the existing merit review process. Another goal of this activity is to address the significant increases in the number of proposals being submitted to NSF for funding. From FY2000 to FY2011, the number of proposal and decline decisions increased by 95 percent without an attendant increase in staff. As a result, introduction of new/improved mechanisms for merit review that could help alleviate some of the increased workload are of particular interest.

This exercise is being accomplished by reaching out to the various NSF stakeholders, including other federal agencies (e.g. NSF has been working with NIH as well as the United Kingdom's Engineering and Physical Sciences Research Council, or EPSRC), to solicit their input on processes to enhance or otherwise complement NSF's merit review process in the context of improved efficiencies and broadening participation. By the judicious application of technologies and by looking at additional methods to complement the already existing merit review process (for example, NSF has been piloting an Ideas Lab concept) NSF expects to help close some of the gap between proposal submission, timely reviews and funding. Recently, NSF's Geosciences (GEO) Directorate and Office of Cyberinfrastructure (OCI) successfully used the concept of a *charrette* in the EarthCube program as a mechanism for group planning and program development[10]. As usual, NSF shall make results of this activity openly available to any interested parties.

[9] http://www.iplantcollaborative.org; http://datadryad.org/

[10] http://earthcube.ning.com/

Virtual Panels

One of the activities being pursued in the merit review process initiative described above, also having applicability to meetings in general, is the increased use of virtual panels/meetings. It is expected that replacing face-to-face meetings, where appropriate, with a virtual counterpart, by using video/teleconferencing technologies, will not only result in cost savings but perhaps, more importantly, in the context of open government in broadening participation. The challenges that are being explored include dealing with confidentiality issues; cost; support; security; meeting moderation; platform agnostic; technologies that cover a broad spectrum of capabilities in addition to others. NSF has been working with other agencies (e.g. NIH) in sharing experiences. Results of this initiative shall be made widely available.

APPENDIX 1: DEVELOPMENT OF THE OPEN GOVERNMENT PLAN

NSF sought input from the public in developing its original Open Government plan. The agency's OpenNSF engagement used the IdeaScale public dialog application. NSF promoted the dialog through a variety of outreach methods, including an item in the Current (NSF newsletter), a news release, items distributed to NSF's GovDelivery and RSS subscribers, announcements on NSF's Twitter and Facebook (social media) sites, an all-staff memorandum, and email blasts to key external groups such as the news media, public information officers at research institutions, and members of science and engineering societies and organizations that are interested in science policy. A link to the dialog was prominently featured on the NSF homepage and also on the agency's Open Government page.

NSF permitted the public's ideas and comments to be posted to the OpenNSF dialog site without pre-moderation. The agency's moderation team monitored the site, removed ideas and comments that violated the terms of participation, moved ideas that did not address open government issues to an off-topic site, responded to questions or directed them to the proper authority, and interacted with the public through moderator comments and/or emails to contributors.

The OpenNSF site received 59 ideas, 85 comments and 529 votes. Ideas were submitted by 46 different authors. The 10 most popular ideas, based on the vote totals (positive votes minus negative votes), were:

1. Require all taxpayer research to be freely available (83 votes)
2. Public funding = public viewing/require all publicly funded projects to publish as open access and all data and code shared as open source (56 votes)
3. NSF should live webcast all meetings (36 votes)
4. Fund proposals, not projects near completion (28 votes)
5. Better explain knowledge economy/need a "Marshall Plan"-type mobilization to ensure citizens understand the importance of innovative, scientific research and how that translates into the many various impacts on our economy. (18 votes)
6. Open source desktop software/implement non-proprietary computer desktop to NSF employees, contractors and grantees (17)
7. Publicize OLPA products to K-12 superintendents and teachers (14)
8. Connect NSF scholars to government jobs (14)
9. Open category for SBIR/ a "what do you have that we don't know about" category (14)
10. Conflict of interest transparency (13)

The ideas, along with comments and discussion, are available on the OpenNSF dialog site (http://opennsf.ideascale.com).

APPENDIX 2: NSF OPEN GOVERNMENT DIRECTIVE DATA COLLECTION

Below is a complete listing of NSF data collections available either via www.nsf.gov/open or www.data.gov along with brief descriptions of their contents. These will be augmented periodically as new high-value datasets are identified and converted to the necessary machine-readable format.

- **Comprehensive Information on Federal Spending by Agency and Spending Type**
  USASpending.Gov
- **Early and Later Career Principal Investigator (PI) Count Percentage and Funding Rates: 10 Year Trend, FY2001-FY2010**
  Data.gov | XML | XSD | Data Dictionary
- **Funding Rate by Principal Investigator (PI) Demographic: 10 Year Trend, FY2001-FY2010**
  Data.gov | XML | XSD | Data Dictionary
- **NSF Average Dwell Time by NSF and Directorate, FY2001-FY2010**
  Data.gov | XML | XSD | Data Dictionary
- **NSF Budget History by Account from 1951**
  Data.gov | XML | XSD | Data Dictionary
- **NSF Freedom of Information Act Report for October 1, 1997 through September 30, 2011**
  Statistical information on the number of FOIA requests received and processed by NSF, response times for FOIA requests, the number of appeals received, and other statistics on NSF's FOIA program.
  NSF.gov | Data.Gov FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY08 | FY09 | FY10 | FY11
- **NSF Graduate Research Fellowship Program Award Recipients, 2000-2009**
  NSF's Graduate Research Fellowship Program (GRFP) provides three years of support for graduate study leading to research-based masters or doctoral degrees in disciplines relevant to the mission of the Foundation. This dataset includes GRFP award recipients.
  Data.Gov 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011
- **NSF Graduate Research Fellowship Program Honorable Mention Recipients, 2000-2009**
  NSF's Graduate Research Fellowship Program (GRFP) provides three years of support for graduate study leading to research-based masters or doctoral degrees in disciplines relevant to the mission of the Foundation. This dataset includes GRFP Honorable Mention recipients.
  Data.Gov 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011
- **NSF Grants Management and Information on Research Spending and Results**
  Research.Gov
- **NSF State Obligations per Fiscal Year: 10 Year Trend, 2001-2010**

Data.gov | XML | XSD | Data Dictionary

- **NSF Obligations for Top 200 Institutions per Fiscal Year: 10 Year Trend, 2001-2010**
  Data.gov | XML | XSD | Data Dictionary
- **NSF Research Grant Funding Rates: Current Fiscal Year**
  FY 2011 NSF funding rates for competitive research proposals by organizational unit. The funding rate is calculated by dividing the number of awards by the number of awards and declines.
  Data.Gov | XML | XSD | Data Dictionary
- **NSF Research Grant Funding Rate per Fiscal Year: 10 Year Trend, 2001-2010**
  FY 2001-2010 NSF funding rates for competitive research proposals by organizational unit. The funding rate is calculated by dividing the number of awards by the number of awards and declines.
  Data.Gov | XML | XSD | Data Dictionary
- **NSF Spending Under the American Recovery and Reinvestment Act of 2009**
  Recovery.Gov Track the Money
- **Performance of NSF Major IT Investments**
  IT Dashboard

SESTAT

SESTAT is a database of the employment, education, and demographic characteristics of the nation's scientists and engineers. The data are collected from the following three surveys, which have been sponsored every two years since 1993 by the National Science Foundation (NSF):

- National Survey of College Graduates (NSCG)
- National Survey of Recent College Graduates (NSRCG)
- Survey of Doctorate Recipients (SDR).

Only the NSRCG and SDR were conducted in 2001.

Information from these surveys has been integrated into the SESTAT database. The SESTAT database allows for analyses of different components of the science and engineering workforce. When accessing SESTAT, the user may select the integrated database for 1993-1999, 2001, 2003, or 2006. In addition, data from the individual surveys maybe accessed for special analytical purposes. Access to some data may be restricted due to confidentiality considerations.
Data.Gov

Research Spending and Results

Research.gov Research Spending and Results is an online, user-friendly platform to access and search detailed information about federally funded science and engineering research and education, giving the general public, the scientific community and Congress visibility into the results achieved with federally-funded research. Research awards are easily searchable by agency, awardee, award amount and date, state and congressional district (where award was made and the work is

being performed), and key word such as a field of science. Information can be reviewed online or exported to various file formats, such as XML, CSV and XLS. Detailed information on federally funded research can be found for multiple agencies. Information provided for each award includes: Award recipient (institution and researcher), Award Amount and funds obligated to date, Period of Performance, State and Congressional district of where the award was made and where the work is being performed., Award Abstract describing the research effort, Citations of Journals Published as a result of the award.
Data.Gov

Key Science and Engineering Indicators: Digest 2012
This digest of key S&E indicators draws from the National Science Board's Science and Engineering Indicators report. The digest serves to draw attention to important trends and data points from across Indicators and to introduce readers to the data resources available in the report.
Data.Gov

NSF Grants Management and Information on Research Spending and Results
Here you can also find information about how NSF and NASA grant award dollars are being spent, what research is being performed, and how the outcomes of the research are benefiting society.
Research.Gov

Comprehensive Information on Federal Spending by Agency and Spending Type
Have you ever wanted to find more information on government spending? Have you ever wondered where Federal contracting dollars and grant awards go? Or perhaps you would just like to know, as a citizen, what the Government is really doing with your money.
USASpending.Gov

NSF Spending Under the American Recovery and Reinvestment Act of 2009
Recovery.gov is the U.S. government's official website providing easy access to data related to Recovery Act spending and allows for the reporting of potential fraud, waste and abuse.
Recovery.Gov Track the Money

Performance of NSF Major IT Investments
The Performance Dashboard tracks information technology (IT) investments self-reported by federal agencies and departments as "major". Major investments (Agency's Exhibit 300s) represent only a portion of the agency's entire IT portfolio (Agency's Exhibit 53).
IT Dashboard

APPENDIX 3: CITED URLS

White House Open Government Plan Evaluations
http://www.whitehouse.gov/open/around

NSF Open Government Plan website
http://www.nsf.gov/open

NSF Open Government Plan
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=opengov

NSF Strategic Plan 2011-2015
http://www.nsf.gov/news/strategicplan/index.jsp

NSF Proposal and Award Policies and Procedures (PAPP) Guide
http://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/aag_6.jsp#VID4

NSF e-Gov Content Inventory
http://www.nsf.gov/policies/egov_inventory.jsp

NSF e-Gov Records Retention Schedule
http://www.nsf.gov/policies/records/index.jsp

NSF Main Website
www.nsf.gov

Federal Agencies Datasets for Open Government
www.data.gov

Government Spending at your Fingertips
http://www.usaspending.gov/

Snapshots of Federal Government IT Spending by Agency
http://www.itdashboard.gov/

Recovery Act Spending Results
http://www.recovery.gov/

NSF/NASA Research Spending
http://www.research.gov

NSF Science, Engineering & Education Innovation
http://www.research.gov/seeinnovation

NSF Collaborations
http://www.nsf.gov/about/partners/fedagencies.jsp

Digital Research Data Sharing and Management
http://www.nsf.gov/nsb/publications/2011/nsb1124.pdf

Decadal and Regional Climate Prediction Using Earth System Models
http://www.nsf.gov/pubs/2010/nsf10554/nsf10554.htm

Networking and Information Technology Research and Development
http://www.nitrd.gov/

eXtreme Science and Engineering Digital Environment (XSEDE)
www.xsede.org

NSF FOIA site
http://www.nsf.gov/policies/foia.jsp

Federal Government Prizes/Challenges
http://challenge.gov/

NSF Multimedia Gallery
http://www.nsf.gov/news/mmg/

Science360/The Knowledge Network, NSF multimedia web portal to science, engineering and technology
http://www.science360.gov/files/

NSF Science360 News Service to science, engineering and technology
http://news.science360.gov/files/

Links to NSF science news items
http://www.nsf.gov/news/newsmedia/sciencefrontiers/

NSF YouTube video site
http://www.youtube.com/user/VideosatNSF

NSF photos site
http://www.flickr.com/photos/nsf_beta

NSF Facebook site
http://www.facebook.com/US.NSF

NSF Twitter site
http://twitter.com/NSF

NSF social media sites
http://www.nsf.gov/social/

Feature article on NSF citizen science
http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=116658&org=NSF

APPENDIX 4: LIST OF ACRONYMS

ACCI	Advisory Committee for Cyberinfrastructure
BFA	Office of Budget, Finance and Award Management
BIO	Biological Sciences Directorate
CDI	Cyber-enabled Discovery and Innovation
CFO	Chief Financial Officer
CIF21	CyberInfrastructure Framework for 21st Century Science and Engineering
CIO	Chief Information Officer
CISE	Computer and Information Science and Engineering Directorate
COV	Committee of Visitors
CTO	Chief Technology Officer
CSV	Comma Separated Values
DoD	Department of Defense
DoE	Department of Energy
EaSM	Decadal and Regional Climate Prediction using Earth System Models
EHR	Education and Human Resources Directorate
ENG	Engineering Directorate
EPA	Environmental Protection Agency
EPSCoR	Experimental Programs to Stimulate Competitive Research
EOP	Executive Office of the President
FOIA	Freedom of Information Act
G8-HORCs	Heads of the Research Councils of the G8 countries
GEO	Geosciences Directorate
IRM	Office of Information and Resource Management
ISE	Informal Science Education
MPS	Mathematical and Physical Sciences Directorate
NASA	National Aeronautics and Space Administration
NIH	National Institutes of Health

NSB	National Science Board
NSF	National Science Foundation
OD	Office of the Director
OCI	Office of Cyberinfrastructure
OGC	Office of the General Counsel
OGD	Open Government Directive
OGD-WG	Open Government Directive Working Group
OIG	Office of Inspector General
OISE	Office of International Science and Engineering
OLPA	Office of Legislative and Public Affairs
OMB	Office of Management and Budget
OPP	Office of Polar Programs
OSTP	Office of Science and Technology Policy
PI	Principal Investigator
POR	Project Outcome Report for the General Public
S&E	Science and Engineering
SAO	Senior Accountable Official
SBE	Social, Behavioral and Economic Sciences
SEES	Science, Engineering and Education for Sustainability
SMART	Senior Management Advisory Roundtable
STEM	Science, Technology, Engineering and Mathematics
USDA	United States Department of Agriculture
XML	eXtensible Markup Language
XSEDE	eXtreme Science and Engineering Digital Environment