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NATIONAL SCIENCE FOUNDATION 4201 Wilson Boulevard Arlington, Virginia 22230

May 30, 2013



OFFICE OF THE GENERAL COUNSEL

<u>Via email</u>

Case # 13-189-F

This is in response to your April 20, 2013 request for a copy of each written response or letter from the National Science Foundation (NSF) to a Congressional Committee in calendar years 2012-2013 to date. We have located forty-six pages which are responsive to your request and all are being released in full. With regard to the Stenographic Transcript of Committee on Commerce, Science and Transportation, United States Senate, The Science and Standards of Forensics, dated March 28, 2012, when the Committee sends the transcript for corrections, NSF only returns the portions that we have edited and we have enclosed those pages. Your right of administrative appeal is set forth in 45 C.F.R. § 612.9 of the NSF FOIA regulation (copy enclosed.) You must make your appeal in writing and it must be received by the Office of General Counsel within ten days after the date of the final response.

There is no fee for FOIA services in this instance in accordance with 5 U.S.C. § 552(a)(4)(A)(i) et seq.

Sincerely,

Sandra Evans FOIA/PA Officer

Enclosures

UNITED STATES HOUSE OF REPRESENTATIVES Committee on Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies Hearing on Hearing on NSF Oversight March 19, 2013 Dr. Subra Suresh, Director, National Science Foundation Questions for the Record Submitted by Frank R. Wolf

Social, Behavioral and Economic Sciences

Question 1. A recently adopted amendment to NSF's fiscal year 2013 appropriations bill seeks to limit spending on political science research to only those grants with a certified link to economic or national security. How does NSF plan to implement this limitation?

Answer: NSF is currently developing a plan to implement this restriction on the Political Science program, which will take into account both the legislative requirements and NSF's existing policies and procedures.

Question 2. What is the expected impact of this amendment on the amount and kind of political science research that you will fund?

Answer: We expect that the portfolio of awards will be intellectually constrained, because a narrower set of requirements has been imposed for this program alone. The restrictions in the legislation will curtail our ability to support research projects that would further fundamental knowledge of how democracies are created and maintained as well as connections between the governed and their government, which seems particularly germane in the wake of Arab Spring and more broadly in the wake of thirty years of efforts to understand and improve democracy around the world. In the long term, these types of restrictions will have a chilling effect on NSF's ability to support basic research across its entire scientific portfolio.

Cross Foundation Initiatives

Question 3. Does the agency's recent emphasis on "OneNSF" initiatives imply that NSF has historically been too stove-piped in its research approach?

Answer: OneNSF is an organizational philosophy that emphasizes the need to continuously look for linkages in research and learning that might transcend disciplines to advance more effectively science, engineering, and education. In fact, depth in traditional research disciplines and cross-collaborations is required to tackle increasingly complex scientific questions.

Question 4. In just a few years, the OneNSF initiatives have come to consume a significant part of the agency's total budget, which means that NSF has become increasingly focused on programs addressing a few predetermined research goals. Is this focus pushing NSF to become more like a mission-specific research agency and less like a basic research agency, whose research focus goes wherever the science takes it?

Answer: All NSF programs support the Foundation's mission "to promote the progress of science, to advance the national health, prosperity, and welfare; to secure the national defense

and for other purposes." NSF's initiatives temporarily crystalize funding opportunities that are particularly ripe for scientific advancement or address high priority national needs. While some initiatives promote basic research to support specific national needs, this is a fraction (about 12 percent of the FY 2014 request) of NSF's overall support for research and education.

Question 5. How does the management of the OneNSF initiatives differ from the management of a typical NSF program? How have you made these differences transparent and understandable to the research community?

Answer: Most NSF initiatives are managed in the same way they were developed. There is a program announcement or solicitation that results in proposals that are reviewed according to well established processes. These processes are either specified in the solicitation or found in the Proposal and Award Policies and Procedures Guide. Webinars, posting of FAQs, presentations at conferences, and other forms of communication commonly are used to explain NSF's management practices to the research community. This is especially important when NSF is piloting new procedures, such as those being used to manage INSPIRE.

Question 6. Some directorates have had to reduce the funding available for their core programs and infrastructure in order to make their contributions to the OneNSF initiatives. What process do you use to make the trade-offs between decreasing funding for existing programs and providing money to initiate new programs?

Answer: Initiatives support areas that are ripe for scientific advancement or address a high priority national need. The decision to allocate funding to an initiative rather than to another program or funding opportunity is based on where the possibility is greatest for significant programmatic outcomes. By supporting a diverse portfolio of research funding opportunities, NSF has been able to support transformative research across the frontiers of science, engineering, and education.

NSF Headquarters

Question 7. The prospectus for a new NSF headquarters facility has been approved by the House but not the Senate. What do you know about the status of the Senate's consideration of your prospectus?

Answer: NSF's FY 2011 prospectus for a new NSF headquarters lease was approved by the Senate Committee on the Environment and Public Works on April 18, 2013.

Question 8. What is the latest that you could receive Senate approval without impacting GSA's planned schedule for awarding a new NSF headquarters lease?

Answer: Given the recent approval of the NSF prospectus by the Senate Committee on Environment and Public Works, there is no anticipated impact on GSA's schedule to award the lease during the summer of 2013.

Question 9. What impact would a potential delay in the lease award have on NSF's headquarters planning? Would such a delay increase your budget needs associated with the new headquarters lease?

Answer: GSA informs us that the NSF lease procurement was extremely competitive and will

yield extraordinary economic advantages resulting from the current inexpensive financing market. With the approval of the NSF lease prospectus by the Senate Committee on Environment and Public Works on April 18, 2013, we believe the benefits of GSA-negotiated financing terms can be realized. Because the procurement will not be delayed, no additional NSF budgetary requirements are anticipated at this time.

Security

Question 10. The NSF Inspector General has told us that the number and level of sophistication of hacking attempts on NSF information technology systems has increased. Are your IT security protections keeping pace with the increased threat?

Answer: The number of IT security threats continues to increase at a rapid pace, and attackers display an increasing level of sophistication. With recognition that the threat landscape is constantly evolving, NSF continuously monitors potential threats and is proactive about preventing and addressing them. NSF faces threats that are common to all agencies, including attempted attacks from external networks, zero day threats, phishing schemes, and the potential for insiders with malicious intent. We use a combination of technologies and user education to help mitigate the risk associated with these threats.

NSF's vulnerability management program employs layers of defense against potential threats. We continuously monitor systems, network devices, workstations, laptops, and mobile devices to quickly identify security vulnerabilities. Our vulnerability remediation activities are centrally tracked and managed. We have strengthened our patch management processes and activities in accordance with National Institute of Standards and Technology (NIST) recommendations.

NSF employs intrusion detection systems to monitor internal and external network traffic on a continuous basis. With the Foundation's transition to the Trusted Internet Connection (TIC) service, NSF relies on the CenturyLink Security Operations Center and the Department of Homeland Security's intrusion detection system, along with NSF's onsite network operations center, to provide 24/7 monitoring. Should we identify areas of potential exposure, we move guickly to mitigate risks.

User education is an important part of NSF's strategy to stay ahead of cybersecurity threats. We regularly advise and train agency staff about their responsibilities for protecting agency information.

NSF's cybersecurity activities have helped us to keep pace with external threats, even as new ones continue to emerge. As reported to US-CERT, NSF's average number of security incidents per year remains in the single digits. However, NSF recognizes the importance of continually reviewing and enhancing our overall security posture. For example, we consistently evaluate our IT security tools to ensure they remain current and effective in light of emerging challenges. NSF will continue to be proactive in monitoring the growing number and types of cybersecurity threats.

Question 11. One potential weakness that your IG has highlighted is NSF's lack of a formal cybersecurity incident response plan. Why doesn't NSF have such a plan? What risks are created by not having a standardized set of policies and procedures to follow whenever an incident occurs?

Answer: NSF has a standard set of policies and procedures for incident response. NSF's

incident response policy and procedures reflect National Institute of Standards and Technology (NIST) guidance and practical experience gained from previous incidents. Our policy and procedures include guidance for consistent handling of computer security events at NSF, including event containment, eradication, and recovery, as well as procedures for notifying NSF management, US-CERT, and law enforcement, if necessary.

As part of our FY 2012 Federal Information Security Management Act (FISMA) review, the NSF Office of the Inspector General recommended that NSF update our existing incident response policy and procedures, and formalize our processes for categorizing, tracking, and reporting incidents. NSF management is currently updating our incident response policy and procedures and is documenting a formal cybersecurity incident response plan, commensurate with NIST 800-53 guidance, to include US-CERT incident categorizations and severity ratings.

Question 12. What policies do you have in place to ensure that your grantees are complying with export control laws and regulations in all relevant instances?

Answer: NSF grantees have full responsibility for the conduct of the project or activity supported under the grant, including compliance with all applicable laws. Grantees are provided notice of certain critical legal requirements, among which are the Export Administration Regulations, and in accepting the award, affirmatively agree to comply. To ensure compliance, grantees develop their own export control plans and seek the necessary licenses, permits and approvals prior to undertaking proposed relevant activities.

MONITORING AND IMPLEMENTATION OF K-12 STEM EDUCATION REPORT RECOMMENDATIONS

Question 13. NSF released a report in 2011 on best practices in K-12 STEM education. There were a number of public events at the time to get that report into the hands of education practitioners and policymakers who could implement its findings, but your efforts to disseminate that report have continued since the report's release. What is the current status of your dissemination efforts?

Answer: The report, *Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering and Mathematics* and its findings have been disseminated by a variety of means, including workshops, print distribution, presentations to professional societies and other policy making bodies, and briefings for Congressional staff.

Workshops

- In September 2011, a national roll out of the 2011 NRC report took place at Drexel University in Philadelphia. Congressman Fattah, members of Congressman Wolf's staff, NSF leadership, and representatives from the U.S. Department of Education took part in this event.
- Four regional "STEM Smart" workshops based on findings of the 2011 report targeted stateand district-level practitioners and education researchers in Seattle, Chicago, Las Vegas, and Baltimore. These workshops took place between February of 2012 and March 2013 and featured sessions and exhibits drawn mostly from NSF research projects that are aligned with the recommendations in the report. Materials and resources from the workshops can be found on the successfulstemeducation.org website.
- NRC staff presented at the 2012 annual meeting of the National Science Teachers Association (NSTA) in Indianapolis, and at a conference in Pittsburgh for 350 math and

science educators and administrators representing the 138 schools in the Pittsburgh metropolitan region (October 2011).

Print Dissemination

- Copies of the 2011 NRC report have been distributed at major professional meetings such as NSTA and the National Council of Teachers of Mathematics (NCTM).
- Copies of the 2011 NRC report have been widely disseminated to the National Science Board, the EHR Advisory Committee, NSF staff members, and to EHR principal investigators.
- As of March 2013, 14,604 free copies of *Successful K-12 STEM Education* were downloaded from the NRC web site, and nearly 5,000 print copies had been sold.
- The Smithsonian's National Science Resource Center purchased and disseminated 300 copies at Science Education Institutes for Leadership Development and Strategic Planning meetings in North Carolina and New Mexico. During the events, leadership teams from school districts developed a long-range plan to enact systemic change in their district, with the goal of implementing and expanding a research-based science education program for students.
- In June and July 2011, report committee member Jerry Valadez, a professor at California State University in Fresno, disseminated 100 copies to directors of the California Science Project and staff of the Oakland Unified and San Francisco Unified School Districts.
- National Academies Press provided 200 copies to a STEM Summit focused on bringing the Pittsburgh region the best information about successful STEM-education strategies by using cutting-edge research and other examples from throughout the region.
- NSF distributed approximately 1,500 copies at the national roll-out event in Philadelphia and the four "Smart STEM" regional meetings.

Professional Societies and Policy Organizations

- Briefings on *Successful K-12 STEM Education* have been held with major policy organizations, such as the National Governors Association, the Council of Chief State School Officers, the Council of State Science Supervisors, and the National Conference of State Legislatures, to initiate conversations about policy implications of the report.
- The report was featured at a June K-12 STEM Education Summit organized by U.S. News and World Report in Dallas.
- Report committee chair Adam Gamoran gave keynote speeches at meetings of the Southern Region Education Board State Leaders' Forum in Jacksonville, Fla., (November 2011), and at the annual meeting of the Oak Ridge Associated Universities in Tennessee (March 2012). Gamoran, committee member Barbara Means, and an NSF representative participated in a panel discussion of the report at the annual meeting of the American Educational Research Association in Vancouver, Canada (April 2012).

Congressional Communications

- In October 2011, report committee chair Adam Gamoran and member Barbara Means, Board on Science Education (BOSE) member Suzanne Wilson, and two others testified at a hearing on "What Makes for Successful K-12 STEM Education" before the House of Representatives Committee on Science, Space, and Technology Subcommittee on Research and Science Education.
- In June 2011, Adam Gamoran briefed staff from EHR and members of the House of Representatives Committee on Appropriations, Subcommittee on Commerce, Justice, Science, and Related Agencies.

- NSF was one of 13 organizations (federal agencies and scientific societies) that participated in an event at the Rayburn House Office Building entitled "Celebrating U.S. Science and Engineering." Invitees included members of Congress, their staff, scientists and engineers, and students. The event was facilitated by the Alliance for Science & Technology Research in America and Institute of Electrical and Electronics Engineers (IEEE). The NSF display featured the report along with issue briefs developed for the "STEM Smart" regional meetings. About 300 postcards with information about how to obtain the reports were distributed.
- In January 2013, NSF engaged in conversations with staff members from Representative Wolf's office about holding a STEM event in his district (scheduled for September 27-28, 2013) based on findings of the report and other developments.

Question 14. Late last year, the National Research Council released a list of 14 key indicators that would allow NSF to track the implementation of the recommendations contained in the best practices report. What steps have you taken to begin collecting data on those indicators? How long do you estimate it will take to get a complete monitoring scheme in place for all 14 indicators?

Answer: The Directorate for Education and Human Resources, in consultation with the National Center for Science and Engineering Statistics, has developed a five-year plan to collect data on the indicators identified by the National Research Council (NRC) and published in the 2013 report *Monitoring Progress Toward Successful K-12 STEM Education: A Nation Advancing?* In FY 2014, NSF will determine the current state of the STEM indicators, analyze and report existing data, and identify data sources that could be expanded to include the data called for in the NRC report. Further, a summary of the NRC report will appear in the 2014 *Science and Engineering Indicators* issued by the National Science Board. Also starting in FY 2014, and continuing through FY 2015, NSF will be working to ensure that newly developed indicators align with the recommendations in the NRC report. The final phase of the plan, establishing a research and development agenda for the development and tracking of new success indicators, is expected to take place from FY 2014 to FY 2019.

NSF has already begun to lay the groundwork for the phases of this plan by holding meetings around this topic with key groups in the Department of Education, such as the National Center for Education Statistics, those involved in Race to the Top Grants, and those responsible for the State Longitudinal databases at the Institute of Education Sciences, whose cooperation will be necessary to accomplish this plan. By FY 2019, plans will be in place to collect data on all 14 indicators.

RECOVERY ACT FUNDING

Question 15. OMB gave you the option to seek waivers to allow certain Recovery Act awards to continue expending funds beyond the government-wide September 30 deadline. How many waivers did you seek, and how much funding is covered by those waivers?

Answer: NSF's waiver request was comprised of 512 awards totaling \$133.60 million (less than 5 percent of ARRA obligations). Specifically, it included: Faculty Early Career Development program (CAREER) (304 awards, \$20.0 million out of \$165.0 million); Robert Noyce Scholarship program (59 awards, \$12.60 million out of \$59.0 million); and a multi-programmatic request, comprised of (149 awards, \$101.0 million out of \$555.0 million).

Question 16. The Recovery Act was enacted with the goal of providing a short term stimulus to an economy in major crisis. At this point, four fiscal years later and amidst a stronger general economy, that justification is much less compelling for the use of your remaining unspent Recovery Act funds. What is the justification you used for seeking waivers to continue paying out some of these awards?

Answer: NSF's primary economic impact in connection with the Recovery Act is to advance the long-term goals – innovation and reinvestment – inherent in the statement of purpose set forth in Sections (3) & (4) of the Act. § (3), "to provide investments needed to increase economic efficiency by spuring technological advances in science and health"; and § (4), "to invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits". As justification for seeking waivers, the Foundation utilized the criteria set forth in OMB Memorandum M-11-34 including projects that were long-term by design, had contractual commitments, environmental considerations and other special circumstances. NSF sought waivers to continue paying out only about 10 percent of the grant agreements in NSF's Recovery Act portfolio. NSF's request was narrowly tailored to only include those awards that the Foundation determined met the M-11-34 criteria, and the agency estimates that there will be less than 5 percent of the total Recovery Act funds obligated remaining unexpended after the expenditure deadline of September 30, 2013.

Question 17. What have you heard from OMB about the status of your waiver requests?

Answer: With regard to the Recovery Act awards included in NSF's agency waiver package, NSF received approval from OMB on April 29, 2013, for all outstanding requests. NSF has instructed awardee institutions that Principal Investigators (PIs) should proceed with work in accordance with the terms and conditions of the award while continuing to responsibly accelerate when possible.

U.S. ANTARCTIC PROGRAM

Question 18. Please provide a list of any of the 84 actions recommended by last year's Antarctic Blue Ribbon Panel with which NSF does not agree or does not currently have sufficient information to implement.

Answer: NSF is engaged with its Department of Defense (DoD) partners to explore the feasibility of implementing recommendations made by the Blue Ribbon Panel. Two primary topics under discussion are the recommendations to reduce the operational LC-130 fleet from ten to six aircraft, and to construct a compacted snow runway at South Pole Station to allow wheeled aircraft operations. While NSF believes that construction of such a runway is technically feasible, there are many operational issues associated with landing wheeled aircraft at the South Pole (such as infrastructure and equipment for fire and emergency response, refueling, and cargo handling) that must be understood in order to conduct a cost-benefit analysis. NSF is also updating the master plans for McMurdo and Palmer stations that will guide decisions on recommendations related to, for example, fire protection, consolidated warehousing, and energy improvements. NSF's Response to the Blue Ribbon Panel report may be found at: http://www.nsf.gov/news/news summ.jsp?cntn id=127345&org=NSF&from=news

Question 19. One of the Blue Ribbon Panel's "concluding observations" was that a temporary reduction in spending for Antarctic science activities could help to free up funds for critically needed logistics and infrastructure improvements. Does NSF support this idea?

Answer: NSF is implementing this recommendation by ensuring that a portion of Antarctic science funding is directed towards developing and improving remote sensing instrumentation and other technologies that will increase the efficiency of the enterprise and make it possible to support more science. NSF management has and will continue to communicate this approach to the community through, for example, U.S. Antarctic Program channels, public forums, and conferences.

Question 20. Lockheed Martin told us that they incorporated many of the fiscal and process improvements recommended by the Blue Ribbon Panel into their contract bid. Do you agree with this statement? If there are additional savings measures that can be implemented beyond what Lockheed assumed in its bid, how can those additional measures be incorporated into their contract?

Answer: Yes, many of the fiscal and process improvements recommended by the Blue Ribbon Panel were included in Lockheed Martin's proposal. NSF works very closely with Lockheed Martin to ensure an environment of continuous fiscal and process improvements. When identified, these improvements are incorporated either by making adjustments to Annual Program Plans or via official modifications to the contract.

Question 21. What is the status of your efforts to close out the previous Antarctic logistics support contract?

Answer: GEO's Polar Division is working with the Division of Acquisition and Cooperative Support to contract for the incurred cost audits that are required before the final invoice can be paid. This process is expected to be completed in the summer of 2014

CLIMATE CHANGE RESEARCH

Question 22. NSF tracks and reports on its investments in the U.S. Global Change Research Program, but this is only a portion of what the agency spends on climate change science in a given year. How much does NSF spend on climate change each year, across all activities? How have your investments in these activities changed over the last five fiscal years?

Answer: NSF reports expenditures for not only the U.S. Global Change Research Program (USGCRP), but other categories of climate change research as well. Investments in Clean Energy Technologies (CET) help to reduce, avoid, or sequester greenhouse gas emissions. International Assistance (IA) programs demonstrate continued U.S. leadership in forging a global solution to the climate challenge and helping developing countries focus their climate investments strategically over the coming years, and creating robust means of measuring, monitoring, and verifying domestic emissions in developing countries. Both of these types of investments reduce vulnerability to climate change.

These data are also reported to Congress by the Office of Management and Budget (OMB) in the Federal Climate Change Expenditures Report to Congress.

,		(Dollars in I	Millions)		
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
	Enacted	Enacted	Enacted	Budget	Request
USGCRP	\$320	\$321	\$333	\$333	\$326
CET	324	312	341	355	372
IA	3	6	6	6	3
Total, NSF	\$647	\$639	\$681	\$694	\$702

NSF's Climate Change Expenditures

Overall, NSF has seen a relatively stable 8.5 percent growth in climate change expenditures over the last five years, which is similar to overall NSF growth (the FY 2014 Request is 10.9 percent above the FY 2010 Enacted level). However, the substance of the climate change investments has evolved over time. The new USGCRP Strategic Plan released in April 2012 places a greater emphasis on providing the information needed to respond to global change impacts and vulnerabilities. Accordingly, NSF programs are encouraging more interdisciplinary efforts, which not only will advance scientific knowledge of the integrated natural and human components of the Earth system, but also provide the scientific basis to inform and enable stakeholders to make timely decisions on adaptation and mitigation actions. This trend toward more interdisciplinary activities across the spectrum of climate change activities at NSF is particularly prominent in NSF's Science, Engineering, and Education for Sustainability (SEES) program, which has significant elements related to climate change.

Question 23. Last year the House voted to approve an appropriations amendment that would prohibit NSF from spending funds on the Climate Change Education Program. What do you believe would be the impact of such an amendment being enacted? Could your other more general STEM education programs serve the same purposes as the climate change-specific program?

Answer: The Climate Change Education Program (CCEP), initiated by Congress in FY 2009, made six awards in FY 2012 and one in FY 2013; the awards ranged in size from \$1 million to \$5 million for periods of four to five years. As continuing grants, many of the awardees have received only a portion of their total funding. In the FY 2014 Budget Request, CCEP is consolidated into the new NSF-wide Catalyzing Advances in Undergraduate STEM Education (CAUSE) program. CAUSE will integrate and leverage NSF's investments in undergraduate education to advance STEM education and workforce development. CAUSE will provide for continuing CCEP commitments in FY 2014, 2015, and 2016. No new CCEP awards will be made.

WORKFORCE MANAGEMENT

Question 24. NSF has seen recent decreases in employee satisfaction as measured by the OPM Employee Viewpoint Survey and the Partnership for Public Service's Best Places to Work in Government ratings. Why do you believe this is the case, and what steps is NSF taking to reverse this trend? What additional steps do you believe are necessary?

Answer: The National Science Foundation (NSF) is committed to being among the best places to work in the federal government. The Federal Employee Viewpoint Survey (FEVS) results confirm many of the positive aspects of NSF: our staff is highly motivated; we put in extra effort.

when needed to get the job done; we are constantly looking for ways to do our jobs better; and we know the work we do is important. Our workforce is excited about our mission and knows that the results from awards we make inspire the imagination while advancing the progress of science, contributing to a prosperous and secure nation. At the same time, the FEVS identifies areas where employee perceptions do not demonstrate the level of organizational excellence to which we all aspire. NSF has initiated specific actions aimed at improving the NSF climate: workload, performance management and recognition, career development, and career-life balance.

- 1) Workload Although NSF employees believe the workforce has the right knowledge and skills to accomplish the Foundation's goals, workload continues to be the area with the largest unfavorable discrepancy between NSF and the government-wide average. NSF will continue its workload modeling efforts and some experimental activities aimed at controlling workload, while more in-depth discussions get at the nature of the dissatisfaction.
- Career Development FEVS data indicate a continued downward trend in training and development indicators, including assessment of training needs and specific training to improve job performance, as well as opportunities for advancement within NSF.
- 3) Performance Management and Recognition Our 2012 survey results revealed some encouraging increases related to performance management, which the Foundation attributes to improving performance management training for supervisors and employees and to implementing performance management for IPAs. However, some FEVS indicators and anecdotal evidence from employees and management indicate that performance management and related rewards and recognition require continued improvement.
- 4) Career-Life Balance Like most organizations in both the Federal government and the private sector, we have spent the past several years placing a strong emphasis on the importance of career-life balance. As such, the Foundation has supported telework and other career-life initiatives geared toward improving morale and employee satisfaction, and we plan to continue to improve these areas.

The FEVS is an important set of indicators to be used, along with other tools and information, to address our commitment at NSF to continual improvement of the workplace culture and climate. (available NSF developed its FEVS Action Plan at has http://www.nsf.gov/about/career opps/fevs nsfactionplan 2013.pdf) to address these four FEVS areas along with over-arching activities related to leadership and communications. analyses also identified disparate opinions across internal organizations indicating that implementing "local" solutions could significantly contribute to improving culture and climate at the organization level. As such, each directorate and office has developed its own focused plan based upon the review of its local FEVS data and other pertinent information. NSF is tracking the progress of these action strategies to identify best practices that may be scalable to the entire organization.

Question 25. One of NSF's more unique workforce characteristics is its heavy use of "rotators", or non-Federal employees who work temporarily at NSF. How has NSF's use of these rotators changed over time? Are they becoming more common, or filling different types of jobs than was previously the case?

Answer: NSF's use of rotators has remained steady in all categories over the last five years. Visiting Scientists (VSEEs) and Intergovernmental Personnel Act assignees (IPAs), known collectively as rotators, made up between 13 and 15 percent of NSF's overall workforce each year during the period between FY 2008 and FY 2012. NSF has not seen a notable change in either the rate at which it uses rotator appointments or the type of positions it fills with them.

Question 26. One of the most common means for hiring non-permanent employees is through the Intergovernmental Personnel Act (IPA), which allows an influx of outside technical expertise to the agency but is also very expensive. In fact, the OIG estimated that NSF's use of IPAs created \$6.7 million in added costs in fiscal year 2012 alone. Is the value NSF receives from bringing in these IPAs always worth the added cost above hiring a regular Federal employee? What kind of analysis have you done to support your conclusions?

Answer: NSF relies upon the expertise of some of the Nation's leading scientists, engineers, and educators to execute its mission, thereby ensuring our Nation remains at the forefront of scientific and engineering discovery. We believe the use of IPAs strengthens the ties between NSF and the communities it serves, and the flow of ideas and experience both ways enriches the science and engineering enterprise and enhances NSF's intellectual capacity. Individuals serving at NSF under the Intergovernmental Personnel Act come from universities and institutions throughout the nation. The active participation of these respected and highly skilled scientists, engineers and educators is important to NSF in ensuring that the best research is being funded with taxpayer dollars. Having the IPA as one of our tools for recruiting rotators enables NSF to tailor a compensation package to the circumstances of those we are trying to recruit so that their losses for public service at NSF are minimized and balanced by the benefits of being at the forefront of the research process. As a practical matter, we find we would be unable to attract this talent if we were restricted to paying for their services under the current Federal pay scale. Consequently, NSF strikes a balance between a highly educated permanent workforce that creates stability and helps retain institutional knowledge, and individuals who bring fresh ideas and new approaches to research at the frontier. Overall, the impact of rotators in our merit review and award oversight processes more than compensates for the potential added cost of bringing them to NSF as IPAs.

In response to the OIG report on IPA costs, NSF is planning to conduct a review of those costs to determine where efficiencies or policy changes may reduce the overall cost of the IPA program to NSF.

Question 27. Many NSF executives are IPA employees who don't necessarily have any experience managing a Federal agency, and they only stay on the job for a few years before returning to their non-Federal positions. What kind of risk does this leadership strategy pose to the agency's management? How are these risks being mitigated?

Answer: IPA assignees in executive positions typically bring with them a wide variety of management experience, including academic positions such as university presidents, provosts, vice provosts, deans and department chairs, as well as directors of research-based organizations. They have experienced most of the key elements of management, including managing budgets, hiring and managing employees (including subordinate managers), conducting and managing research projects, evaluating research proposals, and long range planning. Therefore, we believe the risks of this strategy to agency management are minimal.

However, NSF understands that there are some risks associated with this strategy, and manages those risks using two primary sets of tools: 1) ensuring an appropriate balance in the composition of the executive corps in each of its organizations; and 2) having an active training program for all executives. For example, the New Executive Transition (NExT) Program is designed to enable new executives (both Career and IPA) to quickly reach their full potential and to provide existing managers with the tools and resources for effective leadership. NExT is designed to enhance NSF's capacity by quickly and effectively integrating new members of the executive corps by aiming to:

- 1. Develop executive **knowledge** about NSF mission, culture, organization, people, and business processes.
- 2. Provide executives the **tools**, information, skill-enhancement, and support to reach full performance as quickly as possible.
- 3. Support **transitions** into NSF executive positions from outside the government, from other Federal agencies, & from within NSF.

Question 28. What kind of protections are in place to ensure the independence of IPAs, who may be in a position to make decisions about research awards affecting themselves or their home institutions? Do you believe the existing protections are sufficient?

Answer: Like regular employees, IPAs are subject to criminal conflict of interest statutes (statutes) as well as the Government-wide Standards of Ethical Conduct of Employees of the Executive Branch (regulations) which prohibit IPAs from participating in NSF proposals and awards affecting themselves and their home institutions. To bolster awareness of and compliance with these statutes and regulations, IPAs, like regular federal employees who file financial disclosure reports, are subject to mandatory conflict of interest training. IPAs, like regular federal employees who make award recommendations must file financial disclosure reports. Failure to file may result in disciplinary action (those required to file public reports are subject to statutory fines for failure to do so). Conflicts checks are part of the ethics program to avoid situations wherein IPAs make decisions about in their research awards or those of their home institution. NSF ethics officials counsel IPAs and regular employees to avoid even the appearance of conflicts, and recusal from matters is a common mechanism to prevent even an appearance of impropriety. NSF firmly believes that these protections are sufficient.

RESEARCH MISCONDUCT

Question 29. NSF requires that each grantee certify that it has a plan to address and prevent research misconduct. However, it is largely up to the grantees to decide what to put in their plans; NSF only offers examples and best practices. Why doesn't NSF establish more concrete requirements and criteria that each plan must meet?

Answer: NSF believes that the research community, encompassing both individual researchers and institutions, is best placed to determine the content of Responsible Conduct of Research ("RCR") training without a need for NSF-specified standards. NSF recognizes that specific training needs may vary depending on specific circumstances of research or the specific needs of students intending to pursue careers in basic or applied science after completing their education. Therefore, it is the responsibility of each institution to determine both the content and the delivery method for the training that will meet the institution's specific needs for RCR training in all areas at that institution for which NSF provides support. Furthermore, each institution must decide if development of content or pedagogical methods is

required, or if appropriate content and training can be provided from some existing sources or capabilities, and then take appropriate action to implement their decisions.

Question 30. How often does NSF review grantees' research misconduct plans for adequacy? Is there a regular, comprehensive review process, or are plans checked only on a case-by-case basis?

Answer: NSF can ask to see a proposer's RCR plan at any time after a proposal for funding is submitted. Therefore, if a Program Officer or Grants Officer has a concern about how RCR will be addressed during the project, they can request to see the plan before making a funding decision. Additionally, plans may be reviewed by NSF when deemed necessary post-award, to ensure implementation is proceeding as committed.

Questions for the Record Submitted by Robert B. Aderholt

CLIMATE MODELING

Question 1. I am told that there are refereed, peer-reviewed publications showing that climate models over the past 35 years are running significantly warmer than the actual observations. This would raise serious questions for the Congress about how well the Earth's complex climate system is actually understood, with implications on the scientific basis for energy policy as well as for assessing how our national policy might realistically impact the Earth's climate in a desirable way. What is your agency doing to better understand why the most widely-used climate models are not able to reproduce the actual climatic observations, particularly those made from space?

Answer: NSF is not aware of any peer-reviewed publications showing that climate models are systematically too warm over the past 35 years. To continuously improve the nation's ability to model climate, NSF supports researchers who examine the quality of climate model simulations using a wide of variety of observations, including comparison with satellite observations.

Question 2. What has NSF done to actively promote and solicit scientific investigations that are consistent with the evidence (of very modest climate change) yet which contradict the popular view that global warming is rapid, human-caused, and dangerous? What steps does your agency take to ensure that all expert perspectives, including those that might call into question popular theories, are considered in developing, executing, and assessing your agency's current climate change programs?

Answer: NSF accepts unsolicited proposals for research into the causes of climate variability and climate change, without regard for whether the hypothesized causes are natural or anthropogenic. Projects are supported on their scientific merit, that is, the appropriateness of the proposed methodology to answer a question or test a hypothesis.

Question 3. What has NSF done to ensure that the scientists who are involved in measuring the agreement between the models and the data had no role in developing the models?

Answer: NSF funds a number of research projects that assess the agreement between models and observations, and much of this research is done by university researchers not involved in model development. NSF recently made several awards to examine the quality of the climate model simulations prepared for the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment report. NSF also supports university researchers who are not involved in model development to perform their own simulations to assess the model's ability to simulate a particular process. The results can provide important input to developers for improving the models.

Question 4. What metrics can you present to demonstrate that the development, execution, and assessment of your climate change programs includes all expert perspectives, including those that may not agree with or support the most popular climate system theories? (This is the "red team" concept commonly used in industry and government for expensive programs.)

Answer: NSF receives and supports proposals to conduct research, including the development or evaluation of climate models. NSF does not survey or track the views of scientists regarding climate change. Through its merit review process, NSF seeks input from members of the scientific community based on their expertise relevant to the topic. Reviewers are asked to objectively evaluate proposals utilizing the two merit review criteria established by the National Science Board: intellectual merit and broader impacts. There is no attempt to screen potential reviewers or panelists to select those who do or do not hold particular viewpoints.

REALIGNMENT

Question 5. Your testimony indicates that several of your directorates have been merged and consolidated since September 2012. How has this changed enabled the NSF to prepare for the impact of sequestration? Was it done to help ease the financial burden of sequestration or was it done for other purposes?

Answer: NSF embraces decisions that bring about increased operational efficiency. Periodically, we review organizational structures to determine if the science or our own internal pressures dictate a more desirable organizational structure. Those decisions are balanced with the productivity costs that accompany any organizational change. Where the benefits and scientific fit outweigh the productivity costs, we work to realize the benefits. It was in this vein that NSF undertook a review of the units reporting to the Office of the Director. That review resulted in the recommendation to realign several offices last fall. The former Office of International Science and Engineering was combined with the Office of Polar Programs was combined with the Geosciences to form the Polar Division. Finally, the Office of Cyber-infrastructure was combined with the Computer and Information Science and Engineering Directorate to form the Division of Advanced Cyberinfrastructure.

GRADUATE RESEARCH OPPORTUNITIES WORLDWIDE (GROW) PROGRAM

Question 6. Recently, this subcommittee heard testimony from the Director of the FBI that discussed the threat of foreign cyber-spying on U.S. universities, corporations, and federal agencies for newly developed technologies. With the GROW Program, I understand that we are partnering with eight partner countries to further science research. However, how do we ensure that technologies and other discoveries that are being researched in partnership with other countries will be safeguarded in GROW and other similar endeavors?

Answer: GROW is administered through NSF's Graduate Research Fellowship program and is subject to the same laws and guidelines for research conduct as other federal grant programs. Specifically, "...all academic and research activities carried out in or outside the US comply with the laws or regulations of the US and/or of the foreign country in which the academic and/or research activities are conducted. These include appropriate human subject, animal welfare, copyright and intellectual property protection, and other regulations or laws, as appropriate. All academic and research activities should be coordinated with the appropriate US and foreign

government authorities, and necessary licenses, permits, or approvals must be obtained prior to undertaking the proposed activities."¹

These safeguards, which apply to NSF-supported principal investigators, graduate students, and other award recipients working in the United States or abroad, help mitigate the concerns raised in the question. In addition, NSF does not support the conduct of classified research. Also, NSF supported research is basic research that is pre-commercial and published in the open scientific literature.

¹ National Science Foundation, Directorate for Education and Human Resources Division of Graduate Education. (2011) *Graduate Research Fellowship Program: Administrative Guide for Fellows and Coordinating Officials*. Arlington, VA.

Questions for the Record Submitted by Jose E. Serrano

LATINOS AND THE SCIENCES

NSF has specialized undergraduate education programs for Blacks and Native Americans, but not specialized programs for Latinos. Since fiscal year 2010, there has been appropriations report language directing the NSF to address the needs of HSIs. The House passed bill for Fiscal year 2013 repeated report language that stated: "The Committee has previously asked NSF to consider the concept of creating a program within EHR to focus on Hispanic Serving Institutions (HSIs). NSF shall provide to the Committees on Appropriations a report outlining how the needs of HSIs will be addressed in fiscal year 2013 and any plans to establish an HSI-focused program in fiscal year 2014. This report shall be submitted no later than 120 days after the enactment of this Act." Although the House bill became stuck in the Senate, there are still several years of pending instructions in this area. While I appreciate the efforts NSF is making in expanding opportunities to underrepresented minorities, including through the establishment of a new program in this year's budget?, I am troubled that NSF has not established a dedicated Hispanic Serving Institutions- Undergraduate program. Latinos are now the largest minority group in the United States, and are severely underrepresented in the STEM fields. More importantly, Congressional instruction was very clear in this regard.

Question 1. Are steps being planned to follow the previous language on this issue?

Answer: NSF recognizes that Hispanics are the largest and fastest-growing minority group in the nation; the U.S. Hispanic population grew four times faster than the total U.S. population between 2000 and 2010. To ascertain the support provided to Hispanic Serving Institutions. NSF conducted an internal portfolio analysis to identify the educational efforts that focus on the needs of HSIs. This analysis showed that over the past five years, NSF investments in HSIs have increased considerably and exceeded that of other minority serving institutions with dedicated programs, such as Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities (TCUs). In FY 2012, investments in HSIs reached more than 70 colleges and universities, and 66 percent of NSF's FY 2012 funding to HSIs came from the Research and Related Activities category. Given this significant level of investment, NSF plans to continue activities that are successfully meeting the needs of HSIs, including encouraging proposals from HSIs to appropriate, existing NSF programs that focus on improving undergraduate education and/or express a commitment to broadening participation of groups underrepresented in STEM, and continuing the emphasis within NSF programs such as Louis Stokes Alliances for Minority Participation (LSAMP) and Advanced Technological Education (ATE) to support community colleges. NSF will focus on areas of critical need, such as capacity building at community colleges, particularly those with a high level of Hispanic student enrollment, and evaluation of the overall impact of NSF-wide HSI activities to inform future actions and ascertain the need for additional HSI specific efforts in FY 2014 and beyond. NSF will use data on HSI community college success rates and other relevant findings to better target those institutions and augment the investment's overall impact, which will be essential to future planning.

DIVERSITY IN THE SCIENCES

Statistics show that Latinos and Blacks are under-represented in the science, technology, engineering, and math (STEM) fields – sciences, technology, engineering, and mathematics. The latest National Science Foundation statistics available show that while Blacks represent more than 12% of the population, they only represent 8.2% of bachelor's degree recipients in the sciences in 2009. In addition, Latinos now represent more than 15% of the US population, but only 8.6% of students graduating with a bachelor's degree in the sciences in 2009. In this vein, last year, the American Association for the Advancement of Science (AAAS) issued a report called "Measuring Diversity: An Evaluation Guide for STEM Graduate Program Leaders," based on work with NSF's Alliance for Graduate Education and the Professoriate (AGEP). The report offers a framework and tools for assessing the strengths and weaknesses of graduate programs. Statistics continue to show that Blacks and Latinos are significantly under-represented in the sciences and other STEM fields.

Question 2. How has the Administration approached this problem? Does the Administration have a government-wide policy in place to increase minority participation in these fields? Does the National Science and Technology Council's (NSTC) Committee on STEM plan to specifically address this issue?

Answer: The February 2012 progress report of the National Science and Technology Council Committee on STEM Education (CoSTEM) indicated that the Administration identified "serving groups traditionally under-represented in STEM fields" as one of four priority areas for interagency coordination. The primary objective is to provide higher quality education opportunities to individuals from under-represented groups for the purpose of increasing representation of under-represented groups in STEM fields. The progress report also suggested that the following criteria for investments in STEM education of under-represented groups should be considered: design investments with input from under-represented groups; ensure that investments draw upon the interests, knowledge, practices, and culturally relevant STEM experiences of under-represented groups; and support investments that build capacity and sustained relationships between participants and STEM partners. The five-year Federal STEM Education Strategic Plan that is under development will further delineate the approach with a priority area roadmap of the near, mid- and long-term goals and related metrics and outcomes to facilitate federal coordination for increasing the participation and representation of underrepresented groups in STEM fields. Additionally, a goal of the Administration's proposed reorganization of STEM education programs is increasing opportunities and participation for individuals from underrepresented groups in STEM fields.

Question 3. Furthermore, does the NSF factor in the framework set forth in the "Measuring Diversity" report when awarding grants to graduate institutions?

Answer: The *Measuring Diversity* report continues to be a useful guide for conceptualizing broadening participation in graduate education as well as a tool to help graduate institutions improve the quality of data collected and make meaningful use of participation and performance data. When appropriate, proposers to NSF programs are asked to provide baseline data and evaluation plans with measurable metrics. The *Measuring Diversity* report was intended as a tool for proposers to NSF programs to develop relevant graduate education proposals, particularly for underrepresented groups in STEM as well as include well-designed data

collection and project evaluation. The *Measuring Diversity* report provides a framework to inform the review of this aspect of proposals and annual reports from funded projects.

UNITED STATES HOUSE OF REPRESENTATIVES Committee on Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies Hearing on NSF Oversight March 19, 2013 Dr. Subra Suresh, Director, National Science Foundation Additional Questions for the Record Submitted by Frank R. Wolf

Funding Rates Across the Agency

Question 1. Under the levels proposed in the budget, research grant funding rates across the agency would vary significantly. For example, according to the budget request, it would be nearly twice as difficult to get a research grant in engineering as it would in geosciences. Is this disparity problematic, or are there reasons why the disparity is necessary or useful?

Answer:

There are a number of reasons why success rates vary in different disciplines that reflect the variation in the structure and culture of different research communities. Some of these are the following:

- Some parts of NSF issue a significant number of specialized solicitations each year while in other areas proposals are primarily submitted to long-term programs. In general, solicitations tend to generate significantly more proposals and tend to be associated with lower success rates.
- Some program areas rely on deadlines for proposal submission while others accept proposals at any time. The latter approach tends to be associated with reduced proposal pressure.
- In some disciplinary areas, the majority of researchers have nine-month academic appointments while in others, a significant number of researchers have soft-money positions. The report of the Impact of Proposal and Award Management Mechanisms Working Group (NSF 07-45, 2007) noted that, initially, communities with fewer academic positions and more soft-money positions may be more inclined to continue submitting proposals in the face of declining success rates. In the longer term, however, such pressure may result in a loss of researchers from the field and a reduction in new entrants because of the difficulty of sustaining a soft-money research career. Such a feedback mechanism could help create an apparent stability in success rates while masking deterioration in the health of the research community.

Such differences make it difficult to compare directly proposal success rates. However, the low success rate of engineering research proposals is something that NSF has been seeking to address. For example, over the past decade, comparing the FY 2014 Congressional Request to FY 2004 actual obligations, support from the Research and Related Activity (R&RA) account for Directorate for Engineering research has risen about 61 percent compared to a growth of about 45 percent for the R&RA account overall.

Education Reorganization Proposal

Question 2. Please provide a list of agencies/programs whose operations are being subsumed into NSF's portions of the reorganized, consolidated government-wide STEM education enterprise.

Answer: Attachment 1 contains the list of all programs affected by the reorganization government-wide. NSF does not interpret the President's proposed STEM-education reorganization to mean programs from other agencies will be "subsumed" by NSF. Rather, NSF programs will be expanded and coordinated within new frameworks and will introduce additional approaches for improved impact and effectiveness.

NSF's staff has ongoing relationships with colleagues at agencies whose undergraduate programs and graduate fellowship programs are proposed for termination and NSF will pursue discussions to fully understand the specific goals and operational features of those programs, as well as the agency assets (e.g. laboratories, facilities, instruments) that have been available to participants in those programs. NSF's realigned programs (Catalyzing Advances in Undergraduate STEM Education, NSF Graduate Research Fellowships, and NSF Research Traineeships) will incorporate the intentions and goals of other agencies' programs as appropriate, and will be cognizant of how NSF's programs can meet the particular educational goals of science mission agencies. NSF staff will work collaboratively with other agencies to determine how participants in the NSF programs can have appropriate access to facilities and assets of other agencies as part of their preparation for the STEM workforce.

Question 3. Did NSF have any conversations with the agencies/programs referenced in question 1 about how the restructured program would be administered in order to meet those agencies' needs?

Answer: NSF staff are engaged in conversations and planning with counterparts from other agencies regularly, through such vehicles as the National Science and Technology Council's Committee on STEM Education (CoSTEM) and its two subcommittees (Federal Coordination in STEM Education Task Force and Federal Inventory of STEM Education Fast Track Action Committee), as well as through other groups that meet regularly, such as the Interagency Graduate Fellowship Group, and the Graduate Education Modernization group organized by the Office of Science and Technology Policy. Detailed planning for how the restructured NSF programs can best understand and meet the needs of agencies whose programs are proposed for termination has begun with the release of the President's FY 2014 budget request. These conversations will build on the preliminary, high-level planning conversations begun among agency leaders during development of the budget.

Question 4. If the answer to the previous question is yes, when did these conversations take place and what was decided? If the answer to the previous question is no, does this lack of pre-planning introduce risk that the reconfigured program will not meet all of the existing needs?

Answer: CoSTEM was established through the America COMPETES Reauthorization Act of 2010, was chartered in February 2011, and has focused its work on the federal STEM program inventory and strategic plan. Through CoSTEM, agency representatives have been engaged in identifying priority areas for federal investment and developing coordination objectives and mechanisms. The general frameworks and foundations established by CoSTEM will serve as a

basis for more detailed planning and transition now that the FY 2014 budget request has been released.

Question 5. The general philosophy behind the STEM reorganization is to consolidate K-12 programs at the Department of Education, informal education programs at the Smithsonian, and undergraduate/graduate programs at NSF. However, NSF is retaining more than \$250 million of K-12 programs, as well as its informal education programs. Why aren't NSF's own programs subject to the reorganization being imposed on the rest of government?

Answer: The general design framework was intended to lead to a more nuanced approach, developed through consultation, feedback, and consideration of programs and agency assets. NSF's K-12 and informal education programs are remaining at NSF because they primarily invest in STEM education research and development. NSF's research and development investments in K-12 STEM education and informal STEM learning are aimed at building an understanding of how to improve STEM learning and learning environments inside and outside of school. Most of the investments support evidence-based design, implementation, and research on innovative interventions, often implemented at small scales. Those interventions can then serve as tested models for wider implementation and use at full scale through partnerships with other entities. The NSF-supported projects in the K-12 and informal areas are then available to programs such as those that will be developed at the U.S. Department of Education and the Smithsonian Institution to be taken to scale through the Department of Education's STEM innovation networks and disseminated widely through the virtual STEM Learning Network.

Question 6. For the third consecutive fiscal year, NSF is proposing substantial realignments within the EHR budget. These realignments complicate efforts to track programs over time and imply a constant rethinking of the EHR program strategy. When will the EHR program structure finally be stabilized?

Answer: The past three EHR budget requests represent progressive stages in a planned, strategic reformulation of EHR. The primary and consistent emphasis across all three years is establishing EHR as a leader in investments in research and development to understand and improve STEM education and learning. Establishing this focus requires both internal capacitybuilding and external engagement with stakeholder communities, which is necessarily a gradual strategic process. This emphasis serves also as a vehicle toward a more coherent and focused mission and role for EHR, with a goal of moving gradually toward a set of core programs that encompass smaller programs in the directorate. The FY 2012 request introduced the strong commitment to EHR's role in building the research and development-based understanding of STEM teaching and learning as a critical function, and emphasized evaluation of STEM In the FY 2013 request, the research emphasis is reinforced and education programs. implemented with the introduction of the EHR core research launch. The four core research and development areas (STEM learning, STEM learning environments, STEM workforce, and broadening participation) were introduced to align with EHR's current four divisions. In the FY 2014 request, the four core areas serve as organizers for the budget presentation within each division, and there is some additional consolidation introduced. For the programs that have been combined or consolidated, NSF can track investments and can provide portfolio analyses as needed for activities that are less prominent following this realignment. The realignments presented in the past three budget requests have laid the groundwork for EHR's transformation. EHR does not anticipate any subsequent change of direction from the four thematic areas or the research and development focus.

Grants Management

Question 7. The agency operations budget remains relatively flat in the budget request (after excluding an increase intended for rent payments), and reductions in travel and other administrative activities continue. How will this pressure on your operations budget affect your plans for grants management activities in FY 14? Do you anticipate any changes in the number of expected site and desk reviews or any other oversight activities intended to ensure that grantees are spending Federal dollars appropriately and efficiently?

Answer: The pressure on the NSF operations budget affects grants management activities in a number of ways.

Specifically, reductions in travel impact the ability to conduct site visits. In some circumstances, NSF has been able to conduct these site visits virtually, which helps mitigate the impact of travel constraints and maintain the number of annual site visits in our Award Monitoring and Business Assistance Program (AMBAP) at approximately 30. While virtual site visits have been successful, on-site assessments remain valuable, providing the opportunity to "kick the tires," so to speak.

Desk reviews in the AMBAP program receive significant support from contractor resources. NSF conducts between 100 to 120 desk reviews a year. Reductions to the operations budget that reduce contractor oversight support will tend to decrease the number of desk reviews, and in turn shrink NSF's oversight footprint.

Similarly, constrained travel and contract resources will also constrain implementation of NSF's Business System Review program, which provides oversight of complex large facilities.

NSF also relies on contract support for the complementary financial controls and oversight that are part of our overall approach to managing risk. The frequency and extent of NSF's baseline monitoring of grants expenditures may be reduced. Grant expenditure testing is used to identify and resolve erroneous reporting of grants transactions and is an important part of NSF's overall post award monitoring program.

Testing for improper payments in grant recipient transactions may be done less frequently. Assessing the risk that NSF's grants program may be susceptible to significant improper payments and related testing and monitoring is necessary to comply with legal requirements. NSF has a robust risk assessment underway, which will provide additional insights into the impact of resource constraints.

It is also anticipated that there will be a reduction in the ability of grant and cooperative agreement staff to actively participate in various program readiness and performance reviews taking place off-site from NSF; these include regularly scheduled meetings of groups, such as the Gemini Observatories Finance Committee, and periodic performance reviews of the Arctic Regions Research Vessel construction, Ocean Observatories Initiative construction, and Network for Earthquake Engineering Simulation operations.

Attachment 1: List of Programs Affected by STEM Reorganization

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FY 2012 Inventory of STEM Programs

Program	Program Type
Agriculture	
Consolidations (Funding Redirected Outside of Agency)	
Agriculture in the Classroom	Engagement
AITC Secondary Postsecondary Agriculture Education Challenge Grants (SPECA)	Engagement
Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship Grant Program	Fellowship/Scholarship
Higher Education Challenge Grants (HEC)	Undergraduate Education
Higher Education Multicultural Scholars Program (MSP)	Fellowship/ Scholarship
Women and Minorities in Science, Technology, Engineering and Mathematics Fields Program (WAMS)	Fellowship/Scholarship
Internal Consolidations/Eliminations (Funding Remains within the Agency)	
Distance Education Grants for Institutions of Higher Education in Insular Areas (DEG)	Fellowship/ Scholarship
Resident Instruction Grants Program for Institutions of Higher Education in Insular Areas	Fellowship/Scholarship
Existing Programs Maintained (Not Consolidated)	
1890 Facilities Grant Program	Minority Serving Institutions
1890 Institutions Capacity Building Grants Program: Extension	Minority Serving Institutions
1890 Institutions Capacity Building Grants Program: Teaching	Minority Serving Institutions
4-H Science, 4-H Youth Development Program	Engagement
AgDiscovery	Fellowship/Scholarship
Alaska Native-Serving and Native Hawaiian-Serving Institutions Education Competitive Grants Program	Minority Serving Institutions
Hispanic-Serving Institutions Education Grants Program	Minority Serving Institutions
NIFA Fellowship Grants Program	Minority Serving Institutions
New Programs	
Insular Programs	None
Commerce (includes National Oceanic and Atmospheric Administration)	
Consolidations (Funding Redirected Outside of Agency)	
Competitive Education Grants (including Environmental Literacy Grants)	STEM Instruction
Dr. Nancy Foster Scholarship Program	Fellowship/Scholarship
National Sea Grant College Program*	STEM Instruction
NIST Summer Institute for MIddle School Teachers	STEM Instruction
NOAA Office of Ocean Exploration and Research (Education Only)	Engagement
NOAA Teacher at Sea Program	STEM Instruction
Internal Consolidations/Eliminations (Funding Remains within the Agency)	

Coral Reef Conservation Program

National Estuarine Research Reserve System

NOAA Bay Watershed Education and Training (B-WET)

NOAA Fisheries Education Program

Satellite and Information Service

Defense

Existing Programs Maintained (Not Consolidated)

Educational Partnership Program with Minority Serving Institutions

Ernest F. Hollings Undergraduate Scholarship Program

STEM Pipeline for the Next Generation Scientists and Engineers.

Summer Undergraduate Research Fellowship (SURF)

* \$4M in activities within the National Sea Grant College Program (including funding for the Sea Grant Knauss Policy Fellowships, Sea Grant/NMFS Graduate Fellowship Program, and STEM instruction) was redirected outside of the agency. Engagement STEM Instruction STEM Instruction STEM Instruction Engagement

Minority Serving Institutions Fellowship/ Scholarship Fellowship/ Scholarship Fellowship/ Scholarship

Consolidations (Funding Redirected Outside of Agency)	
DoD STARBASE Program	Engagement
Iridescent Learning	Engagement
National Defense Education Program (NDEP) K-12 component	Engagement
National Science Center (NSC)	Engagement
Uniformed Services University of the Health Sciences (USUHS)	Fellowship/ Scholarship
University Laboratory Initiative (ULI)	Fellowship/ Scholarship
Existing Programs Maintained (Not Consolidated)	
Army Educational Outreach Program (AEOP)	STEM Instruction
Awards to Stimulate and Support Undergraduate Research Experiences (ASSURE)	Fellowship/ Scholarship
Historically Black Colleges and Universities/Minority Institutions Research and Education Partnership	Minority Serving Institutions
National Defense Education Program (NDEP) Science, Mathematics And Research fo Transformation (SMART)	or Fellowship/Scholarship
National Defense Science and Engineering Graduate (NDSEG) Fellowship Program	Fellowship/ Scholarship
Navy - Science and Engineering Apprenticeship Program (SEAP)	Engagement
SeaPerch	Engagement
Stokes Educational Scholarship Program	Fellowship/ Scholarship
The Naval Research Enterprise Intern Program (NREIP)	Engagement
University NanoSatellite Program	Engagement
Education	
Internal Consolidations/Eliminations (Funding Remains within the Agency)	aan bar dhaalaan dhii bara daada ka shii barayay ka shaka kana ka shaka ka baada dhada ahaan dha dha
Improving Teacher Quality State Grants/Effective Teacher and Leader State Grants Set Aside	STEM Instruction
Teacher Incentive Fund	STEM Instruction
Existing Programs Maintained (Not Consolidated)	
Developing Hispanic Serving Institutions STEM and articulation programs	Minority Serving Institutions
Graduate Assistance in Areas of National Need (GAANN)	Fellowship/ Scholarship
High School Longitudinal Study of 2009	None

Investing in Innovation	STEM Instruction
Mathematics and Science Partnerships/Effective Teaching and Learning for a Complete Education	STEM Instruction
Minority Science and Engineering Improvement Program	Minority Serving Institutions
Research in Special Education	None
Research, Development, and Dissemination	None
Strengthening Predominantly Black Institutions	Minority Serving Institutions
Teacher Loan Forgiveness	STEM Instruction
Upward Bound Math and Science Program	STEM Instruction
New Programs	
Fund for the Improvement of Education (FIE): Math Inititative	None
STEM Innovation	STEM Instruction
Energy	
Consolidations (Funding Redirected Outside of Agency)	
American Chemical Society Summer School in Nuclear and Radiochemistry	Engagement
Computational Science Graduate Fellowship	Fellowship/ Scholarship
Global Change Education Program	Fellowship/Scholarship
Graduate Automotive Technology Education	Fellowship/Scholarship
National Undergraduate Fellowship Program in Plasma Physics and Fusion Energy Sciences	Fellowship/ Scholarship
Plasma/Fusion Science Educator Programs	STEM Instruction
QuarkNet	STEM Instruction
Wind for Schools	Engagement
Existing Programs Maintained (Not Consolidated)	
Advanced Vehicle Competitions	Engagement
Community College Internships (formerly Community College Institute of Science and Technology)	None
Visiting Faculty Program (formerly Faculty and Student Teams)	Engagement
HBCU Mathematics, Science & Technology, Engineering and Research Workforce Development Program	Minority Serving Institutions
Industrial Assessment Centers	Engagement
Minority Educational Institution Student Partnership Program	Minority Serving Institutions
Minority University Research Associates Program (MURA)	Minority Serving Institutions
National Science Bowl	Engagement
Science Undergraduate Laboratory Internships	Engagement
Solar Decathlon	Engagement
Special Recuitment Programs/Mickey Leland Fellowship	Engagement
New Programs	
Office of Science Graduate Fellowship (SCGF) program	Engagement

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Environmental Protection Agency

Consolidations (Funding Redirected Outside of Agency)	
Greater Research Opportunities (GRO) Fellowshins for Undergraduate Environmental	Fellowshin/ Scholarshin
Study	renonsnip/ senererinp
Science to Achieve Results Graduate Fellowship Program	Fellowship/ Scholarship
Internal Consolidations/Eliminations (Funding Remains within the Agency)	
Environmental Education Grants	Engagement
National Environmental Education and Training Partnership	Engagement
Existing Programs Maintained (Not Consolidated)	
Cooperative Training Partnership in Environmental Sciences Research	Fellowship/Scholarship
P3-People, Prosperity & the Planet-Award: A National Student Design Competition for Sustainability	Engagement
University of Cincinnati/EPA Research Training Grant	Fellowship/ Scholarship
Health and Human Services (includes National Institutes of Health)	
Consolidations (Funding Redirected Outside of Agency)	 Millinger fragmen Anno 100 merce and an element and
Clinical Research Training Program	Fellowship/ Scholarship
Curriculum Supplement Series	STEM Instruction
NIAID Science Education Awards	STEM Instruction
NINDS Diversity Research Education Grants in Neuroscience	Fellowship/ Scholarship
NLM Institutional Grants for Research Training in Biomedical Informatics	Fellowship/ Scholarship
OD Science Education Partnership Award	STEM Instruction
Office of Science Education K-12 Program	Engagement
Public Health Traineeship	Fellowship/ Scholarship
Science Education Drug Abuse Partnership Award	Engagement
Short Term Educational Experiences for Research (STEER) in the Environmental health Sciences for Undergraduates and High School Students	Fellowship/Scholarship
Internal Consolidations/Eliminations (Funding Remains within the Agency)	
Health Careers Opportunity Program	Engagement
Short Courses on Mathematical, Statistical, and Computational Tools for Studying Biological Systems	Engagement
Existing Programs Maintained (Not Consolidated)	
Bridges to the Baccalaureate Program	Fellowship/Scholarship
Initiative for Maximizing Student Development	Engagement
MARC U-STAR NRSA Program	Minority Serving Institutions
Mathematics and Science Cognition and Learning (MSCL) Program	Engagement
National Cancer Institute Cancer Education and Career Development Program	Fellowship/ Scholarship
RISE (Research Initiative for Scientific Enhancement)	Minority Serving Institutions
Ruth L. Kirschstein National Research Service Award Institutional Research Training Grants (T32, T35)	Fellowship/ Scholarship
Ruth L. Kirschstein NRSA for Individual Predoctoral Fellows, including Underrepresented Racial/Ethnic Groups,Students from Disadvantaged Backgrounds, and Predoctoral Students with Disabilities	Fellowship/ Scholarship
Short Courses in Population Reseach (Education Programs for Population Research R25)	Engagement
Short-Term Research Education Program to Increase Diversity in Health-Related	Engagement

Research Student Intramural Research Training Award Program Summer Institute for Training in Biostatistics Engagement Undergraduate Scholarship Program for Individuals from Disadvantaged Backgrounds Fellowship/ Scholarship New Programs Medical Research Scholars Program (MRSP) Fellowship/ Scholarship Homeland Security Consolidations (Funding Redirected Outside of Agency) Homeland Security STEM Career Development Grant Program Fellowship/Scholarship **Existing Programs Maintained (Not Consolidated)** National Nuclear Forensics Expertise Development Program Fellowship/Scholarship Scientific Leadership Awards Program **Minority Serving** Institutions Interior Existing Programs Maintained (Not Consolidated) Conservation and Land Management Internship Program Engagement EDMAP Engagement George Melendez Wright Climate Change Youth Initiative Fellowship/ Scholarship Geoscientists-in-the-Parks Program Fellowship/Scholarship National Aeronautics and Space Administration Consolidations (Funding Redirected Outside of Agency) Aeronautics Academy Fellowship/Scholarship Aeronautics Content - Smart Skies/Product Content Upgrade Engagement Aeronautics Scholarship Fellowship/Scholarship Aqua Engagement Astrophysics Forum Engagement Engagement Aura Cassini STEM Instruction Chandra STEM Instruction DAWN STEM Instruction **Design Competitions** Engagement Earth Science E/PO Forum Engagement eEducation Small Projects/Central Operation of Resources for Educators (CORE) Engagement EPOESS Engagement GCCE - Global Climate Change Education STEM Instruction GRAIL Engagement GSRP - Graduate Student Researchers Program Fellowship/Scholarship Heliophysics E/PO Forum Engagement HEOMD-NASA's Beginning Engineering, Science and Technology (BEST) Students Engagement (NBS) STEM Instruction HST Innovation in Higher Education STEM Education Fellowship/Scholarship

	INSPIRE - Interdisciplinary National Science Program Incorporating Research and Education Experience	Engagement
	JPFP - Jenkins Pre-Doctoral Fellowship Program	Fellowship/ Scholarship
	Juno	Engagement
	LDCM	Engagement
	LEARN - Learning Environment and Research Network	STEM Instruction
	Mars E/PO Formal Ed	Engagement
	Mars E/PO Informal Ed	Engagement
	MESSENGER	Engagement
	NAS - NASA Aerospace Scholars	Engagement
	NES - NASA Explorer Schools	Engagement
	Planetary Science E/PO Forum	Engagement
	Reduced Gravity Student Flight Opportunity Project	Engagement
	SEMAA - Science Engineering Mathematics and Aerospace Academy/FIRST Buckeye	Engagement
	SOFIA (Stratospheric Observatory for Infrared Astronomy) Education and Public Outreach	STEM Instruction
	SOI - Summer of Innovation/NASA IV&V Engineering Apprenticeship Program	Engagement
	Spaceward Bound	Engagement
	USRP - Undergraduate Student Research Project	Engagement
h	nternal Consolidations/Eliminations (Funding Remains within the Agency)	
	AESP - Aerospace Education Services Project	Engagement
	CEP - Career Exploration Project	Engagement
	Curriculum Improvement Partnership Award for the Integration of Research into the	Minority Serving
	Undergraduate Curriculum (CIPAIR)	Institutions
	EFP - Education Flight Projects	Engagement
	ESMD Space Grant Project	Fellowship/ Scholarship
	HEOMD-Goldstone Apple Valley Radio Telescope (GAVRT) Project	None
	HEOMD-University Student Launch Initiative	Engagement
	Informal STEM Education	Engagement
	Innovation in Aeronautics Instruction Competition	None
	LARSS - NASA Langley Aerospace Research Summer Scholars Program	Fellowship/ Scholarship
	LERCIP - Lewis Educational Research Collaborative Internship Project (College)	Fellowship/ Scholarship
	LTP - Learning Technologies Project	Engagement
	MUST - Motivating Undergraduates in Science and Technology	Fellowship/ Scholarship
	NETS - NASA Education Technologies Services	Engagement
	NSBRI Higher Education Activities - National Space Biomedical Research Institute	Fellowship/ Scholarship
	Research Cluster	None
	SEED - Systems Engineering Educational Discovery	Engagement
E	xisting Programs Maintained (Not Consolidated)	
	GLOBE Program	Engagement
	Space Grant - National Space Grant College and Fellowship Program	Engagement
	Space Technology Research Fellowships	Fellowship/ Scholarship

MUREP (4 STEM programs in FY 2012 Inventory: MUREP Small Projects, NASA Science and Technology Institute for Minority Institutions, NASA Tribal College and University Project, University Research Centers) Minority Serving Institutions

New Programs

STEM Education & Accountability Project*

*NASA's STEM Education & Accountability Project will take on a new structure to ensure the continuation of the most effective functions of its engagement and STEM instruction activities. National Science Foundation Internal Consolidations/Eliminations (Funding Remains within the Agency) Undergraduate Climate Change Education (CCE) Education Undergraduate Computing Education for the 21st Century (CE21) Education STEM Instruction Cyberinfrastructure Training, Education, Advancement, and Mentoring for Our 21st Century Workforce (CI-TEAM) Engineering Education (EE) Undergraduate Education Undergraduate Geoscience Education Education Geoscience Teacher Training (GEO-Teach) Undergraduate Education Global Learning and Observations to Benefit the Environment (GLOBE) Engagement Graduate Teaching Fellows in K-12 Education (GK-12) STEM Instruction Fellowship/Scholarship Integrative Graduate Education and Research Traineeship (IGERT) Program STEM Instruction Math and Science Partnership (MSP) Undergraduate Nanotechnology Undergraduate Education in Engineering Education Undergraduate Opportunities for Enhancing Diversity in the Geosciences Education Research in Disabilities Education (RDE) Fellowship/Scholarship Research on Gender in Science and Engineering (GSE) Engagement Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) Undergraduate Education Transforming Undergraduate Biology Education (TUBE) Engagement Undergraduate Transforming Undergrad Education in STEM (TUES) Education Widening Implementation and Demonstration of Evidence-based Reforms (WIDER) Undergraduate Education Existing Programs Maintained (Not Consolidated) Advanced Informal STEM Learning (AISL), formerly Informal Science Education (ISE) Engagement Advanced Technological Education (ATE) STEM Instruction Fellowship/Scholarship Alliances for Graduate Education and the Professoriate (AGEP) STEM Instruction Centers for Ocean Sciences Education Excellence STEM Instruction Discovery Research K-12 (DR-K12) Fellowship/Scholarship East Asia & Pacific Summer Institutes for U.S. Graduate Students (EAPSI) Fellowship/Scholarship Enhancing the Mathematical Sciences Workforce in the 21st Century (EMSW21) STEM Instruction Excellence Awards in Science and Engineering (EASE) Fellowship/Scholarship Federal Cyber Service: Scholarship for Service (SFS)

Graduate Research Fellowship Program (GRFP)	Fellowship/ Scholarship
Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)	Minority Serving
Innovative Technology Experiences for Students and Teachers (ITEST)	STEM Instruction
International Research Experiences for Students (IRES)	Engagement
Louis Stokes Alliances for Minority Participation (LSAMP)	Fellowship/ Scholarship
NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) Fellowship/ Scholarship
Research Experiences for Teachers (RET) in Engineering and Computer Science	STEM Instruction
Research Experiences for Undergraduates (REU)	None
Research on Education and Learning (REAL), formerly Research and Evaluation on Education in Science and Engineering (REESE)	STEM Instruction
Robert Noyce Scholarship (Noyce) Program	STEM Instruction
Tribal Colleges and Universities Program (TCUP)	Minority Serving Institutions
New Programs	
Catalyzing Advances in Undergraduate STEM Education (CAUSE)	Undergraduate Education
STEM-C Partnerships	STEM Instruction
NSF Research Traineeships (NRT)	None
Nuclear Regulatory Commission	
Consolidations (Funding Redirected Outside of Agency)	
Integrated University Program*	Fellowship/ Scholarship
Nuclear Education Curriculum Development Program*	Undergraduate Education
Existing Programs Maintained (Not Consolidated)	
Minority Serving Institutions Program (MSIP)	Minority Serving Institutions
*Funding was retained at the agency due to the nature of the program's funding mechanism (it is largely funded through a fee). Once 2014 funding is final, funds would be transferred to NSF through a mechanibe determined for undergraduate and graduate programs.	ism to
Smithsonian Institution	
New Programs	
STEM Informal Education and Instruction	Engagement
Transportation	
Existing Programs Maintained (Not Consolidated)	
Air Transportation Centers of Excellence	None
Dwight David Eisenhower Transportation Fellowship Program	Fellowship/ Scholarship
Garrett A. Morgan Technology and Transportation Education Program	Engagement
National Summer Transportation Institute Program (STI)	Engagement
Summer Transportation Institute Program for Diverse Groups (STIPDG)	Engagement
University Transportation Centers Program	None

Agency Summary	N
Consolidations (Funding Redirected Outside of Agency)	78
Agriculture	6
Commerce	6
Defense	6
Energy	8
Environmental Protection Agency	2
Health and Human Services	10
Homeland Security	1
National Aeronautics and Space Administration	37
Nuclear Regulatory Commission	2
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Agriculture	2
Commerce	5
Education	2
Environmental Protection Agency	2
Health and Human Services	2
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National Science Foundation	18
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Defense	10
Education	13
Energy	12
Environmental Protection Agency	3
Health and Human Services	14
Homeland Security	2
Interior	4
National Aeronautics and Space Administration	8
National Science Foundation	23
Nuclear Regulatory Commission	1
Smithsonian	1
Transportation	6

NATIONAL SCIENCE FOUNDATION 4201 WILSON BOULEVARD ARLINGTON, VIRGINIA 22230



April 23, 2012

OFFICE OF THE DIRECTOR

The Honorable Darrell E. Issa Chairman Committee on Oversight and Government Relations 2157 Rayburn House Office Building Washington, D.C., 20515-6143

Dear Mr. Chairman:

The National Science Foundation (NSF) understands that the Committee on Oversight and Government Reform, in its letter dated April 10, 2012, is gathering government-wide data about the cost and frequency of agency-funded overnight conferences held outside of the Washington, D.C. area.

We have reviewed our records and requested information from NSF Directorates and Offices in response to this request and have the following to report:

1. Provide a list of overnight conferences funded by the department and attended by more than 50 employees since January 1, 2005.

Nearly all NSF staff work out of headquarters in Arlington, Virginia. There is infrequent occasion for a large number of employees to gather outside of the local region. We have not identified a single instance since January 1, 2005, that meets the criteria in your request.

NSF's Office of the Inspector General (OIG) conducted an audit of agency sponsored conferences focused on staff retreats during the period FY 2010-2011 (<u>http://www.nsf.gov/oig/12-2-009.pdf</u>). The OIG provided recommendations for improving internal controls to better ensure cost containment and compliance with applicable standards. NSF agreed with the recommendations and is taking action to implement them. The OIG report noted that they:

"did not identify any instances of retreat participants inappropriately claiming reimbursement for meals that were provided. Further, it appeared that retreat planners generally attempted to be cost conscious." 2. Provide the names, titles, and salaries of any individuals employed by the department to plan events.

NSF does not employ event planners for external agency conferences. Due to the nature of the core NSF work in awarding grants and the significant number of internal meetings and panels supporting the external merit review of proposals, NSF does have a few employees whose responsibilities include organizing the logistics for hundreds of on-site NSF panel meetings, the National Science Board meetings, and other meetings at NSF or in local venues when on-site spaces are inadequate (e.g. for Director's Town Hall meetings).

3. The address of any website created to promote, track, or commemorate department conferences.

NSF does not have any websites promoting, tracking, or commemorating department conferences. We do hold meetings with the research community, including principal investigators and institutional administrators, to share research findings within the scientific community; provide NSF program updates; and educate our grantees on new and current policies and procedures and pertinent administrative issues. Websites for a sample of scientific and grantee conferences are included below. If these types of conferences are relevant to the request, NSF will provide a more comprehensive list.

- NSF Grants Conference <u>http://www.nsf.gov/bla/dias/policy/outreach.jsp</u>
- NSF 2012 Emerging Frontiers in Research and Innovation (EFRI) Grantees Meeting - <u>http://abecker.com/index.php/details/11.html</u>
- NSF 2012 Chemical. Bioengineering. Environmental, and Transport Systems (CBET) Grantees Conference - <u>http://www.cvent.com/events/nsl-2012-cbet-</u> grantee-conference/event-summary-500bbf61692e4212b52650785002b3a0.aspx
- NSF 2012 Small Business Innovation Research / Small Business Technology Transfer Phase II Grantees Conference http://www.nsf.gov/cvents/event_summ.jsp?cnth_id=123637&org=NSF

Sincerely.

(usn from

Subra Suresh Director

cc: The Honorable Elijah F. Cummings, Ranking Member

ATIONAL SCIENCE FOUNDATION 4201 WILSON BOULEVARD ARLINGTON, VIRGINIA 22230 February 4, 2013



OFFICE OF THE DIRECTOR

The Honorable Barbara Mikulski Committee on Appropriations United States Senate Washington, DC 20510

Dear Chairwoman Mikulski:

This letter is in reply to your request for information regarding the impact of a possible sequester on the National Science Foundation's (NSF) operations and activities.

At NSF, the central focus of our planning efforts will be predicated on the following set of core principles:

- First and foremost, protect commitments to NSF's core mission and maintain existing awards
- Protect the NSF workforce
- Protect STEM human capital development

By adhering to these principles and the government-wide guidance provided in OMB memorandum M-13-03, "Planning for Uncertainty with Respect to Fiscal Year 2013 Budgetary Resources," the Foundation will best accommodate the possible sequestration reductions in ways that minimize the impact on our mission, both short- and long-term.

We do know, however, that the required levels of cuts to our programmatic investments would cause a reduction of nearly 1,000 research grants, impacting nearly 12,000 people supported by NSF, including professors, K-12 teachers, graduate students, undergraduates, K-12 students, and technicians.

Vital investments in basic research, leading edge technology, and STEM education would be jeopardized. Impacted areas could include:

- NSF-wide emphasis on sustainability, including vital investments in clean energy research;
- Major investments critical to job creation and competitiveness, such as advanced manufacturing and innovation;
- Advances in cybersecurity aimed at protecting the Nation's critical information technology;
- Pathbreaking efforts to improve pre-college and undergraduate education, including new investments to transform undergraduate science courses.

The Honorable Barbara Mikulski

Major Research Equipment and Facilities Construction funding at \$160 million or less in FY 2013 will result in the termination of approximately \$35 million in contracts and agreements to industry for work in progress on major facilities for environmental and oceanographic research. This would directly lead to layoffs of dozens of direct scientific and technical staff, with larger impacts at supplier companies. In addition, out year costs of these projects would increase by tens of millions because of delays in the construction schedule.

Thank you for the opportunity to provide you with this look at possible impacts of a sequester on the Foundation. Please let me know if you have any additional questions, and as always, thank you for your strong support of the Foundation.

Sincerely,

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Subra Suresh Director

Stenographic Transcript of

COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION

UNITED STATES SENATE

THE SCIENCE AND STANDARDS OF FORENSICS

Wednesday, March 28, 2012

Washington, D.C.

ALDERSON REPORTING COMPANY 1155 CONNECTICUT AVENUE, NW SUITE 200 WASHINGTON, D.C. 20005-5650 (202) 289-2260 has supported 147 awards just in the period 2009 to 2011
that contribute to the strengthening of the forensic
sciences. So in keeping with my one NSF philosophy, each of
the foundations seven directorates contributes to this
effort.

6 The awards represent many facets of NSF activity 7 including basic research awards, major research 8 instrumentation, small-business innovation research, student 9 support, as well as workshops.

Just in this period from 2009 to 2011, more than \$50 million of research has been awarded to institutions in 36 states and in the District of Columbia, large and small colleges and universities, EPSCoR states, minority-serving institutions, community colleges and small businesses.

Let me provide you with just a taste of our activities in support of the forensic sciences. Our data analysis also shows that there are more than 200 current awards that are

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18 supported by NSF.

19 With support from the sector behavioral and economic 20 sciences directorate, or SBE, researchers at the University 21 of Arkansas are investigating how to overcome obstacles to 22 the assessment of likely age changes in facial features. 23 An award by the Computer and Information Science and 24 Engineering Directorate is using computer approaches to 25 handwriting examination, which contributes to the scientific

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1 analysis of documents of questioned authorship.

2 NSF has long used workshops to identify cutting-edge 3 opportunities for future directions. In fact, after the NRC 4 report was published in 2009, NSF-supported workshops 5 include one on cognitive bias and forensic science, and 6 another one -- that was at Northwestern University -- and 7 there-was another one on nanoscale science and technology 8 for forensics.

9 NSF supports activities designed to achieve excellence
10 in U.S. science education. Students participate in
11 supported research and thereby gain skills that are
12 transferable to crime labs.

Some awards specifically expose students to research in a forensic setting. A project at Tuskegee University, Auburn University, as well as Mississippi State University provides occupational training to America's veterans in digital forensics.

Other awards, including one at Arkansas State
University, capitalize on the popularity of shows such as
CSI to engage students in science.

NSF provides funding for small-business innovation research to stimulate technological innovation in the private sector, and a number of awards support commercial development of technologies applicable to forensic settings. Likewise, investments in infrastructure provide

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databases and instrumentation used in forensic applications
 and research.

3 NSF also works collaboratively with other agencies.
4 The award that supports training of veterans was made in
5 coordination with the Department of Veterans Affairs.

6 Our science staff serves on the National Science and 7 Technology Council Subcommittee on Forensic Science, and 8 SBE, our Directorate on Social, Behavioral and Economic 9 Sciences, is developing a memorandum of understanding with 10 the National Institute of Justice to facilitate support of 11 relevant forensic sciences.

So, in summary, NSF has supported and is committed to 12. continue supporting the basic sciences that form the 13 foundation for forensic applications, to collaborate with 14 other mission agencies and to support science education 15 16 opportunities necessary for the Twenty-First Century, especially in the --area of forensic sciences. 17 Thank you, Mr. Chairman. I'll be happy to answer any 18 questions. 19 [The prepared statement of Dr. Suresh follows:] 20 21

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1 that into the field? You know, this isn't like pure science 2 in the sense of, you know, oh, creating some sort of 3 scientific breakthrough that you're going to market and 4 perhaps make, you know, many, many dollars, you know, out of 5 it.

You know, when we're talking about bite marks and stuff 6 like that, the commercial aspect of that is not, you know, 7 would not be very great. How do we get that from your 8 laboratory, you know, when there's a breakthrough made, how 9 do we get that out in the field to the small-town policeman? 10 Dr. Suresh: Okay. So maybe let me take a stab at 11 that. In fact, I want to go back to the chairman's question 12 13 to Dr. Lander. You know, the level of uncertainty that you have in DNA interpretation is no different from the level of 14 uncertainty we have in any scientific experimental work. So 15 let me give you an example that we all know. 16

17 Whenever we develop new materials, for example, so 18 Alcoa, not too far from West Virginia, designs a new 19 material and Boeing puts that into a plane. It's a 20-year 20 process.

So what does Alcoa do? They design a material outside of Pittsburgh in their research center, and they make the material in Davenport, Iowa. And they do a lot of testing, and they pull the material, they twist the material, they bend the material, they break the material, and they give

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1 the material to Boeing.

2	And Boeing doesn't believe anybody else's data because
3	human lives are involved in a flying plane. They do their
4	own in-house testing. And in order to make sure that the
5	testing is reliable, and the interpretation of the testing
6	is reliable, there are standards, which have come into
7	existence thanks to the work of NIST.

So there is a whole organization called American 8 Society for Testing and Materials that over the course of 9 many, many decades has established standards. If you want 10 to pull a piece of metal, what are the standards by which 11 you do your experiment? And those standards are established 12 by NIST and various professional societies. And it's that 13 kind of validation of scientific data that needs to exist 14 for the interpretation of DNA. And that's what is lacking. 15 16 That's where the scientific method comes in.

So, historically, what NSF has done in these is we fund 17 the research at universities that work with industry and 18 create the kind-of basic scientific data. Agencies like 19 20 NIST come in and help develop the standards. These, too, 21 are then adopted by industry and that becomes the bread and butter of how the industry develops a new material and puts 22 it into service. And I think it's that kind of a scientific 23 method that needs to be established in forensics. 24 So to your question, Mr. Boozman, what I would -- sk 25

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1 with respect to how do we bring it to the attention of 2 people, we can, with these standards, with these new tools 3 and technologies, we have a variety of things in place. I 4 can only speak for NSF here. We have a variety of things in 5 place.

So if there are basic scientific discoveries, we can
have engineering research centers that work with industry.
8 We have small/business innovation research. We have
9 partnership for innovation. We have innovation research.
10 These are all programs that NSF supports.

11 Those kinds of programs, and not just the SBIR is not 12 just at NSF. It's in nine federal agencies. Those kinds 13 of programs can help take the basic scientific discoveries 14 and help translate them into commercial practice for small 15 businesses, entrepreneurs, bring them in touch with venture-16 capital community.

And the program we launched last year, the NSF
Innovation Corps, is another attempt by NSF to bring that
kind of thinking from basic discoveries to the marketplace
to the community.

21 Senator Boozman: Go ahead.

Dr. Gallagher: I didn't want to take your time, but just very quickly, you asked sort of two questions. One is how do you set priorities, and that happens at the junction between the world that's practicing forensics and the

process I have seen in my 18 years of government. In fact, 1 what's striking is it's much broader than just federal 2 3 involvement. We have representatives from state crime labs and other experts involved directly in the federal 4 5 interagency process, and they've made a lot of progress in 6 addressing certification requirements and a whole list of 7 other things, so that once the structural answer is put on the table, we're ready to roll. And so it's kind of mixed. 8 Dr. Suresh: \$6 I can point to three or four different 9 activities that are evolved or continuing to evolve in 10 response to the NRC report. One is the two workshops that I 11 mentioned, one on cognitive bias and DNA analysis. The 12 other one is on nanotechnology and forensic science. 13 These workshops were organized and supported by NSF in response to the 14 NRC report. So that's the first one. 15

16 The second is, I mentioned in my opening remarks, the 17 memorandum of understanding that's in the works between NSF 18 and NIJ, and that's something that's a direct outcome of the 19 NRC report.

The third is the activity A is part of the National Science and Technology Council Subcommittee on Forensic Science, and there are several possibilities there. One is to develop a white paper that summarizes recommendations to achieve the goals of the NRC report. The other one would be to create a prioritized national forensic-science research

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agenda. A time would be to draft a detailed strategy for
 developing interoperability standards. So those f at least
 a discussion is taking place through NSTC. So those are
 three tangible outcomes following the NRC report.

Senator Udall: Thank you.

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And I think, Chairman Rockefeller, your efforts here at 6 7 the committee, I think, have spurred things to move along. And I think we need to get to the point where we get an 8 organizational part of this, as you just talked about, 9 10 that's really going to come to grips with it and take advantage of all the energy that's going on out there in 11 12 this respect. Thank you very much. Thanks for your 13 attention.

14 The Chairman: You were a prosecutor.

Senator Udall: I was a prosecutor. That's correct, both at the, at the federal level, I was Assistant United States Attorney and prosecuted criminal cases.

I was thinking the same thing that you said. I always 18 19 had the impression when we went into court that the judge 20 was the arbiter over the science. And you had the sense that, you know, and the rules all say that, that the judge, 21 22 he makes sure that the best scientific information comes in, and whenever it's fingerprint evidence or whatever. 23 And you get the sense as a prosecutor, well, that's up 24 25 there with the judge, and if he lets it in, then it's all

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1 our smaller communities, you know, where many times that 2 entity is looked to, and, yet, in many of our states, you 3 know, there's no training at all.

4 Well, yes, sir.

5 Dr. Suresh: I just wanted to add a couple of points to 6 the comment that the chairman made about NSF's ongoing 7 investments. The 147 projects or so amounting to about \$50 8 million that I mentioned were identified by doing a search 9 with the term forensics. So there is a lot of funding that 10 NSF provides which feeds into this, but it's not directly 11 aimed at forensic science.

For example, we fund genetics and genomics research in our Biological Sciences Directorate. The basic discovery there has a lot of potential implications for forensic science. So that's background basic research.

Likewise, in computer and information science and Directorate rengineering there is a lot of funding that goes into data analytics, image processing. And those kinds of things have huge implications for the development of forensic science within the NSF context.

21 So if I were to look at basic science funding with the 22 implication for forensic science, it's likely to be a lot 23 more than \$50 million. So I just wanted to mention that. 24 Senator Boozman: Good. Again, thank you all for being 25 here. That was, you know, your testimony today has been

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Title 45: Public Welfare PART 612—AVAILABILITY OF RECORDS AND INFORMATION

§ 612.9 Appeals.

(a) *Appeals of denials.* You may appeal a denial of your request to the General Counsel, National Science Foundation, 4201 Wilson Boulevard, Suite 1265, Arlington, VA 22230. You must make your appeal in writing and it must be received by the Office of the General Counsel within ten days of the receipt of the denial (weekends, legal holidays, and the date of receipt excluded). Clearly mark your appeal letter and the envelope "Freedom of Information Act Appeal." Your appeal letter must include a copy of your written request and the denial together with any written argument you wish to submit.

(b) *Responses to appeals*. A written decision on your appeal will be made by the General Counsel. A decision affirming an adverse determination in whole or in part will contain a statement of the reason(s) for the affirmance, including any FOIA exemption(s) applied, and will inform you of the FOIA provisions for court review of the decision. If the adverse determination is reversed or modified on appeal, in whole or in part, you will be notified in a written decision and your request will be reprocessed in accordance with that appeal decision.

(c) *When appeal is required.* If you wish to seek review by a court of any denial, you must first appeal it under this section.

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