NSB-09-2

Investing in the Future:

NSF Cost Sharing Policies for a Robust Federal Research Enterprise

January 21, 2009

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The National Science Board (Board) is composed of 25 Presidentially appointed, Senate-confirmed Members, including the Director of the National Science Foundation (NSF), representing the broad U.S. science and engineering community. The Board provides oversight for, and establishes the policies of, the National Science Foundation within the framework of applicable national policies set forth by the President and the Congress. In this capacity, the Board identifies issues that are critical to NSF's future, approves NSF's strategic budget directions, approves annual budget submissions to the Office of Management and Budget, approves new programs and major awards, analyzes NSF's budget to ensure progress and consistency along the strategic direction set for NSF, and ensures balance between initiatives and core programs. The Board also serves as an independent policy advisory body to the President and Congress on science and engineering research and education issues and has a statutory obligation to "*…render to the President and to the Congress reports on specific, individual policy matters related to science and engineering and education in science engineering, as the Board, the President, or the Congress determines the need for such reports*." (42 U.S.C. Section 1863) SEC. 4.(j)(2)

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Acknowledgements

We are deeply grateful to the many members of the science and engineering research and education community who generously contributed their time and insight to the development of this report. Especially deserving of recognition are those individuals who participated in three public roundtable discussions held at the National Science Foundation (NSF), the lists of which are provided in Appendix B of this report. We also thank those who responded to a public comment opportunity, including in particular the Council on Governmental Relations, American Association of Universities, and National Association of State Universities and Land-Grant Colleges. Their valuable contributions and continued interest in the Board's activity on behalf of their member colleges and universities is greatly appreciated.

We also appreciate the valuable input provided throughout the report development process by the following NSF staff members: Mr. Thomas Cooley, Chief Financial Officer and Director, Office of Budget, Finance, and Award Management (BFA); Ms. Jean Feldman, Head, Policy Office, Division of Institution & Award Support (DIAS), BFA; Mr. James Noeth, Senior Audit Manager, Office of Inspector General (OIG); Ms. Joanna Rom, Deputy Director, BFA; Ms. Mary Santonastasso, Director, DIAS, BFA; Ms. Beth Strausser, Senior Policy Specialist, Policy Office, DIAS, BFA; Ms. Joyce Werking, Audit Manager, OIG; and Mr. Charlie Ziegler, Special Assistant for Cost Analysis and Audit Resolution, DIAS, BFA.

The National Science Board Office (NSBO) provided valuable and essential support to the Task Force's work. Especially deserving of recognition is Ms. Jennifer Richards, Executive Secretary to the Task Force, who provided the primary staff support for this effort and had a significant role in drafting this report. We also extend our thanks to Dr. Michael Crosby, Interim Vice Chancellor for Research, University of Hawaii – Hilo (formerly Executive Officer and Board Office Director, National Science Board), Dr. Russell Moy, Senior Advisor & General Council, Southeastern Universities Research Association (formerly Senior Science & Engineering Policy Analyst and Legal Affairs Coordinator, NSBO), and Dr. Robert Webber, Senior Science Policy Analyst, NSBO.

Process for Producing the Report

To prepare this report, the Board engaged in extensive dialogue with and outreach to NSF senior management, policy staff, and other subject matter experts, as well as the research community. A primary objective of the Board throughout this study was to actively involve stakeholders who will be affected by changes to NSF cost sharing policy, and to fully examine the implications of any potential policy changes.

This report is the second of two focused on NSF cost sharing policy released by the Board following a Congressional directive in the 2007 America COMPETES Act. It directed the Board to examine certain consequences of the Board's 2004 revision to NSF cost sharing policy that eliminated all mandatory cost sharing requirements in NSF programs. In February 2008, the Board released its first report, *Report to Congress on Cost Sharing Policies at the National Science Foundation* (NSB-08-17). The report focused specifically on issues raised by Congress, related to the impacts of its 2004 policy revision on programs that were developed around industry partnerships and historically required industry cost sharing. To inform its first report, the Board held a public roundtable discussion in December 2007 and several discussions with leaders in the Engineering Research Centers program, the Industry/University Cooperative Research Centers program, and the Experimental Program to Stimulate Competitive Research. The Board also consulted recent literature on cost sharing, including a 2000 special issue of the National Council of University Research Administrators journal, *Research Management Review*, dedicated to the topic.

To develop this second report, the Board engaged in additional outreach activities to broadly solicit input from stakeholders. These activities included a request in April 2008 for comment from NSF's Advisory Committees; two public roundtable discussions in July 2008 with invited representatives of stakeholder groups; and a two-month public comment opportunity from August to October 2008, publicized through the Federal Register and by an NSF Dear Colleague letter. Throughout these activities, the Board actively involved NSF senior management and policy officials.

The Board's recommendations herein are based on careful analyses of available information, including perspectives from multiple stakeholder groups such as grantee institutions, organizations representing grantee institutions, and NSF. Unfortunately, although general concurrence exists regarding the level, frequency, and impacts of cost sharing in NSF-sponsored research, little robust quantitative evidence is available on which to base definitive conclusions. Data describing cost sharing for NSF awards is recorded only through dollar commitments listed on Line M in the proposal budget. Line M commitments do not distinguish between resources committed to meet mandatory cost sharing requirements and those committed as voluntary cost sharing. Further, Line M commitments do not include any cost sharing commitments made elsewhere in proposals (e.g., in-kind resource commitments made in the proposal text).

Investing in the Future: NSF Cost Sharing Policies for a Robust Federal Research Enterprise

Report Motivation

On August 9, 2007, the America COMPETES Act[1] directed the National Science Board (Board) to "evaluate the impact of its [2004] policy to eliminate cost sharing for research grants and cooperative agreements for existing programs that were developed around industry partnerships and historically required industry cost sharing, such as the Engineering Research Centers [ERCs] and Industry/University Cooperative Research Centers [I/UCRCs]." The Act directed that the Board "also consider the impact that the cost sharing policy has on initiating new programs for which industry interest and participation are sought."

In response to this Congressional directive, the Board's Committee on Strategy and Budget (CSB) established a Task Force on Cost Sharing[2] in October 2007 to examine the issues raised by Congress with emphasis on the Board's 2004 revision to National Science Foundation (NSF) cost sharing policy that eliminated NSF program-specific mandatory cost sharing requirements. Prior to 2004, specific NSF programs could set mandatory cost sharing requirements for solicited proposals. The 2004 revision to NSF cost sharing policy did not impact the statutory requirement for 1 percent cost sharing for all unsolicited proposals.[3]

The Board undertook an intensive study to accomplish the tasks described above and broadened the scope of its examination to include other capacity-building NSF programs such as the Experimental Program to Stimulate Competitive Research (EPSCoR).

The Board issued a report in February 2008 that recommended, for immediate implementation, a suite of targeted changes to NSF cost sharing policy. The Board committed to engage in additional study and issue a more comprehensive follow-up report that would include additional recommendations for NSF cost sharing policy.

Executive Summary

Science and engineering research and education are cornerstones of the U.S. science and technology enterprise. Following World War II, the National Science Foundation (NSF) was established as the only Federal agency explicitly charged with helping to maintain the overall health of science and engineering across all disciplines through the provision of research and education assistance grants to colleges, universities, and other institutions.

Federally sponsored research is fundamentally a partnership between the Federal Government and institutions performing the research. Both are committed to achieving mutually beneficial outcomes, and both have demonstrated agreement to share in the costs of the enterprise.

Institutions that participate in Federally sponsored research provide resources to the enterprise in a multiplicity of ways to cover direct and indirect costs associated with research activities. These resources include general-purpose state and local government appropriations applicable to research, private gifts, activities funded internally, investments in infrastructure and programs, faculty start-up packages, mandatory and voluntary cost sharing, costs of implementing unfunded research compliance mandates, and unrecovered indirect costs. The portion of institutional resources termed "cost sharing" refers to costs of a specific Federally sponsored project or program that are not borne by the Federal Government.[a,b] Cost sharing includes mandatory cost sharing, voluntary committed cost sharing, and voluntary uncommitted cost sharing provided to specific projects, and also unrecovered indirect costs associated with Federally sponsored research projects.

The application of mandatory cost sharing, and consideration of both mandatory and voluntary committed cost sharing in the NSF merit review and award decision processes, are governed by NSF cost sharing policy. In recent years, NSF has attempted to clarify the role of mandatory cost sharing in NSF-sponsored research and to ensure that voluntary committed cost sharing plays no role in NSF award decisions.

In this report, the National Science Board (Board) prescribes a set of recommendations with two primary objectives: (1) to allow, but narrowly circumscribe, the application of mandatory cost sharing requirements in NSF programs in which such cost sharing is foundational to achieving programmatic goals, and (2) to prohibit voluntary committed cost sharing in NSF proposals and thus eliminate post-award tracking and reporting requirements. These recommendations are intended to improve consistency and clarity of NSF cost sharing practices and policy and to maximize the effectiveness of institutional dollars invested in research. The Board firmly believes that prohibiting voluntary committed cost sharing, and permitting mandatory cost sharing requirements only in limited and appropriate circumstances, will not reduce institutional commitment and financial contributions to NSF-sponsored projects or negatively impact institutional stewardship of Federal resources. Instead, it likely will enhance the ability of institutions to strategically and flexibly plan, invest in, and conduct research projects and programs and promote equity among grantee institutions in NSF funding competitions.

Introduction

Science and engineering research and education are cornerstones of the U.S. science and technology enterprise. Over the Nation's history, research and innovation have generated new technologies and industries, improved quality of life, and promoted economic prosperity. The Federal Government has long recognized the need to provide public support for the science and engineering research enterprise. Following World War II, the National Science Foundation (NSF) was established as the only Federal agency explicitly charged with helping to maintain the

[a] Office of Management and Budget, Circular A-110, "Uniform Administrative Requirements for Grants and Agreements With Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations."
[b] The Board views the term "cost sharing" as somewhat unfortunate because it inappropriately suggests that the value of shared participation in the research enterprise – by Federal agencies providing funding and institutions conducting the work – is limited to financial dimensions alone.

overall health of science and engineering across all disciplines through the provision of research and education assistance grants to colleges, universities, and other institutions.

Federally sponsored research is fundamentally a partnership between the Federal Government and the institutions performing the research. As the National Science and Technology Council observed in its April 1999 report, *Renewing the Federal Government-University Research Partnership for the 21st Century*, this partnership in the conduct of research "has yielded benefits that are vital to each [partner]. It continues to prove exceptionally productive, improving the quality of life, educating the next generation of scientists and engineers, and contributing to America's economic prosperity."[4] Each partner is uniquely suited to providing necessary elements for the success of the enterprise: the Federal Government provides funding for and a system through which to select the most meritorious basic science and engineering research ideas, and colleges, universities, and other institutions provide the intellectual resources of their researchers. Both are committed to achieving mutually beneficial outcomes, and both have demonstrated agreement to share in the costs of the enterprise.

Overview of Cost Sharing

Institutions that participate in Federally sponsored research provide resources to the enterprise in a multiplicity of ways to cover direct and indirect costs associated with research activities. These include, but are not limited to, general-purpose state and local government appropriations applicable to research, private gifts, activities funded internally, investments in infrastructure and programs, faculty start-up packages, mandatory and voluntary cost sharing, costs of implementing unfunded research compliance mandates, and unrecovered indirect costs. In total, academic institutions contributed about 20 percent of total research and development expenditures at U.S. colleges and universities in FY 2007.[5] The portion of institutional resources termed "cost sharing" refers to costs of a specific Federally sponsored project or program that are not borne by the Federal Government.[6] Cost sharing includes mandatory cost sharing, voluntary committed cost sharing, and voluntary uncommitted cost sharing provided to specific projects, and also unrecovered indirect costs associated with Federally sponsored research projects.

- *Mandatory Cost Sharing:* Institutional resources required by NSF for specific sponsored projects, usually with different requirements for different programs and solicitations. At NSF, mandatory cost sharing requirements historically have been implemented only for solicited proposals in certain programs.

- *Voluntary Cost Sharing:* Institutional resources made available to a specific sponsored project solely at the discretion of the grantee institution. These resources fall into two categories:

    - *Voluntary Committed Cost Sharing:* Institutional voluntary cost sharing resources that are pledged formally in an NSF proposal and that become binding and auditable commitments to that sponsored project upon award of the grant. These commitments may be articulated in numerous places in NSF proposals, including in the narrative,

letters of support, or budget (e.g., faculty requesting zero salary support from NSF for time contributed to the project).

- *Voluntary Uncommitted Cost Sharing:* Institutional voluntary cost sharing resources that are not pledged formally in an NSF proposal but are subsequently made available upon receipt of the award. Institutions are not bound to contribute such resources, and the resources are not auditable.

- *Unrecovered Indirect Costs:* Although not formally termed "cost sharing", unrecovered indirect costs associated with NSF-sponsored research constitute real costs of conducting research that must be borne by grantee institutions.[7] Indirect costs for NSF-sponsored projects are determined by applying the current institutional indirect cost rate, as negotiated between the grantee institution and cognizant Federal agency, to the modified total direct costs of the project.[8] Indirect costs consist of both facilities (F) and administrative (A) components, known in combination as F&A. Currently, grantee institutions performing NSF-sponsored projects can recover a maximum of 26 percent of administrative costs, per OMB Circular A-21. This cap was established in 1991, and all administrative costs incurred above it represent *de facto* mandatory cost sharing because they must be absorbed by institutions.

Recent NSF Cost Sharing Policy

The application of mandatory cost sharing, and consideration of both mandatory and voluntary committed cost sharing in the NSF merit review and award decision processes, are governed by NSF cost sharing policy. Several important recent revisions to NSF cost sharing policy have attempted to clarify the role of mandatory cost sharing in NSF-sponsored research, and to ensure that voluntary committed cost sharing plays no role in NSF award decisions.

In 1999, NSF issued a cost sharing policy clarifying the following expectations for mandatory cost sharing: (1) mandatory cost sharing is an eligibility, not a review, criterion; (2) NSF cost sharing requirements beyond the statutory 1 percent requirement will be clearly stated in the program solicitation; (3) only statutory cost sharing will be required for unsolicited proposals,[9] and (4) any post-review, pre-award budget reduction of 10 percent or more from the amount proposed should be accompanied by a corresponding reduction in the scope of the project, unless the program officer, principal investigator, and institution clearly agree that the project as proposed can be carried out at a lesser level of support from NSF with no expectation of any uncompensated institutional contribution beyond that formally reflected as cost sharing. The policy was intended to enhance consistency in the application of mandatory cost sharing requirements in NSF programs, including preventing any consideration of mandatory cost sharing for evaluation and decision purposes and eliminating all instances of cost sharing compelled by post-review reductions in NSF project budgets.

In 2004, the Board approved a revision to NSF cost sharing policy that eliminated mandatory cost sharing requirements in all NSF programs. This policy revision superseded previous guidance regarding mandatory cost sharing requirements and had numerous positive

consequences for both NSF and grantee institutions. Further, it aligned NSF cost sharing practices with those of other Federal funding agencies.[10]

The elimination of mandatory cost sharing requirements was intended to make certain that mandatory cost sharing would not be considered during the NSF merit review and award decision processes; to remove eligibility barriers to participation in certain NSF programs by institutions unable to provide the required cost sharing; and to eliminate the lack of uniformity in cost sharing requirements and philosophy of use across NSF programs. Also, it reduced the financial burden on institutions to provide mandatory cost sharing, provided institutions with more flexibility to strategically invest their own resources, and eliminated the administrative burden associated with tracking and reporting mandatory cost sharing.

However, the 2004 revision also may have brought about several potentially negative consequences for certain types of NSF programs that had previously required mandatory cost sharing and depended upon it to achieve programmatic objectives (e.g., those based on university-industry partnerships or the development of large-scale, long-term research programs). Potential impacts on these programs include:

- Removal of institutional leverage to garner industry participation in programs that seek to build university-industry partnerships (e.g., the Engineering Research Centers [ERC] and Industry/University Cooperative Research Centers [I/UCRC] programs);
- Generation of ambiguity in NSF programs for which institutional "participation" (inherently meaning cost sharing) remained a required component, but which could no longer require mandatory cost sharing (e.g., the Science and Technology Centers program);
- Removal of institutional leverage and incentive to ensure sustainability for large-scale, long-term research programs (e.g., large centers); and
- Removal of leverage to garner financial support for programs that involve substantial commitment to building research capacity and infrastructure (e.g., the Experimental Program to Stimulate Competitive Research [EPSCoR]).

In its February 2008 report to Congress, the Board recommended that NSF reinstate mandatory cost sharing for three programs judged to have experienced negative consequences of the 2004 policy revision: the ERC program, the I/UCRC program, and EPSCoR. The Board also recommended that NSF define a set of overarching principles to guide the application of mandatory cost sharing requirements, and implement such requirements in other programs in the future as justified by those principles.

Voluntary committed cost sharing is addressed in the Grant Proposal Guide (GPG) of the NSF Proposal and Award Policies and Procedures Guide.[11] The GPG states that NSF has no expectation for proposals to include voluntary committed cost sharing. Institutions may offer voluntary committed cost sharing in their proposals at their own discretion, but such offers will not be a factor in NSF's decision to make an award, and they will become binding and auditable resource commitments upon award of the grant. These offers include any cost sharing offered above the required eligibility amount in proposals submitted to NSF programs that implement mandatory cost sharing.

Cost sharing resources may be articulated on Line M or in a multiplicity of other locations in NSF proposals, and can *potentially* enter into consideration during the NSF merit review and award decision processes at three times: pre-award (to establish eligibility to participate in a given funding competition), during the merit review process, or during award budget negotiation. The only allowable consideration of cost sharing during these processes, however, is verification of mandatory cost sharing for eligibility purposes during the pre-award phase. NSF instructs its program officers and reviewers that voluntary committed cost sharing is not to be considered during the merit review process, and the agency has no formal method by which to account for or evaluate such offers.

Views on Cost Sharing

Throughout NSF's history, cost sharing has been the subject of debate. Continuing problems include consistency of cost sharing practices, clarity in cost sharing policies, ensuring that cost sharing is applied only in appropriate circumstances, separation of cost sharing from NSF merit review and decision processes, increasing financial pressures on institutions, and administrative requirements associated with cost sharing contributions. It is important to appreciate the variety of perspectives in understanding the recommendations made herein as well as their associated rationales.

Sponsoring Agency Perspectives

Cost sharing is generally perceived by sponsoring agencies to be both a demonstration of institutional commitment to their Federally sponsored projects and a means of increasing the number of investigators funded and the size and/or time-scale of large projects that would be unachievable if only Federal funds were available. Sponsoring agencies may seek cost sharing from grantee institutions because, for example:

- Certain equipment items may be multi-purpose or multi-user or have durations of use that extend beyond a particular project;
- Certain types of projects, especially centers, are viewed as partnerships between the agency and the institution(s);
- Research is considered a fundamental part of institutional mission;
- Cost sharing commitments require institutions to establish priorities; and
- Cost sharing can leverage or stretch an agency's funds.[12]

The Board and numerous advisory bodies have noted the importance of ensuring that grantee institutions are required to contribute cost sharing only in cases in which it is deemed appropriate and in the interest of both the sponsoring agency and grantee institution. These cases may include those in which the sponsored projects generate tangible benefit (e.g., revenue or infrastructure to be used beyond the scope or duration of the NSF award) for the grantee institution.[13] Mandatory cost sharing requirements have been rationalized by a variety of programmatic objectives related to this outcome, including: capacity-building, linkages with industry, procurement or support for facilities or permanent equipment, and long-term project sustainability. These objectives have been deemed appropriate rationales for requiring

mandatory cost sharing because they may help institutions build research capacity and improve competitiveness in future Federal research funding competitions.[14]

Institutional Perspectives

Institutions participating in the Federally sponsored research enterprise hold a variety of views on cost sharing. Mandatory cost sharing generally is perceived by grantee institutions to be appropriate in certain limited circumstances (e.g., when aligned with programmatic objectives and intended to assist institutions in building long-term and/or large-scale projects). However, voluntary committed cost sharing has more tenuous implications, including its perceived impact on both proposal competitiveness and institutional equity in NSF funding competitions. Also of concern is the impact on institutional strategic planning and flexibility in expending research resources, as well as its impact on indirect cost recovery and associated administrative requirements.

- *Impact on Proposal Competitiveness and Institutional Equity:* The proposer community generally views offers of voluntary committed cost sharing in proposals as increasing their competitiveness (i.e., likelihood of receiving funding) in NSF funding competitions. Correspondingly, failing to offer significant voluntary committed cost sharing in proposals is viewed as creating a competitive disadvantage. These views are widespread and strong among proposers even though NSF instructs program officers, reviewers, and the proposer community that voluntary committed cost sharing is not to be a factor in the merit review and award decision processes.

- *Impact on Strategic Planning and Financial Flexibility:* Grantee institutions typically understand the value of shared financial commitment to Federally sponsored research and have invested in building research capacity and infrastructure, and developed strategic research plans. However, they are reticent to commit voluntary cost sharing to specific projects because doing so limits their flexibility in strategically expending limited institutional resources, and because they are required to adhere to specific grant conditions and plans for delivering cost sharing commitments.

- *Impact on Indirect Cost Recovery:* Voluntary committed cost sharing has a two-fold impact on the recovery of indirect costs associated with NSF-sponsored projects by grantee institutions. First, institutions currently are unable to recover indirect costs associated with voluntary committed cost sharing. Additionally, their overall indirect cost recovery is reduced because voluntary committed cost sharing is included in an institution's organized research base for indirect cost rate calculation.

- *Associated Administrative Requirements:* Grantee institutions are required to track and report all voluntary committed cost sharing contributions, in addition to complying with institutional financial reporting requirements. The accurate and complete identification of voluntary committed cost sharing is an important concern of sponsored research officers and research administrators at grantee institutions because the commitments are binding and auditable upon receipt of the award.

Recommendations[c]

Recommendation 1
NSF should define and communicate, both internally and externally, a set of overarching principles to guide the limited application of mandatory cost sharing in NSF programs. Mandatory cost sharing should be applied to only a small fraction of NSF programs in adherence with these principles, and all mandatory cost sharing requirements must be subject to NSF senior management approval.[15]

Mandatory cost sharing represents an appropriate eligibility requirement placed upon proposing institutions or jurisdictions for certain competitive grants for which non-Federal financial support and commitment are considered foundational to program success. Factors that may justify the inclusion of programmatic mandatory cost sharing requirements include, but are not limited to, capacity-building, linkages with industry, procurement or support for facilities or permanent equipment, and long-term sustainability. The Board believes that mandatory cost sharing requirements should be the exception rather than the rule.

Recommendation 2
NSF should continue its current practice of not requiring mandatory cost sharing in unsolicited proposals.

Historically, mandatory cost sharing for unsolicited proposals was required only in the form of statutory cost sharing. Prior to June 1, 2007, recipients of awards resulting from unsolicited proposals were required to contribute a minimum of 1 percent of the costs of the project or 1 percent of the aggregate costs of all NSF-sponsored projects at their institutions subject to the statutory requirement.[16] Additional mandatory cost sharing requirements have never been considered appropriate for unsolicited proposals, largely because NSF funding for awards generated from unsolicited proposals is intended to be sufficient to achieve project objectives.

Recommendation 3
NSF should enhance its training of program officers to avoid unintended implicit or explicit requests for voluntary committed cost sharing during the budget negotiation process, and to ensure consistent application of NSF cost sharing policy.

NSF program officers are exceptionally skilled in managing the merit review process to ensure that the research supported by NSF lies at the frontier of knowledge. They also, like the proposers with whom they negotiate, are resourceful and entrepreneurial in their attempts to ensure maximum effectiveness of the Federal dollars available. During the budget negotiation process, tradeoffs frequently are made between budget size and scope of work. In some instances, funding from institutions may be available to redress shortfalls in NSF funding to maintain the original work plan. However, such funding

[c] Recommendations 1, 3, 5, and 9 are derived and expanded upon from the Board's February 2008 report to Congress on NSF cost sharing policy, *Report to Congress on Cost Sharing Policies at the National Science Foundation* (NSB-08-17).

should not be sought, implicitly or explicitly, by NSF program officers during the budget negotiation processes.

Recommendation 4
In applying mandatory cost sharing, NSF programs should continue to exercise discretion in setting requirements that take into account the diverse attributes of institutions (e.g., size, research intensity, character/mission) so long as the requirements and rationale are clearly identified in program solicitations and are consistent with the principles developed by NSF in response to Recommendation 1. NSF should continue to emphasize that merit review is founded on the quality of the work to be performed, with mandatory cost sharing (where applicable) serving only as an eligibility, not a merit review, requirement.

Historically, on a program-by-program basis, NSF exercised discretion in setting different mandatory cost sharing requirements for different broad categories of institutions (e.g., different requirements for Ph.D.- and non-Ph.D.-granting institutions participating in the same program). NSF should continue to provide its programs with such flexibility consistent with program goals and expected outcomes. Doing so may help mitigate concern in the research community that mandatory cost sharing requirements act as barriers to participation in certain NSF funding competitions. All types of mandatory cost sharing requirements must, as in the past, be approved by NSF senior management prior to implementation and serve as eligibility, not merit review, requirements.

Recommendation 5
NSF should reinstate mandatory cost sharing for the following programs for which cost sharing is foundational to strategic programmatic goals: the Engineering Research Centers (ERC) program, the Experimental Program to Stimulate Competitive Research (ESPCoR), and the Industry/University Cooperative Research Centers (I/UCRC) program. In the case of EPSCoR, mandatory cost sharing requirements may be met in aggregate by contributions across all institutions and/or organizations in the jurisdiction. In accordance with Recommendation 1, mandatory cost sharing may be implemented in other programs for which it is appropriate, at the discretion of NSF senior management.

The programs named above achieve one or more of the following large-scale and/or long-term strategic goals: building regional, state, or institutional capacity; creating meaningful partnerships with industry; promoting the sustainability of projects beyond NSF funding; and encouraging technology transfer for local economic development. The Board determined that the 2004 removal of mandatory cost sharing hampered the ability of these programs to achieve their strategic goals and, in some cases, virtually eliminated the incentive for participation by industry.

The Board recognizes that for certain NSF programs, financial participation by industry more appropriately takes the form of fees, sometimes after the award has been made. The Board's analysis found that the acquisition of financial resources through industry participation fees (as an analogue to cost sharing) tends to provide greater strategic flexibility to principal investigators and, in some cases, may increase the incentive for

industry participation.[17] The use of such fees as cost sharing, as well as the percentage of cost sharing or fees, should be determined on a program-by-program basis relative to the specific goals to be achieved.

The Board also recognizes that some NSF programs (e.g., EPSCoR, ERC, and I/UCRC) involve multiple sub-awards or organizations that collaborate in partnerships. For these named programs, mandatory cost sharing requirements can be met by the prime awardee, sub-awardees, and/or participating organizations in aggregate across the array of activities funded by a particular award. Each individual sub-awardee or participating organization need not meet the specific percentage or a proportionate amount of mandatory cost sharing, as long as the total percentage or amount required by NSF is met in aggregate by all the organizations involved in the particular funded project or activity.

Recommendation 6
NSF should prohibit voluntary committed cost sharing in all components of both solicited and unsolicited proposals. To ensure that reviewers, NSF program officers, and grantee officials have sufficient information regarding investigator capabilities and institutional resources, NSF should broaden the intent and usage of the existing Facilities, Equipment, and Other Resources section of proposals. Specifically, that section should contain a comprehensive description of all resources necessary for and available to a project, without reference to cost, date of acquisition, and whether the resources are currently available or would be provided upon receipt of the grant. The prohibition of voluntary committed cost sharing will eliminate tracking and reporting requirements, imposed externally on institutions, previously associated with such resources. In recognition of the culture shift in the research community necessitated by this change, NSF should clearly and regularly communicate this new policy to program officers, external reviewers, and the proposer community.

Voluntary committed cost sharing poses one of the most challenging and complex problems to institutions receiving NSF grants. The offering of such cost sharing in NSF proposals is perceived to have a number of detrimental impacts. Although no quantitative analysis is available,[18] information gathered by the Board for the preparation of this report—including substantial input from the research community[19]—suggests the following:

- First, voluntary committed cost sharing can foster unequal competitiveness among grantee institutions based on their ability and willingness to contribute cost sharing resources to NSF-sponsored projects. The research community has long expressed concern about inequities among institutions in NSF funding competitions,[20] and this issue was a primary motivator behind the Board's decision to eliminate mandatory cost sharing in all NSF programs in 2004.

- Second, offering voluntary committed cost sharing in NSF proposals is viewed as increasing institutional competitiveness in the NSF merit review and decision processes, both in convincing external reviewers of proposers' capability to complete the work described and in pre-award budget negotiations with NSF program officers.

This notion exists even though NSF exercises great care in training its program officers and external reviewers and preventing cost sharing information from being considered during the merit review process. Because program officers and external reviewers are required to make informed judgments about the ability of an investigator, a team of investigators, or an institution to carry out the proposed work, and because such judgments inherently require information about personal and institutional capability, capacity, and commitment, the influence of cost sharing is difficult to remove entirely from the merit review process, especially when program officers and reviewers want to stretch program research dollars. Currently, NSF requests that proposers describe the organizational resources available to perform the effort proposed in the Facilities, Equipment, and Other Resources section of proposals, but proposers may also articulate resource commitments in numerous other places, including in the narrative, letters of support, or budget (e.g., faculty claiming zero salary support from NSF for time contributed to the project). Any of these discussions may reference or be perceived to be offers of voluntary committed cost sharing, quite frequently without prior knowledge of or approval by cognizant institutional representatives.

The Board suggests broadening the intent and usage of the Facilities, Equipment, and Other Resources (FER) section of NSF proposals to shift all description of resources available to a project to that single section—as opposed to having the description appear in a multiplicity of locations throughout proposals. Within the revised FER section, proposers would be asked to describe all resources (both physical and personnel) necessary for and available to a project, without reference to cost, date of acquisition, and whether they are currently available or would be provided upon receipt of the grant. The Board believes these changes will accomplish at least three objectives: (1) provide more space in the body of the proposal for describing the project, (2) reduce proposers' views that inclusion of voluntary cost sharing will improve proposal competitiveness, and (3) facilitate evaluation of resources available to the project by both external reviewers and institutional sponsored programs officials by confining all related discussion to one proposal section.

- Third, voluntary committed cost sharing generates financial and administrative burdens for institutions in at least three ways: (1) institutions currently are unable to recover indirect costs associated with voluntary committed cost sharing, (2) institutions' overall indirect cost recovery is reduced because voluntary committed cost sharing is included in an institution's organized research base for indirect cost rate calculation, and (3) institutions are required to track and report voluntary committed cost sharing, in accordance with OMB Circular A-110 (2 CFR § 215.23).

The Board firmly believes that prohibiting voluntary committed cost sharing in all solicited and unsolicited proposals will not reduce institutional contributions to Federally sponsored research activities. The Board recognizes that grantee institutions (especially universities) contribute significant resources to the Federally sponsored basic research enterprise,[21] and that they generally are committed to developing strategic plans for building research infrastructure and capacity and to investing appropriate resources in

those endeavors. Voluntary committed cost sharing may represent only marginal contributions as compared to the overall institutional contribution to Federally sponsored research activities, and restrictions on the timing and usage of those committed resources may not allow them to be expended in the most effective manner possible. The Board believes that prohibiting voluntary committed cost sharing in all solicited and unsolicited proposals will afford grantee institutions maximum flexibility in expending their discretionary resources on these activities and generate greater equity among grantee institutions.

The Board also recognizes the critical necessity of ensuring that both NSF and grantee institutions act as excellent stewards of Federal dollars awarded through NSF grants. Historically, grantee institutions have been held accountable for tracking and reporting voluntary committed cost sharing in order to ensure that they provide all resources promised during the proposal process and as one means of measuring achievement of project objectives. The Board does not believe that prohibiting voluntary committed cost sharing and eliminating the externally imposed tracking and reporting requirements will reduce grantee institutions' commitment to stewardship of Federal research dollars, because they will remain committed to investing in and achieving the goals of their sponsored projects and building their research capacity overall. Indeed, the Board believes that this change will press the Federally sponsored research enterprise to focus on the fundamental question of achievement of scientific objectives rather than provision of specific financial resources. NSF will continue to maintain reasonable expectation for delivery of promises made in proposals (fulfillment of grant conditions), but, as is presently the case, NSF program officers will bear responsibility for evaluating the achievement of project goals.

Recommendation 7
With the exception of programs requiring mandatory cost sharing and expectations for grantee institutions to continue the existing practice of sharing in the costs of faculty salaries, NSF should redouble its efforts to ensure that agency funding committed to programs is commensurate with the science goals to be achieved by funded projects within the program, and by the program overall.

Information gathered by the Board for the preparation of this report made clear that the Federal funding awarded by NSF programs is often insufficient to achieve the scientific goals of sponsored research projects (i.e., a program may provide one-half the funding necessary to achieve the scientific goals stated in its solicitation, without sufficient cause for the program to require mandatory cost sharing). As a result, proposers feel compelled to contribute voluntary cost sharing to achieve program goals. By increasing efforts to ensure that all NSF programs not requiring mandatory cost sharing are supported with adequate funding, NSF can avoid implicitly suggesting and exacerbating the perception in the research community that voluntary cost sharing contributions are inherently required to achieve science goals.

Recommendation 8

NSF should avoid creating Foundation-wide special exemptions, or tiered cost sharing requirements, for specific types of institutions that seek funding from NSF competitions that have mandatory cost sharing requirements. Instead, NSF should allow individual programs to develop their own methods for implementing approved cost sharing requirements that best meet the needs of the program.

Broadening the participation of individuals and institutions in the science and engineering research and education enterprise is a primary goal for NSF. The Board recognizes that mandatory cost sharing requirements can pose financial obstacles to the participation of certain types of institutions, but suggests that flexibility in individual programs, as discussed in Recommendation 3, can mitigate this concern, and that as an overall strategy, mechanisms for enhancing participation should be considered separately from NSF cost sharing policy.

Recommendation 9
NSF should periodically and systematically review its cost sharing policies and their impacts and report its findings to the Board.

Consonant with its periodic review of other policies and procedures, NSF should periodically and systematically review cost sharing policies and, wherever possible, use quantitative data to understand impacts and inform future changes.

NSB Resolution

Material forthcoming.

NSF Implementation Plan

Material forthcoming. This section will outline actions already taken to implement the Board's February 2008 report and planned future actions required to implement the expanded set of recommendations in this report.

Other Findings and Recommendations

In conducting this study, the Board recognized the need to address two critical issues related to cost sharing and the provision of institutional resources to the basic science and engineering research enterprise: (1) current practices among other Federal agencies or individual officials encouraging grantee institutions to reduce or waive their reimbursement for indirect costs associated with competitive research grants, and (2) Federal policies governing the reimbursement of F&A costs.[22]

Ensuring the continued financial vitality of the Federally sponsored research enterprise—and more fundamentally, the bedrock of U.S. scientific and economic advancement and competitiveness—depends largely upon maintaining robust funding sources, appropriate allocation of the financial burden, and innovative strategies for future investment. That

important goal is jeopardized first by the practice of some Federal agencies or individual officials of bidding down or forcing waivers of indirect costs on competitive research awards for which universities typically would be entitled to appropriate indirect cost reimbursement. As noted previously, indirect costs represent real costs to institutions involved in Federally sponsored research. The recommendations made in this report are intended to ensure that NSF requires institutions to share in the costs of Federally sponsored research in appropriate circumstances, which typically do not include waivers of all or significant portions of indirect costs. The Board urges other Federal agencies and other policy-making entities to follow this lead.

Second, evaluation of Federal policies governing the reimbursement of indirect costs associated with Federal research grants was raised to a priority level when Congress directed the Comptroller General to conduct a review of existing policies and procedures for F&A reimbursement for indirect costs associated with Department of Defense (DoD) research grants to institutions of higher education.[23] Among the specific provisions of this directive are the following:

- Assess trends in negotiated F&A rates and effective (based on actual reimbursement) F&A rates for universities that receive DoD extramural research grants and contracts; and
- Assess the impact to F&A costs as a result of increased Federal regulations such as environmental, security, and visa issues, assess trends in actual payments by the Department of Defense for direct and indirect costs on DoD extramural research grants.[24]

The Board sees value in and recommends that further research be undertaken in a variety of analyses of the economics of publicly funded research. For example, a Federal Government-wide study of the current finances of the Federally sponsored research enterprise could be undertaken, including study of the F&A costs associated with Federally sponsored research and evaluation of the current 26 percent administrative rate reimbursement cap established in Circular A-21. As previously stated in this report, grantee institutions share in the costs of Federally sponsored projects in part by absorbing indirect costs incurred above the cap. The Board understands the fundamental intent of the administrative rate reimbursement cap—to ensure that the majority of research funding supports direct research effort, rather than administrative costs—but also concurs with the general view of the research community that the current 26 percent reimbursement cap requires re-evaluation.

The 26 percent reimbursement cap was established based on data reflecting average administrative costs at universities prior to 1991.[25] The cap does not account for increases in administrative costs since 1991 or the costs of compliance associated with the increasing number of Federal, state, and local laws and regulations regarding the conduct of research. These laws and regulations include unfunded mandates concerning animal care, lab and hazardous waste safety, protection of human subjects, electronic research administration, effort reporting, data security, conflict of interest, research misconduct, export controls, occupational safety, and the education programs to ensure a campus-wide knowledge base.[26] Most universities incur F&A expenses above their reimbursable amount[27]—effectively requiring university "cost sharing" of all new administrative and compliance costs. The Board observes with significant concern the potential future consequences of the continuing financial pressure of the current F&A reimbursement cap on institutions of higher education involved in Federally sponsored research.

Conclusion

The Board believes the recommendations suggested herein will improve the consistency and clarity of NSF cost sharing practices and policy, but recognizes that a sustained effort will be needed at NSF and in the research community to adapt to new restrictions on voluntary committed cost sharing. The Board hopes these changes will be seen not as an obstacle, but rather as an opportunity to reaffirm and bolster the sense of partnership and mutual commitment between NSF and grantee institutions in pursuing scientific discovery. Prohibiting voluntary committed cost sharing, and permitting mandatory cost sharing requirements only in limited and appropriate circumstances, is not expected to reduce institutional commitment and financial contributions to NSF-sponsored projects or to negatively impact institutional stewardship of Federal resources. Instead, it likely will enhance the ability of institutions to strategically and flexibly plan, invest in, and conduct research projects and programs and promote equity among grantee institutions in NSF funding competitions. Ultimately, these changes are intended to refocus the measurement of accountability in NSF-sponsored research to achievement of research objectives, rather than the provision of financial resources.

Endnotes

[1] Section 7014 (a) of Public Law 110-69 (America COMPETES Act).

[2] National Science Board, Committee on Strategy and Budget, Charge to the Task Force on Cost Sharing, October 9, 2007 (NSB-07-110, Revised July 15, 2008).

[3] Mandatory cost sharing for unsolicited proposals has been required only in the form of statutory cost sharing: Prior to June 1, 2007, recipients of awards resulting from unsolicited proposals were required to contribute a minimum of 1 percent of the costs of the project or 1 percent of the aggregate costs of all NSF-sponsored projects at their institutions subject to the statutory requirement. This statutory requirement was included as part of NSF's annual appropriations bills, when under the jurisdiction of the VA-HUD and Independent Agencies Subcommittee in the U.S. House of Representatives and U.S. Senate. In February and March 2005, respectively, NSF was placed under the jurisdiction of the Subcommittee on Science, State, Justice, and Commerce in the U.S. House of Representatives and the Commerce, Justice, and Science Subcommittee in the U.S. Senate after major restructuring of both the U.S. House and Senate appropriations committees for the 109th Congress. References to statutory cost sharing requirements for unsolicited NSF proposals were dropped from subsequent NSF appropriations bills.

[4] National Science and Technology Council, "Renewing the Federal Government-University Research Partnership for the 21st Century," April 1999.

[5] In FY 2007, the Federal Government contributed about 61.5% and academic institutions contributed about 19.5% of total R&D expenditures at U.S. universities and colleges. *Survey of Research and Development Expenditures at University and Colleges*, National Science Foundation/Division of Science Resources Statistics. Available at: http://www.nsf.gov/statistics/infbrief/nsf08320/#tab1.

[6] Office of Management and Budget, Circular A-110, "Uniform Administrative Requirements for Grants and Agreements With Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations."

[7] Unrecovered indirect costs were in fact the genesis of "cost sharing" in Federally sponsored research—limitations on indirect cost recovery were first implemented in the 1950s. Various laws and regulations governing indirect cost recovery on Federal research grants have been implemented by the U.S. Congress and the Office of Management and Budget since that time.

[8] National Science Foundation, *Proposal and Award Policies and Procedures Guide*, January 5, 2009. Generally, institutions receiving NSF grants negotiate indirect cost rates with the U.S. Department of Health and Human Services.

[9] This statutory requirement was subsequently removed from NSF appropriations bills in FY 2007.

[10] Cost sharing is generally not required for grants funded by the National Institutes of Health (NIH), the National Aeronautics and Space Administration (NASA), and the Office of Science at the Department of Energy (DOE).

[11] National Science Foundation, *Proposal and Award Policies and Procedures Guide*, January 5, 2009.

[12] Feller, Irwin, *Matching Fund and Cost-Sharing Experiences of U.S. Research Universities*, 1997.

[13] National Science Foundation Policy Statement of Cost Sharing (NSB-99-92), Revised June 1, 1999.

[14] National Science and Technology Council, "Renewing the Federal Government-University Research Partnership for the 21st Century," April 1999.

[15] As part of the existing routine clearance process for NSF solicitations and other funding opportunities.

[16] The statutory one percent requirement for unsolicited proposals originated in appropriations language mandating that grantee institutions provide at least a token share of the costs of projects supported by Federal research grants.

[17] In its review, the Board also took note of the successful industrial participation features implemented in the interagency Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, which are governed by the Small Business Administration (SBA) and administered at a number of Federal agencies, including NSF. As appropriate, NSF should identify whether the actions undertaken by NSF in implementing these unique programs can be adapted as a model for industrial participation in other NSF-supported activities.

[18] NSF does not maintain records of voluntary committed cost sharing contributed by grantee institutions to NSF-sponsored projects.

[19] Research community input on experiences related to cost sharing was solicited through a request for public comment published on the Federal Register (FR Doc. E8–18023) and publicized by an NSF Dear Colleague letter (issued on September 4, 2008).

[20] Seligman, R.P., 2000: "An Introduction to Cost Sharing: Why Good Deeds Do Not Go Unpunished." National Council of University Research Administrators, *Research Management Review*, Vol. 11, Spring/Summer 2000.

[21] In FY 2007, the Federal Government contributed about 61.5% and academic institutions contributed about 19.5% of total R&D expenditures at U.S. universities and colleges. *Survey of*

Research and Development Expenditures at University and Colleges, National Science Foundation/Division of Science Resources Statistics. Available at: http://www.nsf.gov/statistics/infbrief/nsf08320/#tab1.

[22] As indicated by continuing discussion and recent calls for re-evaluation of the cap by the Federal Demonstration Partnership (*A Profile of Federal-Grant Administrative Burden Among Federal Demonstration Partnership Faculty*, January 2007) and Council on Governmental Relations (*Finances of Research Universities*, March 2008.

[23] House Report 110-652 accompanying the FY09 National Defense Authorization Act directed the Comptroller General to conduct this review, and the Government Accounting Office (GAO) has initiated the study.

[24] House Report 110-652 accompanying the FY09 National Defense Authorization Act.

[25] The October 1991 revision to OMB Circular A-21 that established a 26 percent cap on F&A reimbursement directly impacted (as defined as reducing university recovery of indirect costs) 69 of 140 universities surveyed in 1995 by the U.S. Government Accounting Office (GAO), may have impacted 13 additional universities, and had little or no impact on the remaining 58 universities. *University Research: Effect of Indirect Cost Revisions and Options for Future Changes*, U.S. Government Accounting Office, March 1995.

[26] List adapted from *Finances of Research Universities*, Council on Governmental Relations, March 2008.

[27] A 2006 survey of 130 member institutions of the Council on Governmental Relations indicated that more than 90 percent of research universities can support F&A rates above 26 percent, and the average uncapped administrative component would likely be over 28 percent. *2005-2006 Survey of F&A Rates*, Council on Governmental Relations, 2006.

Appendix A

Abridged History of Federal and NSF Cost Sharing Policies

Cost sharing has been an important issue for the National Science Foundation (NSF) since the Bureau of the Budget (predecessor of the Office of Management and Budget [OMB]) requested on September 15, 1954 assistance in setting uniform policies for indirect cost reimbursement for research grants from Federal agencies. At its May 1955 meeting, the National Science Board (Board) unanimously approved a recommendation that "in supporting research conducted in institutions of higher learning, agencies of the Federal government, if requested, reimburse these institutions for accountable indirect costs associated with those direct costs of research supported." When grantee institutions are not permitted a full reimbursement of indirect expenses associated with otherwise funded Federal research activities, their un-recovered costs constitute cost sharing. The Comptroller General issued an opinion on January 27, 1956 disallowing the "payment of overhead based on a stipulated percentage of direct labor or other costs . . . in lieu of reimbursement of the actual costs of overhead" for military research grants because the Armed Services Procurement Act prohibited a cost-plus-a-percentage-of-cost system. On June 29, 1957, the first statutory limitations on indirect costs for research grants were approved as part of the Labor-Health, Education, and Welfare-related agencies FY 1958 appropriations act. This act stated that "none of the funds provided . . . shall be used to pay a recipient of a grant for the conduct of a research project an amount for indirect expenses in connection with such project in excess of 15 per centum of the direct costs." On September 10, 1958, the Bureau of the Budget issued Circular A-21, which described the first government-wide principles for determining operation and maintenance expenses for research grants.

On September 5, 1962, Congress approved Public Law 87-638, allowing the payment of predetermined fixed percentage rates for the calculation of indirect costs in research and development contracts (including grants) with educational institutions. This law overcame the Comptroller General's 1956 opinion disallowing cost-plus-a-percentage-of-cost systems. On October 3, 1962, the Independent Offices Appropriations Act, 1963 imposed the first statutory cap on the amount of indirect costs associated with NSF research grants that could be reimbursed by the agency. Indirect costs incurred in excess of the cap – set at a flat 20 percent – would constitute a cost share to be borne by the research funding recipient.

Concerns about the indirect cost reimbursement ceiling led Congress to revisit the issue in 1965. On August 16, 1965, a new provision of the Independent Offices Act, 1966 superseded the 20 percent indirect cost reimbursement cap with more general language indicating that "none of the funds provided herein shall be used to pay any recipient of a grant for the conduct of a research project an amount equal to as much as the entire cost of the project." NSF continued to be subject to a provision of this nature through FY 2005. On September 22, 1965, NSF clarified the meaning of the legislative change in an Important Notice to the heads of colleges and universities. This Important Notice indicated that in most cases, educational institutions would be required to contribute at least 5 percent of the NSF contribution to a sponsored research project's cost. One method of fulfilling this requirement would be the payment of faculty salaries. The notice indicated that the requirement could be satisfied with contributions of any cost elements of the project, "but should be more than a token contribution." Solidifying the new policy, NSF issued Important Notice No. 11 on January 24, 1966, specifying that cost sharing obligations would be considered satisfied by the payment of all or part of faculty academic year salaries, provided that the payment came from non-Federal funding and constituted more than a token contribution. The Bureau of the Budget's Circular A-74, effective on March 1, 1966,

clarified the change for all Federal agencies and indicated that "applicable institution[s] must share in . . . research costs on more than a token basis."

At its May 1966 meeting, the Board was briefed by the NSF Deputy Director on the implementation of the Circular A-74 cost sharing requirements. Concern was expressed that there was no clear set of uniform cost sharing principles, no reporting requirements, and no uniform Federal practices. The issue was assigned to the Board's Committee II for further study; in September 1966, that committee reported that cost sharing and indirect cost policies were being administered satisfactorily. On May 18, 1967, the NSF Director presented a proposal to the Board to simplify the cost sharing system by allowing institutions to choose between the present cost sharing system (participation in costs on more than a token basis) and a new system with a set floor of 5 percent of total costs for cost share of all funded projects at the institution for a given time period, with a one percent floor on individual projects. The Board unanimously authorized the Director to proceed with this proposal.

At the Board's May 1970 meeting, the NSF Director presented a plan to the Board to modify NSF cost sharing policy by discontinuing the mandatory faculty salary matching requirement and by permitting an averaging cost sharing procedure as an optional accounting mechanism. Under this procedure, the percentage of cost sharing could be averaged over several projects, provided that each project had at least a "token" cost share. The Board unanimously authorized the Director to proceed with this proposal, and NSF subsequently issued Important Notice No. 31 describing the new policy on September 3, 1970. On March 31, 1971, Bureau of the Budget Circular A-100 (subsequently designated Federal Management Circular [FMC] 73-3) was issued to replace the seemingly vague cost sharing requirements of Circular A-74. Circular A-100 required that for educational institutions, cost sharing should "normally" be at least 1 percent of the total project costs and in "many cases" should be less than 5 percent. In "some cases," such as for the payment of faculty salaries or when equipment acquired through the research project added significant value to the institution for educational activities, higher cost sharing requirements would be appropriate. The Circular allowed for the amount of cost sharing by an institution to be determined by the aggregate of all of a Federal agency's projects at that institution, with relatively high contributions on some research projects offset by relatively low contributions on others. Additionally, the Circular required recipients of Federal research grants to maintain records of research project costs paid by the Federal Government and contributed as cost sharing by the grantee institution.

In 1976, OMB issued Circular A-110 (2 CFR Part 215.23), setting forth uniform administrative requirements for grants and agreements between the Federal Government and institutions of higher education, hospitals, and other non-profit organizations. Section 215 of the CFR defines types of allowable cost sharing and the method by which in-kind cost shared contributions must be valuated, but provides no guidance as to appropriate circumstances for or levels of cost sharing. NSF cost sharing policies have historically been and remain today consistent with Circular A-110.

On February 27, 1980, NSF issued Important Notice No. 81, indicating that cost sharing would be satisfied by a contribution of 1 percent on each and every project at a grantee institution or on the aggregate total costs of all projects requiring cost sharing. At its September 1980 meeting,

the Board was advised that OMB was considering changes to cost sharing requirements because universities were facing difficulties in documenting faculty costs. On June 23, 1981, OMB rescinded FMC 73-3, removing the Federal requirement for cost sharing at least 1 percent of total project costs in most cases. NSF continued to consider the 1 percent level of cost sharing mandated by FMC 73-3 a statutory requirement until NSF Congressional appropriations language ceased to include that requirement in early 2007.

During the 1990s and early 2000s, discussion on cost sharing focused on ambiguities in the application of NSF cost sharing policy, the indirect cost rate cap, financial constraints on Federal agencies and grantee institutions, and the burden of tracking and auditing cost shared resources. On June 11, 1999, the Board approved a new NSF cost sharing policy; NSF subsequently issued Important Notice No. 124 entitled "Implementation of the New NSF Cost Sharing Policy." Important Notice No. 124 listed the following key aspects of the new policy: (1) Cost sharing is an eligibility, not a review, criterion; (2) NSF cost sharing requirements beyond the statutory 1 percent requirement will be clearly stated in the program solicitation; and (3) only statutory cost sharing will be required for unsolicited proposals.

At its November 2002 meeting, the Board revisited its 1999 policy. That meeting addressed audit concerns related to documentation and satisfaction of cost sharing obligations, undue burdens placed on institutions, inequities among institutions, and friction among administrators and researchers. At the conclusion of its discussion, the Board approved a resolution (NSB-02-188) to change the language in NSF cost sharing policy to specify that cost sharing was to be implemented only as required by law (e.g. the 1 percent statutory requirement). Following this change, specific programs were still permitted to set cost sharing requirements for solicited proposals in addition to the statutory 1 percent requirement.

At the request of NSF, the Board again revisited NSF cost sharing policy at its October 2004 meeting. On October 14, 2004, the Board approved its most recent cost sharing policy revision, eliminating NSF program-specific cost sharing requirements and requiring only the statutory 1 percent of sharing. This revision eliminated cost sharing as an eligibility requirement for grant proposals. On June 1, 2007, the statutory one percent requirement for cost sharing was eliminated for NSF grant proposals because the FY 2007 Congressional appropriations bill providing funds to NSF no longer contained language requiring grant awardees to share in the cost of research projects resulting from unsolicited proposals. This most recent revision to NSF cost sharing policy effectively eliminated cost sharing NSF-wide and for all NSF grants.

At the Board's annual retreat in February 2007, the Chairman of the Committee on Strategy and Budget (CSB) questioned the impacts of the Board's 2004 cost sharing policy revision after hearing concerns from some Board Members about possible unintended consequences of the change. In response, an *ad hoc* Task Group on Cost Sharing was formed; the Task Group was engaging in a timely study of the issue when the America COMPETES Act formally directed the Board to evaluate NSF cost sharing policy.

Appendix B

Roundtable Discussions on Cost Sharing
Agendas and Lists of Participants

NSB/CS-07-3
December 5, 2007

NATIONAL SCIENCE BOARD WORKSHOP

Committee on Strategy and Budget
Task Force on Cost Sharing

Roundtable Discussion on Cost Sharing

National Science Foundation
4201 Wilson Boulevard
Room 1235
Arlington, Virginia
December 7, 2007

AGENDA

8:00 a.m. **Welcoming Remarks**
- Dr. Kelvin K. Droegemeier, Member, National Science Board and Chair, Board Task Force on Cost Sharing

8:05 a.m. **Motivation, Purpose and Goals**
- Dr. Droegemeier

8:15 a.m. **Process and Logistics for Board Workshops**
- Dr. Michael P. Crosby, Executive Director, National Science Board

8:25 a.m. **Introduction of Participants**

8:35 a.m. **Remarks: History of Cost Sharing in Federally Funded Research and Key Issues in Cost Sharing**
Speakers: Robert Hardy, Director, Contracts and Intellectual Property Management, Council on Governmental Relations (COGR) and Anthony DeCrappeo, President, Council on Governmental Relations (COGR)

9:20 a.m. **Direct and Indirect Impacts of Cost Sharing on the University Research Enterprise**
Discussion Moderator: Howard Gobstein, Vice President for Research and Science Policy, National Association of State Universities and Land-Grant Colleges (NASULGC) and Robert McGrath, Senior Vice President for Research, The Ohio State University and Chair, Council on Research Policy and Graduate Education (CRPGE), National Association of State Universities and Land-Grant Colleges (NASULGC)

Discussion Item: The Board is examining the effects of cost sharing requirements on the academic R&D enterprise and the extent to which cost sharing impedes or promotes strategic financial investments in research by colleges and universities. Of further interest is the impact of cost sharing on the overall costs of academic R&D borne by universities and colleges.

10:10 a.m. **Break**

10:25 a.m. **The Nature and Role of Cost Sharing in the Proposal Decision Process**
Discussion Moderator: Arthur Bienenstock, Special Assistant to the President for SLAC and Federal Research Policy, Stanford University

Discussion Item: The Board is examining the fundamental philosophy of mandated and voluntary cost sharing in Federally funded research. Regarding voluntary cost sharing (or institutional commitment), the Board is specifically examining the extent to which these resources should be regulated and monitored, and the extent to which they should be considered as part of the peer review or agency decision processes if they bear on the investigator's or institution's ability to complete the proposed work.

11:15 a.m. **Lunch**

12:30 p.m. **Impacts of Cost Sharing on University-Industry Research Partnerships**
Discussion Moderator: C.D. (Dan) Mote, Jr., President, University of Maryland at College Park and Co-Chair, Government-University-Industry Research Roundtable (GUIRR)

Discussion Item: The Board is examining whether cost sharing policies can be tailored for effective application to specific types of programs (such as those involving industry), and whether the elimination of non-statutory cost sharing has had a positive or negative impact on those specific types of programs.

1:20 p.m. **Reporting and Auditing of Cost Sharing: Agency and Institutional Perspectives**
Discussion Moderator: Sarah Wasserman, former Assistant Vice Chancellor for Research, University of Illinois at Urbana-Champaign

Discussion Item: The Board is examining the nature and magnitude of the challenges for both Federal agencies and grantee institutions in tracking and reporting both mandatory and voluntary cost sharing.

2:10 p.m. **Break**

2:25 p.m. **Preventing the "Have"/"Have Not" Gap in University Competition for Federal Research Grants**

Discussion Moderator: Irwin Feller, Professor Emeritus of Economics, Pennsylvania State University

Discussion Item: The Board is examining the extent to which cost sharing impacts participation in Federal research funding opportunities.

3:15 p.m. **Roundtable Discussion: Options for Revision to Board Cost Sharing Policy for NSF**
Discussion Moderator: Dr. Droegemeier

4:15 p.m. **Summary and Next Steps**

4:30 p.m. **Adjourn**

National Science Board
Task Force on Cost Sharing
Roundtable Discussion
December 7, 2007

List of Participants

National Science Board Members

Dr. Steven C. Beering, Chairman	President Emeritus, Purdue University, West Lafayette
Dr. Mark R. Abbott*	Dean and Professor, College of Oceanic and Atmospheric Sciences, Oregon State University
Dr. Ray M. Bowen	President Emeritus, Texas A&M University, College Station
Dr. Kelvin K. Droegemeier, Task Force Chairman*	Associate Vice President for Research, Regents' Professor of Meteorology and Weathernews Chair, University of Oklahoma, Norman
Dr. Jon C. Strauss*	President Emeritus, Harvey Mudd College
Dr. Thomas N. Taylor*	Roy A. Roberts Distinguished Professor, Department of Ecology and Evolutionary Biology, Curator of Paleobotany in the Natural History Museum and Biodiversity Research Center, The University of Kansas, Lawrence
Dr. Richard F. Thompson*	Keck Professor of Psychology and Biological Sciences, University of Southern California
Dr. Arden L. Bement, Jr., *ex officio*	Director, National Science Foundation
Dr. Michael P. Crosby	Executive Officer, National Science Board

** Task Force Member*

Participants

Dr. Robert Berdahl	President, Association of American Universities (AAU)
Dr. Arthur Bienenstock	Special Assistant to the President for Federal Research Policy, Stanford University

Mr. Henry Blount	Head, Office of Experimental Program to Stimulate Competitive Research (EPSCoR), National Science Foundation
Dr. Christine Boesz	Inspector General, National Science Foundation
Dr. Richard Buckius	Assistant Director, Directorate for Engineering, National Science Foundation
Dr. Elizabeth Curtler	Assistant Vice President, Foundation, Corporate and Government Relations, University of Richmond
Mr. Anthony DeCrappeo	President, Council on Governmental Relations (COGR)
Dr. Irwin Feller	Senior Visiting Scientist, American Association for the Advancement of Science (AAAS) and Professor Emeritus, Economics, Pennsylvania State University
Mr. Howard Gobstein	Vice President, Research and Science Policy, National Association of State Universities and Land-Grant Colleges (NASULGC)
Mr. David Goldston	Visiting Lecturer and Practitioner-in-Residence, Woodrow Wilson School of Public and International Affairs, Princeton University
Mr. Robert Hardy	Director, Contracts and Intellectual Property Management, Council on Governmental Relations (COGR)
Mr. Jack Kamerer	Retired Director of Grants and Contract Administration, University of Illinois at Urbana-Champaign
Dr. Robert McGrath	Senior Vice President for Research, The Ohio State University
Dr. C.D. (Dan) Mote, Jr.	President, University of Maryland at College Park and Co-Chair, Government-University-Industry Research Roundtable (GUIRR)
Dr. Michael Reischman	Deputy Assistant Director, Directorate for Engineering, National Science Foundation
Dr. Richard Seligman	Associate Vice President for Research Administration, California Institute of Technology

Mr. John Walda	President and Chief Executive Officer, National Association of College and University Business Officers (NACUBO)
Ms. Sarah Wasserman	Former Assistant Vice Chancellor for Research, University of Illinois at Urbana-Champaign

NSB/CS-08-10
July 7, 2008

NATIONAL SCIENCE BOARD WORKSHOP

Committee on Strategy and Budget
Task Force on Cost Sharing

Roundtable Discussion on Cost Sharing 2

Voluntary Cost Sharing: Specification, Tracking, and Role in the NSF Decision Process

National Science Foundation
4201 Wilson Boulevard
Room 1235
Arlington, Virginia
July 9, 2008

AGENDA

8:00 a.m. **Welcoming Remarks**
- Dr. Kelvin Droegemeier*, Member, National Science Board and Chair, Task Force on Cost Sharing

8:05 a.m. **Motivation, Purpose and Goals**
- Dr. Droegemeier*

8:15 a.m. **Process and Logistics for Board Workshops**
- Dr. Craig Robinson, Acting Executive Officer, National Science Board

8:20 a.m. **Introduction of Participants**

8:30 a.m. **Remarks: Brief History of NSF Cost Sharing Policy, Overview of Challenges, and February 2008 Report to Congress**

Speaker: Dr. Droegemeier*

9:00 a.m. **Discussion Session 1: Voluntary Cost Sharing and NSF Program Goals**

Mandatory cost sharing plays a relatively well-understood role and is subject to straightforward implementation strategies in the Federal grant funding process. Mandatory cost sharing refers to those resources required from grantee institutions by particular Federal agencies, usually with different requirements for different programs and solicitations. The fundamental role of voluntary cost sharing is less clear in the Federal grant funding process, although the resources

* Task Force Member

and impacts associated with such sharing clearly are significant. Voluntary cost sharing describes resources made available to a given project solely at the discretion of the grantee institution performing the research; these resources can be committed (pledged formally in the proposal and made a binding condition of the award) or uncommitted (not formally pledged in the proposal and approved budget, but subsequently made available to the project). Voluntary cost sharing is not regulated by NSF policy, but contributions offered in an NSF proposal during the NSF decision process are considered binding and auditable contributions upon award of the grant.

1. What role does voluntary cost sharing play in establishing the structure, goals, and budgets of NSF programs and solicitations?
2. What role does voluntary cost sharing play in actually achieving the goals of particular NSF programs and the grants they fund?
3. How would the quality and quantity of research funded by NSF be impacted if voluntary cost sharing were restricted or eliminated?

Discussion Moderators: Dr. Mark Abbott*, Ms. Lynn Preston

10:00 a.m. **Break**

10:15 a.m. **Discussion Session 2: Voluntary Cost Sharing and Institutional Competitiveness in NSF Grant Funding**

The Board's 2004 policy that eliminated program-specific mandatory cost sharing for all NSF programs was motivated in part by concerns that the difficulty for some institutions to provide cost sharing inhibited or eliminated their ability to compete for NSF funding. The 2004 policy effectively eliminated ability to provide cost sharing as a factor in institutional competitiveness in NSF funding opportunities. Voluntary cost sharing is not regulated by NSF policy and remains a factor that may impact relative institutional competitiveness in all NSF funding opportunities. Relative ability to provide voluntary cost sharing may give advantage to certain types of institutions. On the other hand, ability to provide voluntary cost sharing may assist institutions in building research capacity, infrastructure, and program sustainability.

1. To what extent is voluntary cost sharing necessary for a proposal or institution to be competitive in NSF funding opportunities?
2. To what extent does the type or nature of an institution impact its ability to provide voluntary cost sharing?
3. In what ways could voluntary cost sharing be used to stimulate participation and enhance competitiveness in NSF funding opportunities without providing an unfair advantage to any particular type of institution?

Discussion Moderators: Dr. Jon Strauss*, Dr. Eva Pell

11:15 a.m. **Discussion Session 3: Voluntary Cost Sharing in NSF Merit Review Process**

Voluntary cost sharing is not regulated by NSF policy, and NSF has no formal method during the merit review process by which to account for or evaluate voluntary cost sharing. General NSF practice is for program officers to not consider any offers of voluntary cost sharing during the merit review process. However, institutional resources offered in a proposal as voluntary cost sharing may be apparent to reviewers during the merit review process. Such offers may be articulated formally in the proposal narrative, in letters of support, or in the budget (e.g., faculty claiming zero salary for time contributed to the project). Resources provided as voluntary cost sharing may bear on the principal investigator (PI) or institution's ability to complete the work described in a proposal.

NSF Perspective Target Questions

1. How is voluntary cost sharing currently handled in the NSF merit review process?
2. What are the positive and negative implications of formally considering voluntary cost sharing in the NSF merit review process?
3. What are possible means by which voluntary cost sharing could be formally and objectively considered as part of the NSF merit review process?

Institutional Perspective Target Questions

1. What institutional practices are followed for including voluntary cost sharing on proposals submitted to NSF? To what extent do principal investigators and sponsored programs officials coordinate to ensure that voluntary cost sharing commitments are communicated effectively to both NSF and their institution?
2. How should principal investigators express voluntary cost sharing in their proposals? What are effective internal institutional processes that would ensure the fulfillment of voluntary cost sharing commitments?
3. What institutional perceptions exist regarding the importance and evaluation of voluntary cost sharing in the NSF merit review process?
4. What are possible means by which voluntary cost sharing could be formally and objectively considered as part of the NSF merit review process?

Synthesis Questions

1. Philosophically, to what extent should voluntary cost sharing formally enter the NSF merit review process?
2. Mechanistically, what are possible means by which voluntary cost sharing could be formally and objectively considered as part of the NSF merit review process? Should all voluntary cost sharing be "committed"?

Discussion Moderators: Dr. Droegemeier*, Dr. Thomas Taylor*

12:15 p.m. **Lunch (Room 1235, provided for Roundtable 2 and Roundtable 3 participants)**

Presentations: State-Level Perspectives on Cost Sharing

- Dr. Thomas Armstrong, University Liaison and Nanotechnology Program Manager, Technology Investment Office, Department of Community and Economic Development, State of Pennsylvania
- Dr. Paul Hill, Vice Chancellor, Division of Science and Research, West Virginia Higher Education Policy Commission

1:30 p.m. **Break**

2:00 p.m. **Discussion Session 4: Types, Sources, and Timing of Voluntary Cost Sharing**

Currently, institutions applying for NSF grants may commit voluntary cost sharing resources in any form allowable under OMB Circular A-110 (2 CFR § 215.23). All cost sharing resources can be contributed toward any category of project cost and must be allowable (according to Federal cost principles in Circulars A-21 and A-110 [2 CFR § 215]), allocable (with direct benefit to the award), necessary (needed to carry out the objectives of the award), reasonable (what a prudent business person would pay), and contributed toward costs incurred during the award period. For some NSF programs, certain types of cost sharing resources may be more appropriate (e.g. cash industry membership fees in the I/UCRC program). Some institutions may be more able to contribute resources in certain forms. Certain types of resources may bear differently on the ability to achieve the goals of NSF programs and particular grants funded by the programs.

1. What are the relative merits of cash and in-kind cost-shared resources? What types of resources should institutions be permitted to bring to NSF projects? What types of resources should not be allowed?
2. What is the relative value of cash and in-kind cost sharing to NSF? To different types of institutions?
3. Would certain types of institutions be unfairly impacted if cost sharing were restricted to cash only?

Discussion Moderators: Dr. Droegemeier*, Ms. Jean Feldman, Mr. Charles Zeigler

3:00 p.m. **Discussion Session 5: Tracking and Reporting Cost-Shared Resources**

The Board's 2004 policy that eliminated program-specific cost sharing for all NSF programs was motivated in part by concerns about the difficulties of documentation and satisfaction of cost sharing obligations and the burden on

grantee institutions of tracking and reporting cost-shared resources. Federal agencies and grantee institutions are required to maintain auditable records for direct research costs and mandatory cost sharing. Voluntary cost sharing resources offered in an NSF proposal during the NSF decision process are also considered binding and auditable contributions upon award of the grant.

1. What are the nature and magnitude of challenges, both for NSF and grantee institutions, in tracking and reporting both mandatory and voluntary cost sharing? How do the challenges differ for cash and in-kind cost sharing?
2. What are the impacts of time and effort reporting and agency funding regulations (e.g. restrictions on payment of summer salary) on tracking and reporting both mandatory and voluntary cost sharing?
3. What are possible ways to mitigate the challenges of tracking and reporting cost sharing?
4. What consequences should institutions be subject to when they fail to fulfill cost sharing obligations?

Discussion Moderators: Dr. Camilla Benbow*, Dr. Susan Sedwick

4:00 p.m. **Break**

4:15 p.m. **Plenary Discussion**

Discussion Moderator: Dr. Droegemeier*

5:00 p.m. **Summary and Next Steps**

5:15 p.m. **Adjourn**

5:30 p.m. **Reception (Room 390, for Roundtable 2 and Roundtable 3 participants)**

National Science Board
Task Force on Cost Sharing
Roundtable Discussion 2
Voluntary Cost Sharing: Specification, Tracking, and Role in the NSF Decision Process
July 9, 2008

List of Participants

National Science Board Members

Dr. Steven C. Beering, Chairman	President Emeritus, Purdue University, West Lafayette
Dr. Mark R. Abbott*	Dean and Professor, College of Oceanic and Atmospheric Sciences, Oregon State University
Dr. Dan E. Arvizu	Director and Chief Executive, National Renewable Energy Laboratory
Dr. Camilla P. Benbow*	Patricia and Rodes Hart Dean of Education and Human Development, Peabody College, Vanderbilt University
Dr. Kelvin K. Droegemeier, Task Force Chairman*	Associate Vice President for Research, Regents' Professor of Meteorology and Weathernews Chair, University of Oklahoma, Norman
Dr. José-Marie Griffiths	Dean, School of Information and Library Science, University of North Carolina, Chapel Hill
Dr. Douglas Randall§	Professor and Thomas Jefferson Fellow and Director, Interdisciplinary Plant Group, University of Missouri-Columbia
Dr. Jon C. Strauss*	President Emeritus, Harvey Mudd College
Dr. Thomas N. Taylor*	Roy A. Roberts Distinguished Professor, Department of Ecology and Evolutionary Biology, Curator of Paleobotany in the Natural History Museum and Biodiversity Research Center, The University of Kansas, Lawrence
Dr. Arden L. Bement, Jr., *ex officio*	Director, National Science Foundation
Dr. Craig R. Robinson	Acting Executive Officer, National Science Board

** Task Force Member, § Board Consultant, as of May 11, 2008*

Participants

Dr. Thomas Armstrong	University Liaison and Nanotechnology Program Manager, Technology Investment Office, Department of Community and Economic Development, State of Pennsylvania
Dr. Robert Berdahl	President, Association of American Universities
Dr. Claude Canizares	Vice President for Research & Associate Provost, Massachusetts Institute of Technology
Dr. Donna Dean	Senior Science Advisor, Washington Office, Association of Independent Research Institutes
Dr. Marc Donohue	Professor, Chemical and Biomolecular Engineering, and Vice Dean for Research, Whiting School of Engineering, Johns Hopkins University
Ms. Jean Feldman	Head, Policy Office, Division of Institution & Award Support, Office of Budget, Finance, and Award Management, National Science Foundation
Mr. Howard Gobstein	Vice President, Research and Science Policy, National Association of State Universities and Land-Grant Colleges
Dr. Paul Hill	Vice Chancellor, Division of Science and Research, West Virginia Higher Education Policy Commission
Ms. Cindy Hope	Director of the Office for Sponsored Programs, The University of Alabama
Dr. Anthony (Eamonn) Kelly	Professor, College of Education and Human Development, George Mason University
Dr. Eva Pell Senior	Vice President for Research and Dean of the Graduate School, Pennsylvania State University
Ms. Lynn Preston	Deputy Director, Division of Engineering Education & Centers, Directorate for Engineering, National Science Foundation
Ms. Marguerite Pridgen	Senior Policy Analyst, Office of Management and Budget
Dr. Susan Sedwick	Associate Vice President for Research and Director, Office of Sponsored Projects, The University of Texas at Austin,

	and Member, Board of Directors, National Council of University Research Administrators
Dr. Mary Ellen Sheridan	Associate Vice President for Research (retired), University of Chicago, and Member, Advisory Committee for Business & Operations, National Science Foundation
Mr. Charles Zeigler	Special Assistant, Division of Institution & Award Support, Office of Budget, Finance, and Award Management, National Science Foundation

NSB/CS-08-11
July 7, 2008

NATIONAL SCIENCE BOARD WORKSHOP

Committee on Strategy and Budget
Task Force on Cost Sharing

Roundtable Discussion on Cost Sharing 3

Implications of Mandatory and Voluntary Cost Sharing for Broadening Participation in Science and Engineering Research and Education

National Science Foundation
4201 Wilson Boulevard
Room 1235
Arlington, Virginia
July 10, 2008

AGENDA

8:00 a.m. **Welcoming Remarks**
- Dr. Kelvin Droegemeier*, Member, National Science Board, and Chair, Task Force on Cost Sharing

8:05 a.m. **Motivation, Purpose and Goals**
- Dr. Droegemeier*

8:15 a.m. **Process and Logistics for Board Workshops**
- Dr. Craig Robinson, Acting Executive Officer, National Science Board

8:20 a.m. **Introduction of Participants**

8:30 a.m. **Remarks: Brief History of NSF Cost Sharing Policy and Specific Challenges in Broadening Participation**

Speaker: Dr. Droegemeier*

9:00 a.m. **Discussion Session 1: Mandatory Cost Sharing and Institutional Competitiveness in NSF Grant Funding**

In October 2004, the Board approved a revision to NSF cost sharing policy that eliminated NSF program-specific mandatory cost sharing requirements. The Board's policy was motivated in part by concerns that the inability of some institutions to provide cost sharing inhibited or eliminated their ability to compete

* Task Force Member

*for NSF funding. The 2004 policy effectively eliminated ability to provide cost sharing as an **eligibility** factor in institutional competitiveness in these NSF funding opportunities.*

1. How have previous mandatory cost sharing requirements impacted the participation of smaller and traditionally underrepresented institutions in NSF funding opportunities?
2. Has the ability of smaller and traditionally underrepresented institutions to participate competitively in NSF funding opportunities changed since the 2004 cost sharing policy was implemented? If so, in what ways?

Discussion Moderators: Dr. Richard Thompson*, Dr. Jerry Odom

10:00 a.m. **Break**

10:15 a.m. **Discussion Session 2: Voluntary Cost Sharing and Institutional Competitiveness in NSF Grant Funding**

Concerns raised about the relative competitiveness of different types of institutions in NSF funding opportunities in terms of offering voluntary cost sharing remain unresolved. General NSF practice is for program officers to not consider any offers of voluntary cost sharing during the merit review process. However, institutional resources offered in a proposal as voluntary cost sharing may be apparent to reviewers during the merit review process. Such offers may be articulated formally in the proposal narrative, in letters of support, or in the budget (e.g., faculty claiming zero salary for time contributed to the project).

1. To what extent is voluntary cost sharing necessary for a proposal or institution to be competitive in NSF funding opportunities?
2. To what extent does the type or nature of an institution impact its ability to provide voluntary cost sharing?
3. In what ways could voluntary cost sharing be used to stimulate participation and enhance competitiveness in NSF funding opportunities without providing an unfair advantage to any particular type of institution?

Discussion Moderators: Dr. Droegemeier*, Dr. Orlando Taylor

11:15 a.m. **Discussion Session 3: Cost Sharing and Institutional Strategic Investment**

Cost sharing has been rationalized by the idea that it brings additional financial resources to the research enterprise; serves as a means for leveraging institutional and state and local government support; provides incentives for strategic planning and buy-in by grantee institutions; promotes sustainability for large, multi-year activities initiated with Federal funding; and provides a means for creating meaningful partnerships with industry. Cost sharing has been required in certain NSF programs that achieve such objectives as developing

research infrastructure that can be used beyond the scope or life of the specific NSF award, or generating revenue for the grantee institution. An institution's decision to participate had to be made in the context of long-term strategic priorities, institutional goals, and a desire to achieve sustainability beyond NSF funding.

1. How does cost sharing, both mandatory and voluntary, impact institutional strategic planning?
2. To what extent can cost sharing requirements be used as a means of assisting smaller and traditionally underrepresented institutions in becoming and remaining competitive for external research funding?
3. Does cost sharing promote institutional sustainability of NSF-funded programs once NSF funding ends? Does it promote the involvement of industry in ways that otherwise would not be possible or likely?

Discussion Moderators: Dr. Thomas Taylor*, Ms. Cindy Hope

12:15 p.m. **Lunch (Room 1235, provided for Roundtable 2 and Roundtable 3 participants)**

Presentation: Cost Sharing as a Tool for Stimulating Participation and Competitiveness in NSF Grant Funding
Shirley Malcom, Head, Directorate for Education and Human Resources, American Association for the Advancement of Science

1:30 p.m. **Discussion Session 4: Options for Ensuring Institutional Equity in NSF Grant Funding**

No NSF program solicitation issued since the Board's 2004 cost sharing policy revision was implemented has required mandatory cost sharing (except the FY 2008 solicitation for the Major Research Instrumentation [MRI] program, for which mandatory cost sharing was specifically reinstated by the America COMPETES Act). In FY 2009, NSF will reinstate mandatory cost sharing for the EPSCoR, ERC, and I/UCRC programs, as recommended in the Board's February 2008 report to Congress on NSF cost sharing policies. Mandatory cost sharing in such programs and voluntary cost sharing in all NSF programs remain factors that may impact relative institutional competitiveness and equity in all NSF funding opportunities.

1. What policies might be enacted by NSF to ensure institutional equity in NSF funding opportunities that require mandatory cost sharing?
2. What policies might be enacted by NSF to ensure institutional equity in **all** NSF funding opportunities?
3. What policies might institutions employ to more effectively meet both mandatory and voluntary cost sharing needs?

Discussion Moderators: Dr. Daniel Hastings*, Dr. Wesley Harris

2:30 p.m. **Break**

2:45 p.m. **Plenary Session for Roundtable 3**

Discussion Moderators: Dr. Droegemeier*, Dr. Jon Strauss*

3:45 p.m. **Combined Plenary Session for Roundtables 2 and 3**

Discussion Moderator: Dr. Droegemeier*

4:45 p.m. **Summary and Next Steps**

5:00 p.m. **Adjourn**

National Science Board
Task Force on Cost Sharing
Roundtable Discussion 3
Implications of Mandatory and Voluntary Cost Sharing for Broadening Participation in Science and Engineering Research and Education
July 10, 2008

List of Participants

National Science Board Members

Dr. Steven C. Beering, Chairman	President Emeritus, Purdue University, West Lafayette
Dr. Mark R. Abbott*	Dean and Professor, College of Oceanic and Atmospheric Sciences, Oregon State University
Dr. Camilla P. Benbow*	Patricia and Rodes Hart Dean of Education and Human Development, Peabody College, Vanderbilt University
Dr. Kelvin K. Droegemeier, Task Force Chairman*	Associate Vice President for Research, Regents' Professor of Meteorology and Weathernews Chair, University of Oklahoma, Norman
Dr. José-Marie Griffiths	Dean, School of Information and Library Science, University of North Carolina, Chapel Hill
Dr. Daniel Hastings*§	Dean for Undergraduate Education and Professor, Aeronautics & Astronautics and Engineering Systems, Massachusetts Institute of Technology
Dr. Douglas Randall§	Professor and Thomas Jefferson Fellow and Director, Interdisciplinary Plant Group, University of Missouri-Columbia
Dr. Jon C. Strauss*	President Emeritus, Harvey Mudd College
Dr. Thomas N. Taylor*	Roy A. Roberts Distinguished Professor, Department of Ecology and Evolutionary Biology, Curator of Paleobotany in the Natural History Museum and Biodiversity Research Center, The University of Kansas, Lawrence
Dr. Richard F. Thompson*	Keck Professor of Psychology and Biological Sciences, University of Southern California
Dr. Arden L. Bement, Jr., *ex officio*	Director, National Science Foundation

Dr. Craig R. Robinson	Acting Executive Officer, National Science Board

** Task Force Member, § Board Consultant, as of May 11, 2008*

Participants

Ms. Carrie Billy	Deputy Director, American Indian Higher Education Consortium
Mr. Ronald Blakely	Deputy Director, White House Initiative on HBCUs
Ms. Elaine Craft	Director, South Carolina Advanced Technological Education Center of Excellence; President/CEO, SCATE Inc., Florence-Darlington Technical College; and Member, Advisory Committee for Business & Operations, National Science Foundation
Dr. Janice Cuny	CISE Program Director, Broadening Participation in Computing, National Science Foundation
Mr. William Rafael Gil	Executive Director, National Internship Program, Hispanic Association of Colleges & Universities
Dr. Wesley Harris	Chair, Committee on Equal Opportunities in Science and Engineering, National Science Foundation, and Associate Provost, Massachusetts Institute of Technology
Dr. Beverly Karplus Hartline	Member, Committee on Equal Opportunities in Science and Engineering, National Science Foundation, and Dean of Mathematics, Natural Sciences, and Technology, Delaware State University
Ms. Cindy Hope	Director for Research Administration, The University of Alabama
Dr. Shaik Jeelani	Director, Center for Advanced Materials and Vice President, Research and Sponsored Programs, Tuskegee University
Dr. Shirley Malcom	Head, Directorate for Education and Human Resources Programs, American Association for the Advancement of Science
Dr. Jerry Odom	Executive Director, University of South Carolina Foundations, University of South Carolina

Dr. Yuri Rojas	Director, Research and Development Center, University of Puerto Rico at Mayaguez
Dr. Orlando Taylor	Vice Provost for Research, Dean of the Graduate School, Howard University
Ms. Cindy White	Director, Office of Research, Belmont University