

COMMITTEE OF VISITORS (COV) REVIEW
of the
Board on International Scientific Organizations (BISO)
of the
National Academy of Sciences

Final Report

February 28 - March 1, 2018

EXECUTIVE SUMMARY

The NSF-invited Committee of Visitors (COV) was asked to review NSF activities related to the Board on International Scientific Organizations (BISO) of the National Academy of Sciences (NAS). Specifically, the COV was charged with reviewing "the proposal actions and award management of the BISO activities to provide NSF with an independent evaluation that: (1) Assesses the quality, integrity, and transparency of the activities operations, technical and managerial matters pertaining to proposal decisions, and (2) Comments on the program management practices". The COV charge was accomplished by pre-meeting videoconferences, coordinated examination of eJackets from 2006 to 2016 and an onsite meeting at the NSF.

The framework for NSF engagement with and funding of BISO (hereon called the 'BISO program') activities has been in place since 1971. The BISO program has been reviewed several times in the past with a goal of improvement. In determining the quality and efficiency of the BISO program, the COV examined:

- The coherence between the BISO and the NSF missions.
- The process for submission and evaluation of different types of BISO proposals (including "core" and "non-core" proposals).
- The role of the scientific community in conceptualizing, participating and providing input to BISO proposals.
- The assessment and outcomes evaluation of the BISO proposals.
- The dwell time and burden on staff at both NAS and NSF to produce and process proposals, and to manage interactions.

Main Finding: The COV found that the above aspects of the BISO program are often inconsistent across proposals and NSF units, thus obscuring the "value-added" for the U.S. scientific community. This finding applies across all aspects of BISO activities currently supported by the NSF.

Considering its Main Finding, the COV unanimously agreed on the following Main Recommendation:

Main Recommendation: The NSF should pilot a new framework for the BISO program that has the following characteristics:

- Better alignment of the BISO program with the NSF mission and established merit review criteria.
 - Engagement of the U.S. scientific community in conceptualizing, participating, evaluating and managing BISO projects.
 - An intrinsic mechanism for BISO project portfolio improvement and evolution on the basis of evaluation and emerging scientific needs.
 - Creation of a collective strategy informed by the U.S. scientific community, NAS BISO, and NSF that will enable sustainable operation and allocation of available resources based on mutually agreed priorities.
 - Aggregation of the outputs of the BISO program into a holistic and complete picture of the "value proposition" from an NSF perspective.
- Standardization of the process for evaluation, streamlining the coordination of proposed BISO activities and incorporating an explicit procedure for dynamic evolution of the BISO portfolio through consultation.
- Encouragement of shared, cooperative management and joint ownership by the NSF and the NAS.
- Provision of a model that can also be used by the NSF for other BISO-like programs going forward.

- Involves a merit review-based competitive process that emphasizes the importance of addressing emerging needs or challenges. The process should allow for inclusion of new international scientific organizations (a.k.a. Unions) and criteria for Union discontinuation and consider how entities outside of NAS can participate in BISO.

The COV was also charged with the generation of a report that reflects specific aspects of the BISO activities and follows a template provided by the NSF. For this purpose, the COV reviewed 63 proposal jackets and other documents related to BISO activities. The findings and recommendations of the COV for each aspect of BISO activities are detailed in the report and partially summarized below. The COV believes that the implementation of its Main Recommendation (possibly, but not necessarily, a mechanism such as a cooperative agreement) would address many of the specific recommendations mentioned below and others detailed in the body of the report.

Integrity and efficiency of the activities' processes and management

Findings: Methods and guidelines for requesting and evaluating BISO's activities were generally followed in accordance with NSF regulations. Recent agreements between NSF and NAS have brought more clarity to the roles and responsibilities of BISO PIs and NSF Program Officers (POs). However, process actions and outcomes varied widely in efficiency and quality across different BISO proposals, NSF Directorates, POs, and reviewers. This variance is due in part to the existence of different types of proposals, multiple submission pathways, inconsistent responsiveness of BISO proposals to NSF programmatic objectives, and varying understanding of the nature of BISO activities by POs and proposal reviewers.

Recommendations: All proposals from NAS to NSF should be managed through a single point-of-contact for initial review and assignment to NSF Directorates for consideration. The COV recommends that OISE be the single point of contact for all proposal submissions. This is because OISE has an existing set of criteria for meritorious international collaboration that can be used to immediately evaluate proposals for suitability. Initial review should include an assessment of quality and possible revision before further consideration to improve efficiencies and outcomes. A more consistently rigorous and thorough reviewer selection process should be adopted to ensure diverse input from an appropriate number of reviewers for each submission. Training of POs should include how to handle BISO proposals, including potential interaction with NAS. Reviewers should be provided with a fact sheet that describes the International Council for Science (ICSU) and the NSF position in regard to US participation in international science to ensure a common basis for proposal assessments (e.g., to include the OISE criteria and metrics for a successful international activity).

Management of the program under review

Findings: Over the life of the BISO program, there have been interactions between the NSF and BISO/NAS to reconcile misaligned aspects of their missions and objectives. This has led to several efforts to codify management roles and expectations at NAS and NSF, including program reviews, written communications between NAS and NSF, and a Memorandum of Agreement. However, the BISO portfolio is not dynamic, and the BISO program remains idiosyncratic in relation to the NSF context and mission. For example, one of BISO's priorities is to support

international capacity building, whereas this is not NSF's mission. Some COV members felt that BISO Union dues and Infrastructure support also should not be funded by NSF. Other COV members felt that Union dues are necessary conditions for non-core BISO activities to be possible and that making them ineligible for NSF funding would prevent US scientists from participation in ICSU activities that the COV agreed to be meritorious. Accommodating these characteristics of the BISO program is further complicated by a lack of institutional memory at NSF due to the turnover of its workforce and its dependence on external reviewers. BISO proposals are processed by POs from different NSF Directorates or Offices. Since 2016, a team of NSF Program Officers (called the 'NAS team') is charged with tracking BISO proposals and their review progress. The NAS team is a good idea and an improvement over past practices.

Recommendations: NSF and NAS should convene an informed committee to examine and characterize the BISO value proposition. Better communication, processes, training and interactions should continue to be developed to reduce misalignment between the NSF mission and BISO/NAS objectives. Activities that are not in the NSF mission should not be supported. On the NAS side this should include the preparation of proposals that address emerging research and education opportunities, and the involvement of scientists as PIs/co-PIs of proposals (e.g., U.S. delegates/representatives to ICSU subsidiary bodies, U.S. leaders in ICSU and/or U.S. scientists that are active in ICSU subsidiary bodies' activities). There should be improvements in the proposals submitted by NAS that more fully and completely describe outcomes in a context of explicit performance metrics relevant to the NSF (e.g., ICSU regularly, externally reviews subsidiary bodies' performance - proposals should include the outcomes from and responses to review; impact statements by US scientists; achievements and notable outputs, etc.). On the NSF side this should include mechanisms that reduce proposal-evaluation dwell time and regularize periodic evaluations (e.g., reverse site visits) to ensure BISO is responsive to NSF priorities. NSF and NAS should collaborate in creating mechanisms that allow BISO's portfolio to evolve (e.g., to either sunset or initiate activities associated with specific national committees and Unions, ensure broad U.S. participation, promote diversity and inclusion, etc.).

Portfolio processes: evaluation criteria/metrics and internal oversight processes

Finding: There is often a misalignment between NSF evaluation criteria and metrics with BISO proposals and project reports. Examples are proposals that either have objectives that are not directly aligned with the mission of NSF or do not have explicit metrics and methods to measure attainment of NSF criteria for Intellectual Merit and Broader Impacts.

Recommendation: BISO proposals should clearly delineate BISO's strategic goals and which of them support NSF's mission and thus are worthy of funding. BISO activities could be aggregated as a unified program (e.g., a cooperative agreement) awarded through an open, competitive process. The corresponding metrics should be used to periodically evaluate the activities' success from both NSF and BISO's perspectives. The use of a program evaluation specialist (internal or external) could be considered for this purpose but would only be cost-effective if a unified program were awarded.

**FY 2018 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)**

The table below should be completed by program staff.

<p>Date of COV: February 28 - March 1, 2018</p>
<p>Program/Cluster/Section:</p>
<p>Office: Office of International Science and Engineering</p>
<p>Directorate: Office of the Director</p>
<p>Number of actions reviewed:</p> <p>Awards: 48</p> <p>Declinations: 11</p> <p>Other: 29 (including Continuing Grant Increments)</p>
<p>Total number of actions within Program/Cluster/Division during period under review:</p> <p>Awards: 48</p> <p>Declinations: 11</p> <p>Other: 29 (including Continuing Grant Increments)</p>
<p>Manner in which reviewed actions were selected:</p> <p>The sample of proposal actions was selected from a 10 year history of actions submitted to the National Science Foundation.</p>

COV Membership

	Name	Affiliation
COV Chair:	Jose A.B. Fortes	University of Florida
COV Members:	William (Bill) D. Gropp	University of Illinois Urbana-Champaign
	Barbara Schneider	Michigan State University
	Mahlon C. (Chuck) Kennicutt, II	Texas A&M University
	Paula Mabee	University of South Dakota
	Glaucio H. Paulino	Georgia Institute of Technology
	Gregorz A. Rempala	Ohio State University
	Frederick T.L. Leong	Michigan State University, East Lansing

INTEGRITY AND EFFICIENCY OF THE ACTIVITIES' PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the activities' review process and management. Comments should be based on a review of proposal actions (awards, declinations, returns without review, and withdrawals) that were *completed within the past ten fiscal years*. Provide comments for the *activity* being reviewed and for those questions that are relevant to the activity under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

- I. **Questions about the quality and effectiveness of the program's use of merit review process.** Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

<p style="text-align: center;">QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS</p>	<p style="text-align: center;">YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE</p>
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p><u>Findings:</u></p> <ul style="list-style-type: none"> • The COV felt that the review methods followed NSF guidelines and in this sense were generally appropriate. They noted inconsistency in practices, likely because proposals come into portfolios of POs with diverse training who are scattered across NSF's multiple Directorates and Offices. Because the proposals from NAS are for funding of multinational scientific organizations (BISO; ICSU), they do not require external merit review. Thus, Program Officers (POs) generally requested only internal reviews, and they often wrote their content directly in the review analysis (RA). In multiple instances, additional reviews, when solicited, were typically from other POs and often not given ratings. • The COV had concerns that the selected review mechanisms were not always properly justified and that there remain inconsistencies in the review processes by different POs. <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Justification for the review method used (e.g., internal review because of specific NSF policy) should be described in the RA. • Rationale for the choice of particular additional reviewers, whether internal or external, should be better articulated, and described by POs in RAs. • POs should be better trained to ensure consistency in the handling of BISO proposals. <p>Data Source: EIS/Type of Review Module</p>	<p style="text-align: center;">YES</p>

<p>2. Are both merit review criteria addressed:</p> <p>a) In individual reviews? Yes, by most external reviews, but not consistently in internal reviews.</p> <p>b) In panel summaries? Not applicable as no proposals were reviewed by panels.</p> <p>c) In Program Officer review analyses? Yes, but POs need to always sign off on RAs and identify their position.</p> <p>Findings:</p> <ul style="list-style-type: none"> • The COV felt that the inconsistent use of merit review criteria was indicative of the misalignment between BISO and NSF. The nature of the proposals from BISO present an unusual burden to the PO in that it is often not research that is being proposed, and therefore proposals are difficult to judge using the standard interpretation of NSF merit review criteria. • COV members noted that national membership fees are the financial resources that allow ICSU subsidiary bodies to undertake activities that are more clearly aligned with the two merit review criteria, and that U.S. participation is leveraged many-fold by other nation's contributions to common efforts undertaken by the organizations. • Some reviewers do not address Intellectual Merit, and instead they state that the value of the proposals is in the Broader Impacts. Other reviewers indicated that they couldn't rate a proposal because its nature didn't match with what is expected from NSF proposals. Others were concerned about the fit in relation to the NSF and/or Directorate mission and goals. <p>Recommendations:</p> <ul style="list-style-type: none"> • BISO projects are unique and idiosyncratic compared with the bulk of NSF proposal submissions. Therefore it would be useful if NSF developed a set of example activities in regard to the two merit review criteria that are more specific to the types of projects typically presented by BISO (e.g., participation in ICSU Unions and the attendant national membership fees, the U.Ss National Committee activities and costs, the International Visitors Office (IVO)). • Provide instruction and education to reviewers about BISO activities and guide them in how to use the merit review criteria. For instance, what specific criteria characterize competitive vs. non-competitive Intellectual Merit for a proposal to pay dues for a scientific Union or for funding of the IVO? <p>Data Source: Jackets</p>	<p>Generally YES</p>
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Finding:</p> <ul style="list-style-type: none"> • The COV found that in general the reviewers provide substantive comments in their assessments although there were some exceptions. <p>Recommendation:</p> <ul style="list-style-type: none"> • A template for the reviewers detailing the specific additional considerations for BISO proposals evaluation should be developed. <p>Data Source: Jackets</p>	<p>Generally YES</p>

<p>4. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p><u>Findings:</u></p> <ul style="list-style-type: none"> In general, the COV felt that for the awards covering non-core activities the proper rationale was provided in most cases. Several members did find that not to be the case for some jackets requesting supplemental funding for non-core activities. Overall though, the COV felt overwhelmingly that the rationale provided for non-core activities awards were extensive and detailed and, in cases of divergent scores, provided additional narrative and explanations, as appropriate. However, the decisions on core activities grants (especially Union dues) were found to be often poorly summarized with only brief rationale. As above, BISO should point to dues-enabled Union activities that more clearly align with the two merit review criteria. Supporting statements by US scientists describing the value added by participation in the Union activities would be helpful in judging impact. <p>Recommendation:</p> <ul style="list-style-type: none"> Documentation on rationale for decisions on core activities and supplemental awards should be consistently provided. <p>Data Source: Jackets</p>	<p>Generally YES</p>
<p>5. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p><u>Findings:</u></p> <ul style="list-style-type: none"> COV found that the exchanges and proper communications with the Pis of awarded grants were often too short and uninformative, especially in the area of core activities. Most of the information is in the RAs, which are not available to the Pis. There was little evidence of correspondence with Pis, though perhaps not all emails were uploaded to eJacket. Context Statements, with information on success rates and numbers of submitted proposals, were generally not available. For many proposals, however, this may be a reflection of the fact that BISO proposals are not submitted in response to competitive solicitations or competing with the pool of proposals submitted to a given program. Further, Context Statements where available, did not describe the rationale for external vs. internal review process or specific details on the funding program/mechanism utilized. There was little guidance to Pis on the specific expectations of the annual reports, especially for the core activity awards (tied to the merit review criteria). <p>Recommendations:</p> <ul style="list-style-type: none"> Post-award communication with Pis should be further improved. Context Statements should be mandatory. 	<p>Data not available (Maybe yes - not clear in the eJackets)</p>

6. Additional comments on the quality and effectiveness of the activity program's use of merit review process:

Findings:

- The COV found that the current merit review process for BISO projects faced some challenges due to what was felt to be a misalignment of the missions of BISO and NSF. This misalignment makes the clear and robust justification of decisions difficult at best. In particular, the COV felt that especially with respect to the core activities, the standard NSF Intellectual Merit criterion did not always apply. Some of the external reviewers struggled with this aspect of BISO proposals. Moreover, in many cases, the COV found that both core and non-core activities proposals were written in a way that indicated that Pis expected funding by default (e.g., for the International Visitor's Office). In such proposals, Pis often provided neither proper context nor rationale for the proposed activities, falling far below the usual NSF proposal standards. Additionally, the COV found that sometimes NSF POs had problems finding qualified external reviewers, especially ones with competence to comment on the value of the Union dues and other fees and appropriateness of personnel effort. Within the above-stated constraints and challenges, the overall process seemed to be guided by the PO's desire to be fair in the evaluation of proposals. Most outcomes of Union participation are derivative activities, not just the action of "belonging" or having a "seat at the table". Greater effort should be made by BISO to explicitly identify those Union activities that are enabled by U.S. participation that align with the NSF mission.

Recommendations:

- External reviewers from relevant scientific communities should be used for proposal evaluation whenever possible. Additional clarification should be provided on merit review in the review template to ensure that the nature of the proposals (especially in the area of core activities) is properly reflected in the reviews.

**MAJOR
POINT**

II. **Questions concerning the selection of reviewers.** Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

<p>SELECTION OF REVIEWERS</p>	<p>YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE</p>
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications? <u>Findings:</u></p> <ul style="list-style-type: none"> In many proposals sent to external review, the reviewers had appropriate expertise and qualifications based on institutional affiliations and remarks. There was little documentation, however, of the rationale for the selection of reviewers beyond the consultation with other Directorate personnel. Declined proposals did not consistently have three or more reviews. When reviewers either declined, did not respond, or did not rate the proposal, there was no apparent evidence of further efforts to increase the number of reviews. In a few instances, only two fully completed reviews formed the basis for decisions. Some reviewers seemed unaware of ICSU and/or the Union under consideration. POs made reasonable efforts to find diverse reviewers. <p>Data Source: Jackets.</p>	<p>Generally YES</p>
<p>2. Did the program recognize and resolve conflicts of interest when appropriate? <u>Findings:</u></p> <ul style="list-style-type: none"> The COV did not find jackets where conflicts of interest (COi) were noted. Program Officers reported a difficult time in finding reviewers due to COi and appropriate expertise. Activities associated with ICSU Unions often involve a broad spectrum of US scientists - therefore finding "COi-free" reviewers can be difficult and lead to reviewers with little or no knowledge of ICSU or a particular Union. <p>Data Source: Jackets.</p>	<p>YES- none identified</p>
<p>3. Additional comments on reviewer selection. <u>Recommendations:</u></p> <ul style="list-style-type: none"> All proposals from NAS to NSF should be managed through a single point-of-contact (preferably OISE) for initial review and assignment to NSF Directorates and their POs for consideration. Initial review should include an assessment of quality, and possible revision, before further consideration. A more rigorous and thorough reviewer selection process should be adopted that leads to more diverse input from an appropriate number of COi-free reviewers for each submission. Reviewers should be provided with a fact sheet that describes ICSU and the NSF position in regard to US participation in international science to ensure a common basis for proposal assessments (e.g., it might include the OISE metrics for a successful international activity). 	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Findings:

- There is misalignment between the missions of NSF and BISO/NAS.
- Lack of institutional memory at NSF has been a source of problems. When POs change, the NAS may be provided with shifting and/or inconsistent advice.
- In some proposals, the dwell time has been long and needs to be improved. The problem seems less critical with respect to more recent proposals.
- The COV noted that there is significant reliance on internal reviewers (especially for smaller proposals) and external reviewers who are senior members of the community. Although the former may be justified by internal NSF processes, the COV felt that including more external reviewers would enable a more competitive review process and hence, high quality awards that would be well aligned with the international objectives of the science community involved. Further they noted that often junior researchers are more aware of emerging areas in their domains.

Recommendations:

- POs should be encouraged to request regular reverse site visits in the case of some awards to ensure that the institution is taking responsibility for implementing their plans in a timely and regular manner. Although this implies more work for POs, this kind of interaction is a good approach, as it prevents misaligned expectations and is conducive to a successful project.
- Coordinating official(s) should be designated at NSF (e.g., in OD/OIIA) to address the problem of poor institutional memory. The NAS team at NSF is a good idea, should be continued and should be more involved in the process than simply collating submissions.
- Internal mechanisms (at NSF) should be developed to reduce dwell time.
- The review process should be improved by increasing the number of external reviewers. The COV suggests a minimum of three reviewers for BISO-related proposals (other than small dollar travel grant applications). This would be addressed if a single omnibus proposal for all ICSU Union activities was adopted rather than the current approach of multiple similar proposals.

2. Responsiveness of the program to emerging research and education opportunities.

Findings:

- There is significant room to improve responsiveness of the program to emerging research and education opportunities (related to core and non-core activities). A responsive example is a proposal on an emerging, disruptive technique, which was recently funded.
- Proposals that the COV had access to are quite heterogeneous. While some workshop proposals are built around emerging topics, others mostly enable attendance at routine meetings.
- In general, BISO proposals are not as competitive as successful unsolicited proposals.
- The profile of the Pis of BISO proposals is different from the profile of Pis of proposals from the main academic institutions in the U.S. (since BISO proposals are not for support of fundamental research).

Recommendations:

- Main recommendation: For each proposal, a member of the National Academies of Sciences, Engineering, and Medicine (NASEM) should be required as a PI or co-PI in every BISO proposal. The COV notes that there is an OISE advisory body that includes NASEM members, but it is unclear whether this group is active in developing or vetting proposals to NSF.
- Additional "Program Specific Criteria" should be added as part of the review requirements. A template should be provided for reviewers.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Findings:

- There appears to be very little planning and prioritization - the program is somehow prescribed, and the portfolio seems to be predetermined and not mutable.
- The portfolio has two dimensions: one includes core versus non-core activities and another relates to the fields of science/engineering (or topics) that compose the portfolio.
- The portfolio is neither vibrant nor dynamic.
- No clear mechanism exists to bring in new Unions or to drop dysfunctional Unions. It is not clear how entities outside of NAS can participate in BISO.
- Although the set of Unions that comprise ICSU is large, it leaves out several fields of science. For instance, what is the mechanism to inject "computer science" into the portfolio?

Recommendations:

- Mechanisms should be developed to allow a more dynamic portfolio by means of collaborative efforts between NSF and NASEM. Although the existing MOA (March 17, 2016) considers "Changes in Status of USNCs and Related International Unions," this seems to be a latent item which needs to be expanded and acted upon.
- To avoid supporting poorly performing national committees, they should be evaluated on a regular basis.

IV. Questions about Portfolio Processes. Please answer the following about the portfolio of awards made by the activity under review.

PORTFOLIO PROCESSES\$
<p>1. What (universal/addition?) criteria should we (NSF) use to evaluate BISO proposals consistently across the foundation?</p> <p><u>Findings:</u></p> <ul style="list-style-type: none">• It appears that reviewers are guided by 5 review elements under both Intellectual Merit and Broader Impacts in evaluating the BISO proposals. These may not be ideal for the BISO program in comparison to the usual NSF research proposals. For example, despite the guidance provided by these review elements, a consistent theme across the reviewers was the insufficiency in the outcome/impact assessment component of the proposals. Therefore, it seems that the evaluation/assessment element and criteria need specific consideration (e.g., a specific review element or additional "Program Specific Criteria") given the unique dimensions of the BISO program. Part of the problem may be that this element in the preparing of proposals and their evaluation is quite difficult and ambiguous. Please see item 2 below for recommendations.
<p>2. What internal structures/processes, if any, should we implement to ensure consistent oversight?.</p> <p><u>Findings:</u></p> <ul style="list-style-type: none">• BISO did undertake a strategic planning exercise in 2008.. <p><u>Recommendation:</u></p> <ul style="list-style-type: none">• NSF should evaluate progress of awarded BISO proposals with respect to the objectives in BISO's strategic plan. A common best practice is to generate a strategic plan and periodically review and update it in order to guide the focus and objectives of an organization. From that strategic plan, a typology of related outcomes could be generated for use in the proposal funding evaluation. This may involve hiring internal program evaluation specialists or contracting with external program evaluation specialists. Such personnel have expertise that is specialized for this work vs. engaging scientists from different disciplines that constitute e.g., the COV. This would only be cost effective if an omnibus program was funded rather than upwards of 16 separate individual Union proposals.
<p>3. What are appropriate metrics required to better evaluate the return on investment to the NSF and scientific community writ large?</p> <p><u>Findings:</u></p> <ul style="list-style-type: none">• While some data are collected, there is no regular or uniform reporting of relevant metrics, for example, in project final reports. <p><u>Recommendation:</u></p> <ul style="list-style-type: none">• Projects should be required to collect and report impact-related metrics (e.g., workshop participation and outcomes; Union dues and travel - metrics of US participation including leadership activities). Data should be aggregated so that trends and comparisons can be evaluated across the overall ICSU participation supported by the NSF.• Regular evaluations of the portfolio should be performed (perhaps as part of the Recommendation in point 4 below), using appropriate metrics. An omnibus program would allow use of more typical NSF oversight practices such as site visits, panel reviews, external reviews, annual reports, etc.

4. Is there a preferred mechanism for competing and awarding this activity (i.e. grant, contract, cooperative agreement)?

Findings:

- The current small grants are very inefficient and make it difficult to evaluate the effectiveness and impact of the overall portfolio.
- Proposals from BISO appear to be less competitive, less reflective of emerging areas, and less vetted by domain experts.

Recommendation:

- NSF should consider an arrangement, such as a cooperative agreement, that would manage both the core (dues) and related activities (e.g., meetings and workshops). An open solicitation could be used, or other mechanisms to introduce appropriate competition. A pilot might also be a viable solution. An advantage of using a cooperative agreement is that it is feasible to aggregate and evaluate broader impact, review content of the portfolio, employ a project analyst and address balance and change in the investment portfolio.
- The COV recommends that NSF consider mechanisms to enable Unions or other similar Entities outside of NAS (e.g., societies) to compete for awards, perhaps through specific solicitations in order to level the playing field, improve fairness, and make awards that are more strategic investments.

5. How could the value of each Union fairly and effectively be evaluated if funding constraints limit future commitments to this activity?

Recommendation:

- Regular reviews should be performed (e.g., every 5 years, staggered so that review burden is distributed over time) with appropriate stakeholders. These reviews should include an evaluation of the Union's relevance to NSF priorities, involvement by the community, and the competitive processes used to allocate resources.

OTHER TOPICS

1. Please comment on any areas in need of improvement or gaps (if any) within activities' areas..

Findings:

- Please see the Executive Summary
- BISO's priorities include the activities of its International Visitors Office.

Recommendations:

- Please see the Executive Summary
- Some members of the COV felt that the activities of the BISO's International Visitors Office should not be funded by NSF.

2. Please provide comment as appropriate on the activities' performance in meeting program-specific goals and objectives that are not covered by the above questions.

Findings:

- Please see the Executive Summary

Recommendations:

- Please see the Executive Summary

3. Please identify agency-wide issues that should be addressed by NSF to help improve the activities' performance.

Recommendation:

- Please see the Executive Summary

4. NSF would appreciate your comment on how to improve the COV review process, format and report template?

Findings:

- The template format is good in that it clearly identifies the questions to be addressed.
- The COV thanks the NSF OISE staff for their extensive support of the COV activities, including the provision of access to a large amount of documentation that greatly helped the COV members in quickly assessing and learning about BISO activities.

Recommendations:

- The template should include an Executive Summary field.

APPENDIX

MERIT REVIEW CRITERIA

An understanding of NSF's merit review criteria is important in order to answer some of the questions on the template. Reproduced below is the information provided to proposers in the Grant Proposal Guide about the merit review criteria and the principles associated with them. Also included is a description of some examples of Broader Impacts, provided by the National Science Board

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These Broader Impacts may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of Broader Impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities. These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. ([GPG Chapter](#)

11.C.2.d.f(i) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter 11.C.2.d.f(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society
- and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

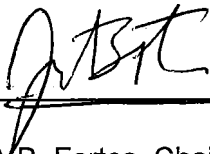
3. Examples of Broader Impacts

The National Science Board described some examples of Broader Impacts of research, beyond the intrinsic importance of advancing knowledge¹. "These outcomes include (but are not limited to) increased participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education at all levels; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a globally competitive STEM workforce; increased partnerships between academia, industry, and others; increased national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education. These examples of societally relevant outcomes should not be considered either comprehensive or prescriptive. Investigators may include appropriate outcomes not covered by these examples."

¹ NSB-MR-11-22

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SIGNATURE BLOCK:

A handwritten signature in black ink, appearing to read 'J.A.B. Fortes', is written above a horizontal line.

José A.B. Fortes, Chair