

Committee of Visitors Findings and Recommendations

The findings and recommendations in this document were compiled from forty-four (44) Committee of Visitors (COVs) reports generated between FY 2015 and FY 2018. Each was the most recent report available for a division, program or collection of programs, as of summer 2019. Reports cover all seven NSF Directorates plus programs in the Offices of Integrative Activities and International Science and Engineering, housed within the Office of the Director.

The text below reflects common or overarching themes across all reports and is not intended to be quantitative, except where expressly noted. Comments are reported using the standard template provided to COVs.

I. **Questions about the quality and effectiveness of the program’s use of merit review process.**

Of the 44 reports reviewed, 40 COVs completed the standard template. Their responses to the questions (yes/no/other) were tabulated directly. The remaining 4 COVs completed templates at a program level and wrote an overarching summary for the division under review. This latter group did not uniformly provide yes/no answers to the questions, so their responses are not included in the numerical tallies. Narrative comments from all reports are summarized.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p><u>COV Comments:</u></p> <p>COVs reported being impressed with the overall quality, consistency, and integrity of the Merit Review process. They note that the review methods maintain a very high standard and that the mix of review methods is sensible, given the range of programs in most divisional portfolios. When there are options for review method, COVs recommended that justification for the choice be included in the proposal review analysis.</p> <p><u>Ad hoc reviews:</u></p> <p>COVs commented that the combination of ad hoc and panel reviews is generally very effective because ad hoc reviewers can complement or supplement the expertise on a panel. In addition, the use of ad hoc reviews can diversify the types of reviewers that are engaged in the merit review process.</p>	<p>Yes: 100%</p>

<p>However, a few COVs reported that ad hoc reviews were not always incorporated into the panel discussion (as evidenced in the panel summary) or weighted equally with the reviews of individual panelists, especially when the perspective of the ad hoc reviewers differed from that of the panelists.</p> <p><u>Virtual or hybrid panels:</u></p> <p>Although COVs generally favored in-person panels, they acknowledged the utility of virtual or hybrid panels, commenting that virtual panels could be very effective, less time-consuming, and less expensive. One COV encouraged a study of virtual and hybrid panels to assess their quality relative to traditional in-person panels.</p> <p><u>Site visits:</u></p> <p>The use of site visits for very large awards was found to be an effective way to balance efficiency and community time with the level of scrutiny appropriate for these types of proposals. One COV encouraged expanding the use of site visits for large, comprehensive and/or institution-wide programs, as well as for capacity-building awards at less mature institutions.</p> <p><u>Internal review:</u></p> <p>COVs found NSF's use of internal review for certain categories of awards appropriate but cautioned that programs should be clear about the difference in funding rates for externally and internally reviewed proposals.</p>	
<p>2. Are both merit review criteria addressed:</p> <p>a) In individual reviews?</p> <p>In their review of proposal files, COVs generally found that both merit review criteria were addressed, although in a small fraction of jackets, Broader Impacts (BI) was not. COVs uniformly note that the reviewer comments on BI are less detailed and often less substantive than those provided on Intellectual Merit (IM). Many COVs recommended continued NSF efforts to educate both researchers and reviewers about BI.</p> <p>Several COVs noted that reviewers did not evaluate proposals' data management plans and a few commented that reviewers did not consistently address solicitation-specific criteria.</p> <p>b) In panel summaries?</p> <p>COVs found that the quality of panel summaries was, in general, higher than that of individual reviews. Nonetheless, a tendency for panel commentary to be less substantive on BI was noted. A few COVs commented that panel summaries for highly recommended proposals were more detailed than those for weaker submissions.</p>	<p>Yes: 88%</p> <p>Yes/No: 12%</p>

<p>c) In Program Officer review analyses?</p> <p>COVs commended program officers for the consistency and thoroughness of review analyses (RAs), noting that they usually pay great attention to articulating how strengths and weaknesses in IM and BI contribute to the decision to award or decline a proposal. COVs did find, however, that RAs were limited and often generic for low-rated, declined proposals.</p> <p><u>Additional COV Comments:</u></p> <p>The vast majority of additional comments made by COVs elaborated on the evaluation of BI. COVs noted that there is still confusion about the nature of BI from all participants in the merit review process – PIs, reviewers, and even program officers. This confusion includes what exactly constitutes BI and how to evaluate its strengths, weaknesses, and likelihood of success. Many COVs recommended additional training for reviewers in this area to improve the feedback that is provided to proposers.</p>	
<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p><u>COV Comments:</u></p> <p>Overall, individual reviews provided substantive detail for both awarded and declined proposals. However, COVs reported finding significant variation in the quality and length of reviewer comments. Regardless, in aggregate for a given proposal, there was appropriate detail regarding strengths, weaknesses, and merit.</p> <p>In addition to concerns raised in question 2(a), COVs noted frequent mismatches between reviewers' comments and their ratings. cursory or inconsistent reviews are seen as particularly problematic in terms of the feedback they provide to PIs when a proposal is not discussed by a panel.</p>	<p>Yes: 70%</p> <p>Yes/No: 28%</p> <p>No: 2%</p>
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p><u>COV Comments:</u></p> <p>COVs found that panel summaries tended to provide a more comprehensive and complete summary of the panel members' assessments – including strengths and shortcomings – than did the individual reviews. However, there was a general sense that the panel summaries did not always explain the rationale for the panel's recommendation nor did they convey how consensus was reached, especially when there were divergent views expressed in ad hoc reviews or among the panelists. COVs emphasized the importance of the feedback to PIs, especially in the case of declined proposals and for early career researchers.</p>	<p>Yes: 83%</p> <p>Yes/No: 15%</p> <p>N/A: 2% (no panels used)</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p>	<p>Yes: 95%</p> <p>Yes/No: 5%</p>

<p><u>COV Comments:</u></p> <p>COVs commended program officers for the extent to which they consider and critically evaluate the strengths and weaknesses of a proposal as assessed by ad hoc reviewers and panelists. They found the explanation of what factored into a decision to recommend an award or declination thorough and clear. COVs reported that the jackets contain all necessary materials; the review analyses (RAs) are thorough and clearly explain the rationale for award and decline recommendations.</p> <p>COVs recommended that the post-panel decision-making process be documented in the jackets, along with copies of e-mail correspondence notifying PIs of an award or decline decision. A few COVs stated that PIs of declined proposals did not receive adequate documentation about the rationale for the decision.</p>	
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p><u>COV Comments:</u></p> <p>In general, COVs found that the rationale for award decisions was clearly communicated to PIs, although the depth of feedback varied among programs and among individual jackets. Detailed and specific feedback from program officers (POs) to PIs is very valuable, especially when award/decline decisions are based on considerations beyond those conveyed in written reviews and/or panel summaries. Many COVs recommended providing additional information when factors such as portfolio balance or alignment with strategic goals influence decisions.</p> <p>While acknowledging the workload involved, several COVs recommended that POs avoid sending award/decline messages that are solely boilerplate text. They noted that providing additional recommendations or pointing out the one or two most significant weaknesses would be beneficial to the PI.</p> <p>Many COVs commented that e-mail and telephone communications were not consistently documented in the proposal jackets.</p>	<p>Yes: 83%</p> <p>Yes/No: 17%</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p><u>COV Comments:</u></p> <p>A few COVs suggested that there should be more substantive evaluation of a proposer's results from prior support and of Data Management plans. Asking explicitly for this information in the review template or instructions would be useful.</p>	

<p>There was a variety of recommendations for additional guidance to and training for reviewers, including more detailed FastLane templates, regional workshops to recruit and offer training to prospective PIs and reviewers, and provision of sample ideal reviews to aid reviewers in preparing their assessments.</p> <p>Several COVs noted uneven content in revised proposals (sometimes called re-submissions) with regard to inclusion of responses to prior reviews. One COV commented that, at other agencies, PIs have the option of having their previous reviews presented to new reviewers, which increases the consistency of feedback.</p>	
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II. Questions concerning the selection of reviewers

COV responses were tallied as for question I.

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p><u>COV Comments:</u></p> <p>Nearly all COVs praised the programs' selection of reviewers, commending their efforts to find a broad range of specific expertise for assessment of the various elements of the proposals, as well as encouraging demographic diversity among reviewers. Nonetheless, most COVs also recommended finding ways to further diversify and expand the pool of reviewers, both to limit reviewer fatigue and to bring in new perspectives.</p> <p>Several COVs commented that there was a general weakness in the breadth of expertise among reviewers of interdisciplinary or multi-disciplinary proposals, while a couple of COVs recommended including documentation of reviewer and/or panelist selection criteria in the proposal jacket.</p> <p>Many COVs expressed surprise at the lack of demographic and institutional details available with which to assess the composition of the reviewer pool.</p>	<p>Yes: 88%</p> <p>Yes/No: 7%</p> <p>Data not available: 5%</p>

<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p><u>COV Comments:</u></p> <p>Every COV said that conflicts of interest (COI) had been handled appropriately. A handful of committees suggested that the COI rules might be too restrictive, limiting the availability of reviewers with relevant expertise, especially in the cases of highly collaborative research and small research communities.</p>	<p>Yes: 100%</p>
<p>3. Additional comments on reviewer selection:</p> <p>Several COVs drew attention to the low representation of reviewers from community or junior colleges, suggesting that increased use of ad hoc reviewers and/or virtual participation might allow these communities to participate. Some COVs made suggestions for technological improvements, such as creating a reviewer database, developing algorithms to help with reviewer selection, and creating a system to track review invitations and responses.</p>	

III. Questions concerning the management of the program under review

<p>MANAGEMENT OF THE PROGRAM UNDER REVIEW</p>
<p>1. Management of the program.</p> <p><u>COV comments:</u></p> <p>COVs generally found that the NSF programs are well-managed, citing the professionalism and dedication of staff at all levels, effective use of the available budget, and clear processes for managing solicitations, merit review, and post-award actions.</p> <p>About a third of COVs remarked on the heavy workload of program officers and administrative professionals. Of these, a few noted apparent morale issues arising from lack of professional development opportunities, staff turnover, and/or the impact of workload on quality of life.</p> <p>Around a quarter of COVs commented about NSF’s use of IPAs (rotators), noting the value brought by their fresh perspectives and expertise. At the same time, the COVs encourage NSF to pay close attention to the potential for lack of consistency and continuity that can arise as a result of turnover</p>

among program officers. A few COVs cited effective practices used by programs to mentor new IPAs and other staff.

A few COVs recommended improving data collection mechanisms and developing strategies to use data to inform decisions about portfolio balance and to evaluate the impact of programs.

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

COV comments:

Nearly all COVs reported that NSF programs are responsive to emerging research opportunities. They noted a variety of mechanisms that are employed, including support for conferences and workshops, cross-directorate co-funding, issuance of Dear Colleague Letters, and funding of EARly concept Grants for Exploratory Research (EAGERs) and Grants for Rapid Response Research (RAPIDs). A few COVs cited specific solicitations or award types that illustrated programs' responsiveness to cutting-edge ideas or topics.

Many COVs commented on the process(es) by which NSF staff keep abreast of emerging opportunities and national or community needs. They cited participation in cross-directorate panels and working groups, service on interagency committees, and attendance at PI meetings and professional conferences as important strategies. A few also noted that programs benefit from employing, as rotators, top researchers who offer up-to-date perspectives on emerging research areas. Another useful strategy is identifying important needs from workshop reports, decadal surveys and National Academies of Science, Engineering and Medicine (NASEM) studies.

A few COVs said that programs were less responsive to emerging educational opportunities than to research opportunities.

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

COV comments:

The majority of COVs stated that the NSF organizations they reviewed had planning and prioritization processes that were well-informed by a combination of workshops, NASEM studies and other types of reports, and the expertise of program officers and management. Most felt that divisions did a commendable job of balancing top-down priorities (those aligned with the NSF strategic plan, for example) with bottom-up, community-driven needs. A few COVs commented that the planning and prioritization processes could be made more transparent to the research community, and that, ideally, those processes would inform strategic goals for their units. These goals are important for informing long-term funding decisions and for articulating to stakeholders what the unit does.

4. Responsiveness of program to previous COV comments and recommendations.

COV comments:

Nearly all COVs said that programs had been responsive to the comments and recommendations of prior COVs. About half cited one or two specific recommendations that had not been implemented or where the program response was judged to be inadequate.

IV. Questions about Portfolio

The use of the template for this question was not uniform across the COV reports reviewed. In some cases, an older template was used and in others, COVs did not answer all of the questions. As a result, no quantitative information was tabulated for this question.

<p style="text-align: center;">RESULTING PORTFOLIO OF AWARDS</p>	<p style="text-align: center;">APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE</p>
<p>1. Does the program portfolio have an appropriate balance of awards across disciplines and sub-disciplines of the activity?</p> <p><u>COV comments:</u></p> <p>The majority of COVs found the balance of awards across disciplines and sub-disciplines within programs’ portfolios to be appropriate. In the words of one COV, “the submissions and the awards cover the breadth of scientific areas relevant to the field and also include investments in emerging topics of importance to the scientific community.”</p> <p>A few COVs commented on specific content area gaps.</p>	
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p><u>COV comments:</u></p> <p>Most COVs said that the level of funding was well-scoped for the work proposed and that the award duration was appropriate. However, over half commented on the challenges caused by relatively flat program budgets.</p>	

<p>While COVs commended the creative approaches that program officers employ to fund as many meritorious proposals as possible, they also expressed concern about the size of awards not keeping up with the rising cost of research. Further, a few COVs commented that the current size of awards may not be large enough to support truly transformative research.</p> <p>A few COVs noted that the typical 3-year award duration is not sufficient to support large field research projects nor efforts requiring long-term data collection. They argued for a careful consideration of award duration, recommending longer cycles in some situations.</p>	
<p>3. Does the program portfolio include awards for projects that are innovative or potentially transformative?</p> <p><u>COV comments:</u></p> <p>In general, COVs agreed that program portfolios contained awards for innovative or potentially transformative projects, with some citing specific examples.</p> <p>One COV said that this question, as posed, was out-of-scope, but it did find direct evidence that the innovativeness and potentially transformative nature of proposals were regular factors in the recommendation for funding.</p> <p>Several COVs recommended that metrics be developed to help gauge the transformative potential or nature of projects.</p>	
<p>4. Does the program portfolio include inter- and multi-disciplinary projects?</p> <p><u>COV comments:</u></p> <p>Nearly all COVs found evidence of interdisciplinary and/or multi-disciplinary projects within the portfolios they reviewed. Most cited co-funding with other programs, divisions, and directorates as a signal of interdisciplinarity. A few COVs noted that the program(s) they were reviewing were already inherently interdisciplinary.</p>	
<p>5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators?</p> <p><u>COV comments:</u></p> <p>The majority of COVs found that the geographic distribution of awards was consistent with national demographics and population densities or with the distribution of research-intensive universities. Most noted that NSF makes a concerted effort to ensure geographic diversity in award portfolios, in some cases citing the role of the Established Program to Stimulate</p>	

<p>Competitiveness Research (EPSCoR) in achieving that goal. However, a few COVs commented that awards seemed concentrated on the coasts, which may simply be reflective of the locations of research-intensive universities in the discipline.</p>	
<p>6. Does the program portfolio have an appropriate balance of awards to different types of institutions?</p> <p><u>COV comments:</u></p> <p>COVs were divided in their responses to this question. While some said that awards were well-balanced across institution types, others found that the majority of awards were made to research-intensive institutions. Nearly all COVs noted the low number of awards to minority-serving institutions (MSIs) and a few also commented on lack of awards to community colleges and primarily undergraduate institutions.</p> <p>COVs recommended a variety of efforts to expand programs' institutional portfolios, including concerted outreach activities, grant-writing workshops, additional publicity about grant mechanisms that are more accessible for less-research-intensive organizations, and recruitment of reviewers from those institutions.</p>	
<p>7. Does the program portfolio have an appropriate balance of awards to new and early-career investigators?</p> <p><i>NOTE: A new investigator is an individual who has not served as the PI or Co-PI on any award from NSF (with the exception of doctoral dissertation awards, graduate or post-doctoral fellowships, research planning grants, or conferences, symposia and workshop grants.) An early-career investigator is defined as someone within seven years of receiving his or her last degree at the time of the award.</i></p> <p><u>COV comments:</u></p> <p>The majority of COVs reported that new and early-career investigators made up an appropriate fraction of the award portfolio, often citing similar funding rates for these populations and more experienced PIs. For a couple of programs where COVs perceived a problem, they suggested additional outreach and perhaps the creation of a distinct category for proposals from new and early career PIs.</p>	
<p>8. Does the program portfolio include projects that integrate research and education?</p> <p><u>COV comments:</u></p> <p>COV findings range from suggesting that integration of research and education in projects is a hallmark of NSF and the most widely cited broader</p>	

<p>impact to saying that, although an education component was included in many projects, it is not strong in the portfolio overall. Most COVs commented about the support for undergraduate and graduate students in awards and several noted that, by definition, CAREER awards (common in many programs) require integration of research and education.</p>	
<p>9. Does the program portfolio have appropriate participation of underrepresented groups¹?</p> <p><u>COV comments:</u></p> <p>COVs were somewhat hampered in their ability to address this question by lack of data. Approximately 25% of PIs do not provide demographic information, so it is difficult to gauge the true diversity of applicants and awardees. Within that limitation, most COVs found that the funding rates for underrepresented groups (by gender, race and/or ethnicity) were comparable to those for the majority population. Nonetheless, the majority of COVs expressed concern about the size of the pool of submissions and encouraged programs to engage in outreach activities to expand the population of PIs proposing to NSF.</p> <p>Only a few COVs commented on other populations, such as those with disabilities or military veterans, noting their continued underrepresented among PIs.</p>	
<p>10. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports.</p> <p><u>COV comments:</u></p> <p>COVs uniformly said that the programs they reviewed were funding work that is highly relevant to national priorities and the NSF mission. Many also highlighted how the funding from NSF programs addressed the recommendations of disciplinary professional societies and directorate advisory committees.</p> <p>The citations provided by the COVs included reports from the National Academies of Science, Engineering and Medicine, reports of the National Research Council, publications in top-ranked journals, and White House Executive Orders and policy documents, among others.</p>	

¹ NSF does not have the legal authority to require principal investigators or reviewers to provide demographic data. Since provision of such data is voluntary, the demographic data available are incomplete. This may make it difficult to answer this question for small programs. However, experience suggests that even with the limited data available, COVs are able to provide a meaningful response to this question for most programs.