

CORE QUESTIONS and REPORT TEMPLATE for FY 2019 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2019 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2019. Specific guidance for NSF staff describing the COV review process is described in the “COV Reviews” section of NSF’s Administrative Policies and Procedures which can be obtained at <https://inside.nsf.gov/tools/toolsdocuments/Inside%20NSF%20Documents/COV%20Policy%20and%20Procedures%20070915.pdf>¹.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. COV reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations; and (2) program-level technical and managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may add questions relevant to the activities under review. Copies of the report template and the charge to the COV should be provided to OIA prior to forwarding to the COV. In order to provide COV members adequate time to read and consider the COV materials, including proposal jackets, COV members should be given access to the materials in the eJacket COV module approximately four weeks before the scheduled face-to-face meeting of the COV members. Before providing access to jackets, the Conflict of Interest and Confidentiality briefing for COV members should be conducted by webinar, during which, NSF staff should also summarize the scope of the program(s) under review and answer COV questions about the template.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at <http://budg-eis-01/eisportal/default.aspx>. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

For programs using section IV (addressing portfolio balance), the program should provide the COV with a statement of the program’s portfolio goals and ask specific questions about the program under review. Some suggestions regarding portfolio dimensions are given on the template. These suggestions will not be appropriate for all programs.

Guidance to the COV: The COV report should provide a balanced assessment of NSF’s performance in the integrity and efficiency of the **processes** related to proposal review. Discussions leading to answers of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. **COV reports should not contain confidential material or specific information about declined proposals.** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see <http://www.nsf.gov/od/oia/activities/cov/>.

¹ This document has three parts: (1) Policy, (2) Procedures, and (3) Roles & Responsibilities.

FY 2019 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: November 8–9, 2018
Program/Cluster/Section: Division-Wide COV for the Division of Undergraduate Education: <ul style="list-style-type: none"> • Advanced Technological Education (ATE) (FYs 2015–2017) • Improving Undergraduate STEM Education (IUSE: EHR) (FYs 2015–2017) • NSF Scholarships in STEM (S-STEM) (FYs 2014–2017) • Robert Noyce Teacher Scholarship Program (FYs 2014–2017) • I-Corps for Learning (I-Corps L) (FYs 2015–2016)
Division: Division of Undergraduate Education (DUE)
Directorate: Directorate for Education and Human Resources (EHR)
Number of actions reviewed: Awards: 275 Declinations: 371 Other: 0
Total number of actions within Program/Cluster/Division during period under review: 7,066 Awards: 1,800 Declinations: 5,265 Other: 1 (proposal that was Returned without Review)
Manner in which reviewed actions were selected: There were 7,066 proposals (3,682 IUSE proposals, 597 ATE proposals, 611 Noyce proposals, 1,940 S-STEM proposals, 196 supplement proposals, and 40 I-Corps L proposals) in the initial set. The COV chair was asked to name several digits between “0” and “9” that would be used to select a subset of proposals based on their occurrence as the last digit in the proposal number. The chair chose “7.” After selecting all jackets ending in “7,” a more than sufficient number of projects were available. That set of projects was reduced by deleting jackets at regular intervals in the list until a total of 646 awards and declines was reached. The 646 proposals included 224 collaborative proposals; the number of unique projects in the sample is 422.

COV Membership

	Name	Affiliation
COV Chair:	Catherine M. Casserly	Hewlett Foundation
COV Members:	Elizabeth A. Burroughs	Montana State University
	Garikai Campbell	Knox College
	Lesia L. Crumpton-Young	Tennessee State University
	Lizanne DeStefano	Georgia Institute of Technology
	Christopher J. Harris	WestEd
	José Herrera	Mercy College
	Victoria L. Interrante	University of Minnesota
	Dyan L. Jones	Mercyhurst University
	Judy Kasabian	El Camino College
	Eve A. Riskin	University of Washington

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. ([PAPPG Chapter II.C.2.d.\(i\)](#) 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 [PAPPG Chapter II.C.2.d.\(i\)](#), 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 knowledge.² “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.”

² [NSB-MR-11-22](#)

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's 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 four fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) 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.

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>Comments:</p> <ul style="list-style-type: none"> • DUE has effectively managed the increase in the number of proposals over the past several years. • The predominant method of review was panel review. Both virtual and face-to-face panels were employed. Panel sizes ranged from 5 to 12 members. Proposals generally received 3-6 reviews. The procedure for choosing the method of review was not clear to the COV members. • In some cases when additional expertise was needed, ad hoc reviews were used to supplement panel reviews. • The type of review (virtual, face-to-face, etc.) was available in the pull down menu in the eJacket file, but it was difficult for the COV to use this distinction in its analysis. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends DUE clarify for the next COV the guidelines Program Officers (POs) use in determining whether to convene a virtual or a face-to-face panel, and to understand whether/when DUE uses site visits as a review method. • In material provided for COV review, in addition to word count as a criterion for comparison between virtual and face-to-face reviews, other metrics should be included such as the quality of panelists and panel summaries, panel consensus, and final project outcomes. <p>Suggestions:</p> <ul style="list-style-type: none"> • Future COVs could be provided data about the number of proposals assigned to each reviewer during the review panel. This could be correlated with the word count metric to assess the impact of reviewer burden on review quality. 	<p>YES</p>

<ul style="list-style-type: none"> • Future COVs should receive a representative sample of all the different types of reviews that were conducted in DUE. Perhaps what this COV received was representative. No site visits showed up in our review, so perhaps none were completed in DUE during this period. If no site visits were conducted for the DUE, the COV inquires “why not?” The COV is unsure of how site visits are used and believes that they could be particularly useful for larger awards. <p>Data Source: Jackets; DUE Overview, Section 0.0.1.1; COV Documents, Section 2.4 (Program Management Plans)</p>	
<p>2. Are both merit review criteria addressed</p> <ul style="list-style-type: none"> a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? <p>Comments:</p> <ul style="list-style-type: none"> • The COV noticed that the discussion on Broader Impacts in individual reviews and panel summaries typically had less detail and critique than the discussion of Intellectual Merit. • POs tended to address Broader Impacts thoroughly and consistently in their review analysis. • The video clips used to prepare reviewers were excellent. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends that the video training be expanded to include more examples of Broader Impacts as a means of improving reviewers' treatment of this criterion. • DUE provided word count as a metric for analyzing quality of review; while this analysis is helpful, more qualitative analysis is needed. DUE would benefit from routine use of qualitative analysis software tools (e.g., NVivo, Provalis Research Text analytics, ATLAS.ti) for more substantive analysis of reviews. <p>Data Source: Jackets; DUE Overview, Section 0.0.1.2</p>	<p>YES</p>

<p>3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <ul style="list-style-type: none"> In general, the reviewers provided substantive comments, though there was quite a bit of variability within and across panels. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV recommends incorporating writing tools into the Panel Review System to aid in providing readable and useful reviews (spelling and grammar check, formatting, etc.). The implicit bias training provided to reviewers is helpful; however, the COV recommends that instructions to reviewers also include examples of both preferred language and language to avoid. Panelists would also benefit from reviewing examples of mock “substantive” and “weak” reviews and discussing what makes them “substantive” or “weak”. <p>Suggestion:</p> <ul style="list-style-type: none"> The COV would benefit from an understanding of how proposals are assessed vis-à-vis budgets, and if any third party vendors are engaged for analyses. More information on this process, if appropriate, would be useful to include in future COV reviews. <p>Data Source: Jackets; DUE Overview, Section 0.0.1.3</p>	<p>YES</p>
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments:</p> <ul style="list-style-type: none"> In some cases, the panel summaries seemed to be a cut and paste from an original individual panel review and did not capture the panel discussion and decision process. The COV is concerned that individual bias may be introduced into the summary review by having one reviewer summarize the full panel, giving preference to their viewpoint and not reflecting panel differences. The “Panel Recommendations” field was used inconsistently throughout the panel summaries. For some panels it was blank; others included a recommendation. <p>Recommendations:</p> <ul style="list-style-type: none"> An explicit strategy should be put in place to strengthen the process by which panel summaries are written. The current process of assigning one of the primary reviewers to write the panel summary and asking other reviewers to “sign off” does not seem robust enough to produce panel summaries that reflect consensus or lack thereof. The COV recommends a process in which the person writing the panel summary is someone other than a primary reviewer. The Panel Summarizer should read the proposal, listen to the panel discussion, and have access to the individual reviews, but develop the panel summary 	<p>NO</p>

<p>independently of the individual reviews. This will help avoid the “cut-and-paste-from-their-own-review” issue.</p> <ul style="list-style-type: none"> • There may be value in explicitly encouraging (through a text prompt) the panel summary writer to include dissenting opinions when consensus was not reached. • Panelists need to be encouraged to ensure the summary is independent of the panel summary writer's review before signing off. There needs to be a shared responsibility across the panel that the review is reflective of the group's deliberation and recommendation. • As another strategy for improving panel summaries, a chair could be appointed from among panel members to oversee the production of quality panel summaries. That person would not do individual reviews but would focus on producing high quality panel summaries and getting sign off from panel members. <p>Data Source: Jackets; DUE Overview, Section 0.0.1.4</p>	
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>[Note: Documentation in the jacket usually includes a context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.]</p> <p>Comments:</p> <ul style="list-style-type: none"> • The POs did an excellent job in stating the rationale for the award/decline decision and aligning that decision with the context statements. In cases where the panel summary did not capture panel consensus or differing viewpoints, the POs often went back to the individual reviews and provided information on the panel process in the jacket documentation. <p>Data Source: Jackets; DUE Overview, Section 0.0.1.5</p>	YES
<p>6. Does the documentation to the PI provide the rationale for the award/decline decision?</p> <p>[Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written in the PO Comments field or emailed with a copy in the jacket, or telephoned with a diary note in the jacket) of the basis for a declination.]</p> <p>Comments:</p> <ul style="list-style-type: none"> • POs consistently provided documentation to the Principal Investigators (PIs) regarding the rationale for the award/decline decision, often in some detail. For example, some POs explained the misunderstandings of individual reviewers to the PI and indicated that those misunderstandings did not influence the decision. 	YES

<p>Recommendation:</p> <ul style="list-style-type: none"> The COV recommends that DUE explore the use of enhanced boilerplate language or a rubric to inform declines, particularly for first time submitters/reviewers, in order to save PO time and potentially improve the quality of feedback to PIs. <p>Suggestion:</p> <ul style="list-style-type: none"> The COV suggests that DUE explore software that would allow for the integration and separation of the PO comments with the boilerplate, so that PO comments could be easily identified for effective analysis and review. <p>Data Source: Jackets; DUE Overview, Section 0.0.1.6</p>	
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>Comments:</p> <ul style="list-style-type: none"> Some POs routinely encourage resubmission; others encourage resubmission on selected proposals only. PIs take POs' encouragement to resubmit very seriously. Discussion with a subset of POs indicated that encouraging resubmission was at the discretion of the individual PO and was used sparingly. A COV review of declined applications in the provided sample indicated that resubmission was encouraged in more than 50% of the sample. Some POs spend a great deal of time giving constructive feedback on declined proposals. Other POs tend not to do this. The COV is curious about what happens to declined proposals. It is unclear what support and tracking exist for proposals that are innovative and potentially transformative but are declined. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV recommends that DUE explore the criteria that POs use to encourage resubmission, and judge the consistency and propriety of that advice to the PIs. The COV recommends that DUE clarify its role and responsibility to provide feedback and work with POs to enact that role. 	

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.

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>Comments:</p> <ul style="list-style-type: none"> • The COV commends the DUE POs for convening appropriately diverse and expert panels. • Scientific disciplinary expertise is well aligned with the needs of the panels, but it was not always the case that there was a thorough representation of types of institutions or sectors. • Reviewers’ educational research and evaluation expertise was not always clear; while it may be the case that panels have the appropriate expertise, this information was not readily available by examining the jackets. • Gender balance in the panels seems well addressed throughout. • The COV noted ongoing questions about process that were also raised in the last set of COV reports concerning the training and mentoring of review panelists. The COV discussed that DUE could explore more sophisticated methods of identifying, inviting, and training quality reviewers. <p>Recommendation:</p> <ul style="list-style-type: none"> • The COV recommends that future COVs have access to information about reviewers’ expertise or qualifications in educational research or evaluation. <p>Suggestions:</p> <ul style="list-style-type: none"> • The COV suggests that DUE consider requesting feedback from PIs regarding the quality and helpfulness of reviews they have received in order to assist POs in forming future panels composed of reviewers who provide quality reviews. • Active mentoring of all panelists by POs may be a mechanism for improving the quality of panel summaries, which would in turn reduce the burden on POs at the time of writing review analyses and PO comments. For example, POs could actively train reviewers in advance of the panel meeting. One way this could be done is by implementing a requirement for panelists to submit a draft review to the PO for feedback before they create the reviews of their whole set of assigned proposals. 	<p>YES</p>

<p>Data Source: Jackets; DUE Overview, Section 0.0.2.1; COV Documents, Sections 3.1 (Reviewer Disciplines and Institution Types) and 3.2 (Types of Reviews)</p>	
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments:</p> <ul style="list-style-type: none"> • The procedure that the NSF and DUE has in place for identifying COIs is appropriate. • The COI process relies on the integrity of the reviewers to identify conflicts; this is appropriate. The COV would not have a way of independently identifying any COIs without them being self- or systematically-identified. <p>Data Source: Jackets; DUE Overview, Section 0.0.2.2; COV Documents, Sections 3.3 (Proposals with Reviewer COIs), 3.4 (Reviewer Instructions), and 3.5 (Reviewer Webinar Information)</p>	<p>YES</p>
<p>3. Additional comments on reviewer selection:</p> <p>Comments:</p> <ul style="list-style-type: none"> • The COV would benefit from understanding how DUE identifies great reviewers and how the Division retains them. It was not clear what, if any, incentives are offered to high quality reviewers. • The COV discussed the desire to make use of highly qualified reviewers who represent diverse perspectives, while recognizing the intensive time required to be a panelist and the need to not overburden highly qualified reviewers with too-frequent requests to review. <p>Suggestions:</p> <ul style="list-style-type: none"> • The COV suggests that DUE explore the effects of teaching load of faculty members on their ability to participate in the panel review process. • The COV suggests that DUE provide a value proposition to institutions to incentivize them to allow faculty to participate in panel reviews. As an example, NSF and DUE could send Dear Colleague letters to presidents and provosts. • The COV suggests that DUE establish a system to recommend an appropriate frequency for an individual to serve as a reviewer. 	

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.

Comments:

- This division has done an excellent job of retaining well qualified and knowledgeable POs and staff across all four programs.
- Communication within the division among POs and staff is a strength, and the COV noted the excellent quality and consistency of communications and information with all involved.

Recommendation:

- Based on comments in the “FY 2014-2017 Division Overview” document that was given to the COV, it appears that POs are burdened with heavy program and jacket responsibilities. Accordingly, the COV recommends that an assessment of workload be conducted to help identify the appropriate staffing and PO workload.

Suggestion:

- In regard to programs that have tiered award structures, the COV suggests that DUE consider tracking and reporting the progression of awards to funding at higher levels.

Data Source: DUE Overview, Section 0.0.3.1; COV Documents, Section 2.4 (Program Management Plans)

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

Comments:

- The COV noted that all the programs have regularly reviewed and updated their solicitations.
- The COV lauds the development of logic models in each of the programs.
- The COV felt that each of the programs within DUE is appropriately structured to broaden participation and reduce barriers faced by some institutions.
- The COV commends the Noyce Program for focusing on broadening participation of historically underserved and underrepresented K-12 student populations in STEM via encouragement and in the program’s further support of STEM majors and professionals to become teachers in high-need K-12 schools.
- The portfolio of S-STEM awards demonstrates that students from underrepresented groups are being supported to pursue majors in STEM fields.
- The COV applauds the positive changes in the S-STEM program to allow for up to 40% of the funds to be used for student programs, research, and other supporting elements, as well as the evolution to include three tracks that support current educational needs.
- The syncing of the S-STEM award dates and the timing of financial aid packages on college campuses is commended and enhances the administration and impact of the program.

Recommendations:

- In the S-STEM program, the COV recommends that DUE review the process for determining student financial need and award size to ensure that the students are receiving the amount of scholarship support necessary for matriculation. This recommendation is based on national reports documenting that financial affordability is one of the greatest barriers to student persistence and graduation for low income and first-generation students.
- In the S-STEM program, because the maximum dollar amount of individual student scholarship awards has remained unchanged for 13 years while the cost of education has risen consistently, the COV recommends that the maximum scholarship limits be reviewed.
- The COV recommends the reconsideration of the requirement that S-STEM PIs must be “teaching” in a STEM field, as some PIs may have administrative responsibilities that preclude their ability to teach regularly and administrative experiences that enhance the success of the S-STEM program.

Suggestion:

- Some COV members noted that the detailed reporting of institution-level data required for S-STEM proposal preparation could be onerous for individual PIs and suggested that DUE consider the balance between institutional accountability and PI workload.

Data Source: DUE Overview, Section 0.0.3.2

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

Comments:

- It appears the POs are effective at leveraging the current research literature and NAS reports to set direction and vision for solicitations.
- The COV recognizes that the Division’s leadership has solicited input from the reviewers at the end of each panel and uses this input to guide the advancement of the individual programs.
- The COV commends DUE for engaging a variety of stakeholders when identifying new horizons for programmatic elements and new directions.

Data Source: DUE Overview, Section 0.0.3.3

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

Comments:

- S-STEM has been very responsive to including additional dollars that can be used in the award to support research and other programmatic components beyond individual student scholarships; however, it is not clear if other initiatives were taken up subsequently based on previous COV suggestions.
- The responsiveness of other programs to previous COV comments and recommendations appears thorough.

Data Source: DUE Overview, Section 0.0.3.4; COV Documents, Sections 1.3.1 and 1.3.2 (COV Reports, Responses, and Updates)

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

<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>Comments:</p> <ul style="list-style-type: none"> • The Noyce solicitation does an excellent job of developing institutionally diverse portfolios despite the solicitation’s complexity. • ATE has a good balance between the “New to ATE” track, projects, and regional/national centers. ATE awards exhibit a good balance between the varied CTE fields as well as reaching individual institutions, collaborations between institutions, and regional/national centers. • IUSE and S-STEM have an appropriate balance of awards across STEM disciplines. • The COV commends the four programs for having almost 40% of all awards be inter-/multi-disciplinary; although it is unclear whether this yields improved outcomes. <p>Data Source: Jackets; DUE Overview, Section 0.0.4.1</p>	<p style="text-align: center;">APPROPRIATE</p>
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments:</p> <ul style="list-style-type: none"> • The COV notes that the increase in award size in S-STEM is an appropriate change in order to reflect the scope of the projects awarded. • The COV noted that the mean duration of ATE awards has decreased by 0.5 years, but the mean award size was relatively stable. <p>Data Source: Jackets; DUE Overview, Section 0.0.4.2</p>	<p style="text-align: center;">APPROPRIATE</p>
<p>3. Does the program portfolio include awards for projects that are innovative or potentially transformative?</p> <p>Comments:</p> <ul style="list-style-type: none"> • The new S-STEM program allows for greater innovation. • The Noyce program has improved the likelihood to develop educational innovations, particularly with respect to the new structure of the program. • ATE is ideally suited to look at projects that are innovative. ATE does a great job being responsive to industry needs while seeking out innovative and transformative projects. 	<p style="text-align: center;">DATA NOT AVAILABLE</p>

<ul style="list-style-type: none"> • IUSE is inherently innovative by definition. <p>Recommendations:</p> <ul style="list-style-type: none"> • Future COVs should be provided a rubric that defines innovative and transformative in order to better answer this question. <p>Data Source: Jackets; DUE Overview, Section 0.0.4.3</p>	
<p>4. Does the program portfolio include inter- and multi-disciplinary projects?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Yes, the program portfolio includes inter-/multi-disciplinary projects at a level of 38.4% <p>Data Source: Jackets; DUE Overview, Section 0.0.4.4</p>	APPROPRIATE
<p>5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators?</p> <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends that DUE investigate the barriers faced by institutions in underserved geographic areas regarding proposal submission and awards. This was especially notable for Puerto Rico, Nevada, and Wyoming – which was particularly unfortunate given that they are EPSCoR states. • The COV recommends an analysis of the awards with respect to the capacity of PIs to build relationships with POs. The COV notes, for example, that there may be unintentional bias introduced due to proximity to NSF Headquarters (e.g., DC, Delaware, Virginia, North Carolina, and Pennsylvania) impacting relationships and awards. <p>Suggestion:</p> <ul style="list-style-type: none"> • The COV suggests that DUE consider outreach to US Territories which are underserved by DUE awards. <p>Data Source: DUE Overview, Section 0.0.4.5; COV Documents, Section 4.2.1 (Geographic Distribution of Awards)</p>	NOT APPROPRIATE
<p>6. Does the program portfolio have an appropriate balance of awards to different types of institutions?</p> <p>Comments:</p> <ul style="list-style-type: none"> • It is clear that ATE has made a significant impact on the two-year college sector. • The COV noted a good balance between awards across minority serving institutions through 2016 but expressed concern about the downturn in awards to those institutions in 2017. 	APPROPRIATE

<p>Recommendation:</p> <ul style="list-style-type: none"> The COV recommends that the data reporting of awards by type of institution (two-year college, bachelor's, master's, Ph.D) be disaggregated by number of institutions and percent of proposals submitted to DUE, by program. <p>Data Source: DUE Overview, Section 0.0.4.6; COV Documents, Section 4.2.2 (Awardee Institution Types)</p>	
<p>7. Does the program portfolio have an appropriate balance of awards to new and early-career investigators?</p> <p>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.</p> <p>Comments:</p> <ul style="list-style-type: none"> The COV suggests data be presented to distinguish new versus early-career investigators as there may not be a direct overlap. Assuming a benchmark of 25% of awards to early-career investigators, the data provided to the COV seem to be slightly lower than expected. However, the COV reiterates that this benchmark should likely vary across programs. The COV notes that IUSE and ATE have a track for supporting new/early investigators. <p>Recommendation:</p> <ul style="list-style-type: none"> The COV recommends that DUE make explicit in all program solicitations any expectations about the appropriateness of an award for new/early career investigators. For example, if preferred or only appropriate for an experienced faculty to lead, it should be so stated. <p>Data Source: DUE Overview, Section 0.0.4.7; COV Documents, Section 4.3 (PI Demographics)</p>	<p>DATA NOT AVAILABLE</p>
<p>8. Does the program portfolio include projects that integrate research and education?</p> <p>Comments:</p> <ul style="list-style-type: none"> The COV commends DUE for its 65% integration of education and research in the program portfolio. The COV notes the increased prioritization of research in the S-STEM program. <p>Suggestion:</p> <ul style="list-style-type: none"> The COV suggests that DUE give attention to the role of research in education and training. 	<p>APPROPRIATE</p>

<p>Data Source: Jackets; DUE Overview, Section 0.0.4.8</p>	
<p>9. Does the program portfolio have appropriate participation of underrepresented groups³?</p> <p>Comments:</p> <ul style="list-style-type: none"> • While the COV recognizes the historical efforts being made, the COV expresses concern about the drop in HBCUs, MSIs, and HSIs receiving funding, which appears in the data for 2017. <p>Suggestion:</p> <ul style="list-style-type: none"> • The COV suggests that DUE investigate whether this is due to lower funding rates for these institutions, lower numbers of proposals submitted, or both. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends that DUE provide data on the distribution of award sizes across the various sectors and PI (and targeted student) demographics. This should include data on institutional partnerships. • The COV recommends other categories such as gender distribution and disability status be addressed in the data provided. The next COV should be provided a broader set of demographic data. <p>Data Source: DUE Overview, Section 0.0.4.9; COV Documents, Section 4.3 (PI Demographics)</p>	<p>NOT APPROPRIATE</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>Comments:</p> <ul style="list-style-type: none"> • These programs provide upward mobility for families and access to viable careers. <ul style="list-style-type: none"> ○ For example, see the economic-mobility work of Raj Chetty of Harvard (formerly Stanford). Citations: Chetty, R., Grusky, D., Hell, M., Hendren, N., Manduca, R., & Narang, J. (2017). "The fading American dream: Trends in absolute income mobility since 1940." <i>Science</i>, 356(6336), 398-406, and Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). "Where is the land of opportunity? The geography of intergenerational mobility in the United States." <i>The Quarterly Journal of Economics</i>, 129(4), 1553-1623. 	<p>APPROPRIATE</p>

³ 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.

<ul style="list-style-type: none"> • DUE contributes to the national priority of broadening participation in STEM. • DUE has contributed financial and intellectual support to the development of national reports. Many national reports cite the work of DUE-funded projects in the setting of their priorities and planning. <p>Data Source: Jackets; DUE Overview, Section 0.0.4.10</p>	
<p>11. Additional comments on the quality of the projects or the balance of the portfolio:</p> <p>No additional comments.</p>	

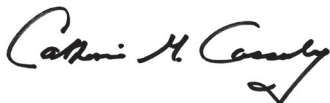
OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.
 - DUE would benefit from mentorship and guidance to help new awardees become better leaders.
 - Several DUE programs have mentoring programs to pair experienced grant writers with new grant writers to increase diversity in the grant pool.
 - Suggestion:
 - The COV suggests that DUE explore emerging ways to characterize PIs' leadership and commitment as well as how that leadership and expectation is conveyed at the proposal review stage. It may be helpful for program staff to make their definition of leadership more explicit to reviewers.
2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.
 - No comments needed.
3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.
 - The COV is concerned about the continued challenge of disseminating to the relevant communities the knowledge that results from DUE grant awards.
 - Recommendations:
 - The COV recommends an examination of the program award data to minimize select agencies and institutions from receiving disproportionate awards of funding in various ways.
 - The COV recommends that DUE attend to and track resubmissions of underdeveloped but high promise applications. The COV recommends an analysis on this issue in each of the programs.
4. Please provide comments on any other issues the COV feels are relevant.
 - The COV understands the heavy workload of program staff and it seems as if eJacket/Fastlane has not adapted to the contemporary approaches for scaffolding and assisting reviewers to write competent reviews (e.g., platforms like Grammarly). This would allow POs to do a more efficient and perhaps more effective job.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.
- The COV commends DUE on the thorough first attempt of a self-study that encompasses all programs. The data could benefit from a more thorough analysis and the use of more modern tools.
 - Recommendations:
 - The COV recommends that access to the eJacket be made farther in advance of the COV webinar orientation training.
 - The checklist provided was exceedingly helpful. For future COVs, it is recommended the long COV documents be accompanied by a similar checklist and much farther in advance of the COV meeting. It was unclear what the responsibilities of the individual COV members were, especially in advance of the convening. DUE should include more explicit instructions and provide eJacket information more than a week in advance.
 - Suggestions:
 - The COV encourages DUE to provide aggregate data and also data disaggregated by program. It would be helpful for DUE to explore the development of data dashboards aligned with the COV prompts used in this review.
 - The COV notes that the design of the eJacket COV Module is sub-optimal. The COV suggests all documents be downloadable in one click and organized. All documents should be viewable in the browser.
6. To manage workload and increase time for value-added activities such as personal consultations with PIs, should DUE eliminate PO Comments and automate the production of Review Analyses for declines? For example, some divisions outside EHR use the same Review Analysis for all declines in a particular competition.
- An automated system with a dropdown menu might help to reduce PO workload while still providing some feedback to declined PIs and could be evaluated after a sufficient period of time.
 - Suggestion:
 - The COV suggests a comprehensive analysis of upgrading the quality and efficiency of the panel summaries, review analysis, and comments to the PIs to optimize and reduce the burden on the POs.

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SIGNATURE BLOCK:



For the Committee of Visitors for the Division of Undergraduate Education
Catherine M. Casserly
Chair