

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/Policy,%20Procedures,%20Roles%20and%20Responsibilities%20for%20COV%20Reviews%20and%20Program%20Portfolio%20Reviews.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: October 17-18, 2019
Program/Cluster/Section: Division-Wide COV for the Division of Research on Learning: <ul style="list-style-type: none"> • Advancing Informal STEM Learning (AISL), FYs 2015-2018 • Discovery Research preK-12 (DRK-12), FYs 2015-2018 • EHR Core Research (ECR), FYs 2017-2018 • Innovative Technology Experiences for Students and Teachers (ITEST), FYs 2015-2018 • STEM-C Partnerships/STEM + Computing K-12 Education (STEM+C), FYs 2015-2018
Division: Division of Research on Learning (DRL)
Directorate: Directorate for Education and Human Resources (EHR)
Number of actions reviewed: 640 Awards: 83 Declinations: 546 Other: 11 (proposals Returned without Review)
Total number of actions within Program/Cluster/Division during period under review: 7,100 Awards: 1,328 Declinations: 5,638 Other: 134 (proposals Returned without Review)
Manner in which reviewed actions were selected: There were 7,100 proposals in the initial set. The COV chair was asked to choose 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 “1” as her first digit. After selecting all jackets ending in “1,” 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 640 awards and declines was reached. The 640 proposals included 291 collaborative proposals; the number of unique projects in the sample is 349.

COV Membership

	Name	Affiliation
COV Co-Chairs:	Okhee Lee	New York University
	Darryl Williams	The Franklin Institute
COV Members:	Angela Calabrese Barton	University of Michigan
	Marta Civil	University of Arizona
	James Dorward	Utah State University
	Barbara Means	Digital Promise
	Hari Narayanan	Auburn University
	Ross Nehm	Stony Brook University
	Lance Pérez	University of Nebraska – Lincoln
	Julie Sarama	University of Denver
Guillermo Solano-Flores	Stanford University	

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, declines, 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"> • The review methods were generally appropriate; most involved panel reviews, as opposed to ad hoc reviews or site visits. • The COV believes that when proposals receive mixed reviews, or when there are unique expertise needs, there can be value in a fourth, ad hoc review. • It was not clear why an ad hoc reviewer was brought in in some cases. As such, there should be an institutional record of the criteria for requesting an ad hoc review, including at what point in the process the review is requested. • The COV notes that the Division does not explicitly describe the criteria or internal processes that are used to determine the need for site visits, selection of projects for site visits, or the methods used to review these selected projects. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends the Division consider conducting a study of the value added by a fourth reviewer (for example, as done in the ECR program) for certain types of proposals (e.g., transformational or those requiring expertise in content, methodology, and context), or for proposals with certain rating patterns (e.g., divergence across the first three reviews AND one or more Excellent or Very Good ratings). 	<p>YES</p>

<ul style="list-style-type: none"> The COV encourages the Division to consider implementing an explicit policy and process for adding a fourth reviewer, and to make the rationale for adding a fourth reviewer explicit and consistent across programs. <p>Data Source: eJacket COV Documents, see Section 2 for each Program Management Plan; see Section 5 for Reviewer Webinars for each Program</p>	
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>b) In panel summaries?</p> <p>c) In Program Officer review analyses?</p> <p>Comments:</p> <ul style="list-style-type: none"> The COV notes variation in quality and depth of individual reviews, panel summaries, and Program Officer (PO) reviews - especially with respect to the Broader Impacts criterion. Reviewers did not seem to respond to the “Additional Solicitation Specific Review Criteria” in some cases. The direction about how the “five review elements” should be considered is unclear and seems to be interpreted in different ways. There were some cases of inconsistencies between the rating and the review. There were some cases where the needed balance between conceptual and methodological reviewer comments was not clearly evident. The COV felt that the inclusion of the Broadening Participation (BP) emphasis in the AISL and ITEST solicitations (including in the “Additional Solicitation Specific Review Criteria”) is important. However, the COV was not sure why the BP emphasis is only included in AISL and ITEST but not in all programs. Moreover, the COV was not sure why within AISL and ITEST it was left up to the investigators as to whether the BP emphasis would be applied. In this case, the process is not clear in terms of how this is handled from a decision-making perspective by program officers and NSF broadly. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV encourages the continued training of reviewers on the Broader Impacts criterion. The COV encourages greater clarity of the criterion itself. The COV encourages NSF to continue promoting a strong balance of reviewer experience and expertise for each proposal. 	<p>YES</p>

<ul style="list-style-type: none"> • In order to better characterize submitted proposals for matching with reviewer expertise, text mining can be helpful, but asking the investigators to characterize their proposals at submission time with keywords included in the project summary or description (or supplementary document) may provide even more value to POs. • The COV encourages further work with framing what BP is and may be, especially in light of ongoing knowledge production and changing societal contexts in the U.S. • The COV encourages POs to continue providing substantive comments, due to wide variations in reviews and new Principal Investigators (PIs). • The COV was comfortable with cases of triaged proposals that did not receive a detailed PO Review Analysis because individual reviews were detailed. • The COV notes the quality of reviews has improved over time, but there is still variation. The COV recommends review of panelist workloads to identify opportunities to improve the quality of the reviews. • The COV recommends clarity on the “transformational” and “innovative” aspect of the review criteria, which may impact how reviewers review and rate proposals. <p>Data Source: Jackets</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"> • The COV commends the different approaches the Division utilizes to encourage reviewers to consistently provide substantive and meaningful review comments through webinars, the training video, PO instructions at the start of panels, and PO reviews of panel summaries and individual reviews at the end of panels. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends the Division continue improving consistency in these activities for all panels in a particular program in order to reduce variability across panels within the same program. Continuing to provide reviewers with detailed and concrete guidance on how to conduct high quality reviews should remain a high priority. • The COV encourages POs to make time for panelists to reflect on their reviews and to ensure the comments are constructive, realistic, and consistent with their proposal ratings. <p>Data Source: Jackets</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"> • Overall, panel summaries provide a rationale for the panel consensus or reasons consensus was not reached. <p>Data Source: Jackets</p>	<p>YES</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"> • POs’ analyses were especially detailed when the reviews and award decision were discordant. The COV observed several cases in which the funding decision varied from the panel consensus and agreed that the POs provided detailed analyses to justify the final decisions. • The “Reviews in Conflict with Recommendation” section within the Review Analysis template is valuable and should continue to be used. It is important to provide justifications for anomalies. • There is good boilerplate text that discusses the alignment of the proposal with the program portfolio, which is especially useful in explaining why some higher quality proposals are not funded. • The COV was not clear about the rationale for using the “second read” process and would recommend more transparency. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends enhancing the boilerplate text (in the Context Statement and/or the PO Comments) regarding consideration of the portfolio and the number of proposals. • The COV recommends ensuring that the documentation in the jacket clearly explains why a proposal with discordant reviews does or does not enhance the portfolio. <p>Data Source: Jackets</p>	<p>YES</p>
<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</p>	<p>YES</p>

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.]

Comments:

- Overall, the documentation provides the rationale for the award/decline decisions. The low funding rate suggests that program officers are declining many proposals highly rated by panels.

Recommendations:

- The COV encourages continuous improvement of the clarity, transparency, and protocols associated with the justification of the funding decision process.

Data Source: Jackets

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

Comments:

- The COV acknowledges the relationship between the budget allocation and the quality of the merit review process, and the challenges associated with that relationship. The COV also notes heavy workload of the reviewers and POs.
- The COV notes there is room for improvement in collecting reviewer information (within institutional restraints) beyond the current reviewer grids. The COV suggests improving how the information is organized so POs can utilize it more effectively.
- The COV notes that the "potentially transformative" aspect in the review criteria would benefit from further clarification and consistency in application.
- The COV agrees the processes by which POs sometimes identified weaknesses with a proposal that were not indicated by any of the individual reviews are appropriate but should be more transparent. This is especially important for proposals that are rated low by one or more reviewers, but eventually awarded.

Recommendations:

- The COV recommends adding "strengths" and "weaknesses" to the templates to encourage reviewers to provide further clarity in their responses.

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"> • In general, the selection of reviewers appears appropriate. There were a few instances where it appeared that a greater diversity of expertise among the assigned reviewers would have improved the review process, though it is possible that additional expertise was represented on the panel and thus reflected in the panel summary. • The COV acknowledges the challenges with forming panels and obtaining qualified reviewers and supports the Division's efforts to promote balance of reviewer experience and qualification on panels. • As noted in the previous COV report, the data about reviewers is not complete enough to provide an in-depth answer to this question. For example, it is not clear whether the categories used for reviewer expertise are aligned with the types of expertise needed for a given proposal or program. It is also difficult to assess the experience of the reviewers, specifically as reviewers as opposed to their broader NSF experience. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV encourages the Division to continue its efforts to expand the reviewer pool to include more people from industry, school districts, and other constituents impacted by its programs. For example, a proposal involving a sovereign nation would benefit from the inclusion of at least one ad hoc reviewer with a given perspective. • The COV encourages the Division to continue its efforts for improved data collection about reviewer expertise and qualifications. • It would be helpful to develop a clear policy or procedure for when and why ad hoc and other additional proposal reviews are obtained. <p>Data Source: Jackets</p>	<p>YES</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 COV observed many examples of conflicts of interest being appropriately recognized and resolved by NSF. <p>Data Source: Jackets</p>	<p>YES</p>
<p>3. Additional comments on reviewer selection:</p> <p>None</p>	

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:

- In general, the overall program management plans for the programs under review have been improved.
- The COV found it difficult to determine how portfolio management occurs, how it is evaluated, and how continuous improvement is addressed. Some programs note that annual portfolio analyses are conducted on submitted proposals and compared with historical analyses of the funded portfolio to determine funding, outreach, and capacity-building priorities. This is valuable, but the targets for program portfolios were not always clearly specified. Additionally, some programs note that a formal process of internal consultations augments the expertise of the cognizant PO's judgment about a potential award. However, this formal process was not clearly documented. This omission makes it difficult to monitor internal portfolio management towards continuous improvement.
- Some Division programs mention that knowledge building tools, such as text-mining and data visualization, enable POs to conduct timely and efficient portfolio analyses, assess program and project-level progress and outcomes, identify emerging education issues and solutions, inform funding and outreach priority areas, and respond to stakeholder data calls. However, these are not provided Division-wide.
- The COV believes the effort for AISL POs to work across NSF to co-fund projects is a positive way to enhance the quality and quantity of STEM engagement opportunities.
- The COV believes that AISL and ITEST have been responsive to creating strategies and approaches to encouraging submissions from a wider range of non-traditional applicants. However, it is unclear if the employed strategies have had the desired results. In addition, with respect to AISL, the COV wondered what the percentages of the overall proposals, and the eventual awardees, were across informal learning service providers. The category of "all other" types of institutions is problematic, as research non-profits receive a significant portion of funding, and they are distinct from informal learning service providers.

Recommendations:

- The COV notes the project evaluation reports available to the NSF are not a consistent source of administrative data. The COV recommends the Division consider ways to make more effective use of project evaluation reports in its efforts towards continuous improvement.
- The COV recommends that the Division's program management processes be better documented and distributed for transparency.
- The COV suggests providing greater transparency on how the Division is strategically leveraging STEM engagement opportunities like those funded through AISL, perhaps as a way to provide guidance for future inter-divisional funding.

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

Comments:

- The Division has been responsive to emerging research and education opportunities. The COV notes STEM-C Partnerships/STEM+C, Computational Thinking, CS for All, making and tinkering, ECR, and learning analytics as examples of this responsiveness.

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

Comments:

- The COV notes that the program planning and prioritization process has improved since the last COV report.

Recommendations:

- The COV encourages the Division to devote additional effort to document the rationale used for portfolio development and evaluation.

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

Comments:

- There is evidence that the programs have been responsive to previous COV comments and recommendations. The COV recognizes the creation of a logic model for each program as an important advance, but also notes there is no Division-wide logic model that makes clear the contribution of the Division to the EHR and NSF-wide mission.
- The COV notes the progress in providing specific guidance on the meaning of Broader Impacts in several programs. For example, since the last COV, ITEST has produced an enhanced logic model, added solicitation-specific criteria for Broader Impacts, funded a resource center, generated program-specific synthesis reports, and added explicit criteria characterizing robust research plans. These actions address specific suggestions raised in the prior COV and have helped stakeholders generate higher-quality proposals and a corresponding portfolio.
- The committee notes that ECR is the only program that had its own COV (in 2016). A review of a subset of ECR proposals included in the set of proposals made available to the current COV, and the response provided by the Division to the previous COV's comments and recommendations, indicate that the ECR program has been responsive.

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 COV agrees that the solicitations generally address disciplinary and sub-disciplinary priorities. • The COV believes that the information on the funding rate by discipline does not clearly include information on the multidisciplinary nature of the projects. <p>Recommendations:</p> <ul style="list-style-type: none"> • The COV recommends the Division develop a document that specifies each program’s priority areas, and a matrix that specifies the target multidisciplinary domain according to those areas. • The ‘coverage’ of the matrix could be an indicator of balance: Occupied and empty cells could respectively indicate the topic areas that both have and have not been funded. • The COV recommends that this matrix reference NSF’s “10 Big Ideas.” <p>Data Source: eJacket COV Documents, see Section 3 Proposal Data and Award Data</p>	<p>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 appreciates that there are clear pathways for projects that are different in scope, size, and duration as this provides flexible categories to foster creativity and encourage investigators with different levels of experience. • The COV would appreciate having information about the percentage of exploratory/pilot studies that later translated into full-scale projects. • The COV would benefit from project duration data disaggregated by intended duration, and actual duration along with no-cost extensions. <p>Data Source: eJacket COV Documents, see Section 1 Template Data Sheet, slide 7; Section 3 Award Data Excel file</p>	<p>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 COV notes there were a number of innovative and transformative awards in the portfolio, and that a report describing innovative awards was provided. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV recommends the Division provide more clarity regarding the criteria for designating projects as innovative or transformative for this report. <p>Data Source: Jackets; eJacket COV Documents, see Section 1 Innovative Awards document</p>	<p>Appropriate</p>
<p>4. Does the program portfolio include inter- and multi-disciplinary projects?</p> <p>Comments:</p> <ul style="list-style-type: none"> The COV appreciates that the program includes inter- and multi-disciplinary projects. While many of the projects state a multi-disciplinary perspective, the role of the individuals with different kinds of expertise and the time they commit to the projects seem uneven. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV recommends the Division provide more detailed information about the expertise and the level of participation of the professionals involved in each project to inform decisions about the quality of the overall portfolio moving forward. <p>Data Source: eJacket COV Documents, see Award Co-Fund Received and Award Co-Fund Out Excel files; see Section 1 Template Data Sheet</p>	<p>Appropriate</p>
<p>5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators?</p> <p>Comments:</p> <ul style="list-style-type: none"> The COV notes the Division awards funding to a diversity of geographical locations. However, several states submitted very few proposals to programs and have few or no awards. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV recommends that the Division consider additional research capacity development in those states. The COV suggests considering additional indicators intersecting with state, such as the socio-economic status and academic achievement of the state's students. 	<p>Appropriate</p>

<ul style="list-style-type: none"> In addition to the state where the PI is located, the COV suggests coding the state(s) of the audiences directly served by each project, including sovereign nations/tribal communities and U.S. territories, to see the states and geographic areas impacted by the project work. <p>Data Source: eJacket COV Documents, see Section 3 Award Data Excel file; see Section 1 Template Data Sheet</p>	
<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"> The program portfolio demonstrated an appropriate balance of awards to different types of institutions. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV encourages the Division to continue supporting partnerships with organizations that have less-developed research infrastructures and offer significant connections to underserved populations. The COV suggests disaggregating "Non-Academic Institutions" into "Nonprofit Research Organizations" and "Other Non-Academic Institutions." <p>Data Source: eJacket COV Documents, see Section 3 Award Data Excel file; see Section 1 Template Data Sheet</p>	<p>Appropriate</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 notes a decrease in percentage of awards and number of awards to new investigators and investigators on CAREER proposals (who are "early-career" investigators). The COV expresses concern over low funding rates for new PIs in relation to the future capacity building in the field. <p>Recommendations:</p> <ul style="list-style-type: none"> The COV encourages the Division to give more consideration to the development of young investigators by expanding outreach and implementing mentoring workshops to increase the number of CAREER awards, provided the quality of proposals merits award. 	<p>Not Appropriate</p>

<p>Data Source: eJacket COV Documents, see Section 4: PI Rates Excel file; Section 1 Template Data Sheet</p>	
<p>8. Does the program portfolio include projects that integrate research and education?</p> <p>Comments:</p> <ul style="list-style-type: none"> • Yes. The COV agreed that the integration of research and education is the essence of the projects in the program portfolio. <p>Data Source: Jackets</p>	<p>Appropriate</p>
<p>9. Does the program portfolio have appropriate participation of underrepresented groups³?</p> <p>Comments:</p> <ul style="list-style-type: none"> • The COV notes the participation of underrepresented groups in the program portfolio. • The COV notes that data on the involvement of underrepresented groups was provided for proposals, but not for the funded awards. • The COV notes that the Division did not provide data for Co-PIs or subawards. <p>Data Source: eJacket COV Documents, see Section 3 Award Data Excel file; see Section 1 Template Data Sheet</p>	<p>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"> • The Division’s program portfolio is relevant to national priorities and the Agency mission and demonstrates progression from 2015 to today. • Relevant external reports include “Federal Science Technology Engineering and Mathematics (STEM) Education 5-Year Strategic Plan” (2013) and the Committee on STEM Education (CoSTEM) report entitled “Charting a Course for Success: America’s Strategy for STEM education” (2018). 	<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"> • For example, “Charting a Course” sets goals for building strong foundations for STEM literacy, increasing diversity and inclusion in STEM, and preparing the STEM workforce for the future. These goals align with the three EHR "pillars" (STEM Learning and Learning Environments; Broadening Participation and Institutional Capacity; and STEM Workforce Development). The approaches called for in this national strategy document include strategic partnerships for STEM learning, engaging transdisciplinary activities, and building computational literacy, which align well with AISL, ITEST, STEM+C, and DRK-12. <p>Data Source: Jackets</p>	
<p>11. Additional comments on the quality of the projects or the balance of the portfolio:</p> <p>None</p>	

OTHER TOPICS

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

- The COV identifies multidisciplinary convergence research in K-12 teaching and learning as a program area in need of improvement.

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.

- The COV notes that the Division does not clearly describe the process to assess the impact of Dear Colleague Letters (DCLs) on the overall program portfolio, nor does it explain the extent to which DCLs contribute to the advancement of the field and how DCLs inform the regular programs.
- The COV commends and supports the need for fundamental research and the vision of the ECR program as supporting such research across the entire Directorate as articulated by the ECR Management Plan developed in 2015.

Recommendations:

- The COV suggests reviewing and revising the ECR Management Plan as several years have passed.

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

- The COV acknowledges that the Division has made progress and should continue to improve, specifically to pursue changes not yet made to reach the identified program targets.

Recommendations:

- The COV suggests further clarification of the Broader Impacts merit review criterion and recommends better structuring of reviews to align with the program solicitation.

4. Please provide comments on any other issues the COV feels are relevant.

- The COV suggests that more proposals related to climate change be encouraged in partnership with Earth Science and/or Arctic Research programs.
- The COV suggests that the inclusion of the Broadening Participation (BP) emphasis for AISL and ITEST is important. However, the COV is unclear as to why the BP emphasis is only included in AISL and ITEST, instead of in all programs. In addition, the COV is confused as to why within AISL and ITEST it was up to the specific proposal as to whether the BP emphasis would be applied.

Recommendations:

- The COV encourages further work with framing what BP is and may be, especially in light of on-going knowledge production and changing social contexts in the U.S.
- The COV suggests revising DRL solicitations to further incorporate NSF's "10 Big Ideas" as part of the NSF operation at large, quoting the following excerpt from the Division's 2016 Report on Strategic Planning:

Separately from the above examples in the FY 17 budget request, DRL staff members have also been active participants in discussing EHR's potential contributions to NSF's 10 Big Ideas for Future Investment. Due to its breadth, DRL is well-suited to engaging in conversations about what education for the future of science should be like. As these ideas are further developed, DRL will make investments to enhance its own potential to partner across the Foundation. A few ideas have captured immediate attention. The Human-Technology Frontier connects to DRL's portfolio in technology-based learning. The Data Science topic connects to DRL's growing portfolio involving learning analytics and educational data mining. The Convergence topic connects to DRL's interest in funding research on interdisciplinary, as well as problem-based, STEM education. Research capacity development in those states that do not submit many proposals or have many awards: hold a regional DRL proposal development conference via the web.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

- The COV notes that some COIs were not flagged in the system, even after COV members indicated COIs.
- The COV notes that COV members are instructed to refer to information sources that only NSF has access to.

Recommendations:

- The COV recommends clearly outlining and specifying the location of program management plans and prior COV documents to help facilitate the COV meeting.
- The COV suggests the inclusion of subfolders for clearer mapping of review information and updating the logistics for the review process (flowcharts, guides, etc.).
- The COV suggests clearer guidelines as to what needs to be done prior to the actual meeting (i.e., what documents to look at, where they are located, how many hours are expected to review the documents prior to the meeting).

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SIGNATURE BLOCK:



Okhee Lee
COV Chair and Member of the EHR Advisory Committee
on behalf of the DRL COV