

Directorate for Social, Behavioral, and Economic Sciences Office of Multidisciplinary Activities Response to the 2020 Committee of Visitors Report

Overview

The Directorate for Social, Behavioral, and Economic Sciences (SBE) Office of Multidisciplinary Activities (SMA) Committee of Visitors (COV) met July 13-15, 2020. The COV included the chair and two members representing each of four programs under review: Science of Science and Innovation Policy (SciSIP); Research Experiences for Undergraduates Sites (REU Sites); SBE Postdoctoral Research Fellowships (SPRF); and Resource Implementations for Data Intensive Research in the Social, Behavioral, and Economic Sciences (RIDIR). The members of the COV met in plenary and in program-focused sessions, which were all conducted remotely via video conferencing. The program-focused teams also met with the program officers (POs) managing those programs and the whole COV met with administrative staff who provide support for SMA programs. The COV presented its findings and recommendations to Dr. Arthur Lupia, Assistant Director, SBE; Dr. Kellina Craig-Henderson, Deputy Assistant Director, SBE; Mr. John Garneski, Staff Associate, SBE; and to program officers and administrative staff involved in SMA programs.

The COV provided recommendations pertaining to the quality and integrity of operations, specifically data-related issues (i.e., data collected and provided to the COV); reviewer training and consistency; and programmatic management comments for SMA. This Overview section first considers and responds to the COV's recommendations for SMA as a whole. Finally, recommendations made at the individual program level are addressed in the final section of this report.

Section A: General Recommendations

1. Merit Review Process

Recommendation: We recommend that SBE undertake a more systematic analysis of the panel review process with the goal of identifying what works well and what would benefit from improvement. Some practices such as who prepares panel summaries or the number of ad hoc reviews about which we have impressions of effectiveness (or not) would benefit from more rigorous analysis. At present, panel-and review-related data are not as robust as needed to study effectiveness of the review process as it currently exists and to consider alternative models.

Response: The SMA division will reach out across SBE and NSF to identify best practices in their panel management that can be implemented by the SMA programs. In addition, NSF is growing its usage of business intelligence tools, such as the internal MyNSF system and those offered by the Foundation's Evaluation and Assessment Capability (EAC). Using our internal data analytics, it might be possible to analyze a subset of reviews for

the programs to determine whether more or fewer reviews is systematically associated with specific funding recommendations.

Recommendation: We recommend that SBE capitalize on the expertise of RIDIR and SciSIP in particular to create a data infrastructure to track program outcomes over time using state-of-the-art methods. Such an infrastructure would also facilitate our efforts to ask the appropriate questions and keep track of long-term outcomes without having to add additional work for PIs after the research support has ended.

Response: We thank the COV for this recommendation.

The recent repositioning of the SciSIP program to the Science of Science: Discovery, Communication, and Impact (SoS:DCI) program is uniquely positioned to address this recommendation. The SoS:DCI program supports research that builds theoretical and empirical understandings of three fundamental areas:

- 1) How to increase the rate of socially beneficial discovery;*
- 2) How to improve science communication outcomes; and*
- 3) How to expand the societal benefits of scientific activity.*

The program actively seeks proposals that

- A) Develop data, models, indicators, and associated analytical tools that constitute and enable transformative advances rather than incremental change.*
- B) Identify ethical challenges and mitigate potential risks to people and institutions.*
- C) Provide credible metrics and rigorous assessments of their proposed project's impact.*
- D) Include robust data management plans with the goal to increase the usability, validity, and reliability of scientific materials.*

2. Quality of Proposal Reviews

Recommendation: We recommend that there be better training of reviewers – both panel members and ad hoc – in how to write an effective review (e.g., highlighting strengths as well as weaknesses in a proposal).

Response: NSF has engaged in a number of activities to improve the quality of written reviews. At present, participation in these activities is variable and voluntary. SMA adheres to NSF-wide criteria for merit review and additional program/solicitation-specific review criteria, when applicable. Many

guidelines, training, and information resources are available for reviewers, and program officers managing SMA programs will work to ensure that ad hoc reviewers and panelists continue to be made aware of these resources. Specifically, SMA programs provide reviewers with detailed guidance on how to develop thorough and effective reviews tailored for the types of proposals submitted to the specific SMA programs. SMA program officers will continue the current practice of not inviting reviewers or panelists back if they fail to provide reviews of sufficiently high quality and utility to the investigators.

Recommendation: *Scoring of proposals is the lever for funding. There appears to be considerable variability in scores within a proposal and such variability has unknown impact on whether a proposal achieves a fundable score. We recommend that SBE consider implementing calibration exercises during panel meetings to gain more insight into the challenges of scoring variability.*

Response: Thank you for this recommendation. We will encourage POs to do this at the outset of panel deliberations.

Recommendation: *Scoring impacts which proposals get triaged (i.e., not discussed) and there are many unknowns about the triage process. For example, do triaged proposals have consistently low scores across all reviews? Are they more likely to come from members of underrepresented groups or minority serving institutions? We recommend that SBE systematically analyze the process by which proposals are triaged, the characteristics of such proposals, and the kind of feedback given to PIs of these unsuccessful proposals that do not have the benefit of a panel summary.*

Response: We thank the COV for the recommendation to systematically analyze the process by which proposals are triaged, the characteristics of such proposals, and the kind of feedback given to PIs of these unsuccessful proposals that do not have the benefit of a panel summary. This will provide valuable information about the triage process and strengthen confidence in the approach to manage the volume of non-competitive proposals received.

SBE programs require a minimum of three reviews (including two from panelists) for programs and those that received comparatively low review scores are triaged. If any panelist would like to discuss the proposal, it is discussed in the panel. When a proposal is triaged, it eliminates a panel discussion and the resulting panel summary. To address this issue going forward, SMA program officers will strive to reference both panelists' findings and ad hoc reviewers' findings in the written PO Comments that they provide to PIs. In addition, NSF's expanding business intelligence tools will allow SBE to learn more about the characteristics of the triaged proposals and their submitting institutions. SBE will update outreach efforts with information gleaned from any analyses of triaged proposals.

Recommendation: *Writing good reviews presents workload issues for panel members. We are concerned that some panel members are overburdened with the required number of proposals to review and how this varies across programs. We recommend that SBE analyze how workloads (number of proposals to review) varies across programs and address questions such as whether there is an association between number and quality of reviews from panel members. We also recommend that panelist compensation adjustments may need to be considered for time commitment and to emphasize the importance and significance of their reviews. Workload expectations should clearly be articulated to reviewers to ensure sufficient time for thorough reviews.*

Response: We thank the COV for this suggestion. A systematic analysis of panelist assignments and the quality of panelists' reviews could certainly be conducted at the program level. We will encourage program directors to conduct such an analysis for their programs at least once in the next COV period.

Workload for both panelists and program officers is a concern across the Foundation. As a result, NSF instituted several pilot programs to address the issues. These pilot programs include going to no deadlines for proposal submissions, standardizing templates, etc. SBE will use the outcomes of these pilot programs to inform and implement changes to its merit review processes in the hopes of reducing workload burdens.

SBE also adheres to the panelist compensation rates set by the Foundation. SBE will suggest that NSF review its current panelist compensation rates.

3. Broadening Participation

Recommendation: We recommend that SBE consider innovative ways to increase the willingness of applicants for funding to report critical demographic information such as gender and race/ethnicity. If reporting of such information remains voluntary, consider situating requests with explanations of why such information is important and how it will be used. It could be that the way NSF currently collects demographic data creates uncertainty or disincentives to respond. NSF should update systems, such as Fastlane, to increase reporting of demographic data. This includes question ordering and sequence, clear disclaimers, annual updates, etc. The COV strongly believes that accurate tracking of the diversity of applicants is essential.

Response: Although we see value in being able to obtain demographic information such as race/ethnicity and gender, demographic information about proposers is based on self-reported data from the PIs. Not all proposers choose to disclose this information. SMA program officers will continue to encourage self-reporting and stress the importance of this information in informing NSF merit review processes and program

developments. Because the COV feels strongly about this, we recommend it be an item presented for discussion to the SBE Advisory Committee (AC). A change in this policy would require NSF-wide support.

Recommendation: We recommend that SBE engage in more systematic efforts to work with the HBCU program, the new Build and Broaden program, and NSF INCLUDES as good mechanisms for identifying promising collaborators from underrepresented groups. Individual program solicitations should highlight the importance of collaboration and how they might be initiated. Regular availability of webinars for grant preparation is advisable, as well as outreach to relevant college and university graduate programs (e.g., Alliances for Graduate Education and the Professoriate, AGEP). We further recommend outreach not just to potential applicants, but also to potential faculty mentors as well. For example, faculty can be encouraged to identify individuals who might consider a postdoctoral fellowship, and then encourage and support the proposal development.

Response: We thank the COV for this recommendation. A series of webinars are currently planned for outreach such as the kind suggested to reach faculty and potential PIs who have never applied for funding previously or who have been unsuccessful in previous submissions. SBE's newly developed Build and Broaden program represents a commitment to systematic engagement with Minority Serving Institutions.

SBE agrees with the COV's recommendation to continue expanding outreach efforts and partnerships. Recent successes demonstrate that this an important issue to the Directorate and that SBE is a leader in NSF's Broadening Participation efforts. For example, the directorate initiated the Build and Broaden activity in FY 2020 to foster partnerships and build research collaborations between Minority-Serving Institutions (MSI) and R1 institutions. In addition, SBE recently elevated the Science of Broadening Participation, its program that supports the science behind effective broadening participation programs, to a formal program. As appropriate and feasible, SBE will continue to expand these programs. In addition, SBE will continue to have targeted outreach efforts to underrepresented institutions such as MSIs and undergraduate institutions to increase their submissions and proposal development capabilities.

Recommendation: We recommend that SBE conduct systematic studies (e.g., double blind review) appropriate for specific programs to evaluate whether and how proposal evaluation is influenced by knowledge of PI demographic characteristics. If it is not, then knowing PI and Co-PI demographics can be an asset rather than deterrent to broadening participation.

Response: NSF does not require submission of PI demographic information about race, gender or ethnicity and is therefore limited in its ability to provide this type of information about PI identity to ad hoc reviewers. It might be

possible for SBE through one of its programs in SMA to support the conduct of a study aimed at better understanding whether and how proposal evaluation is influenced by knowledge of PI demographic characteristics. We will consider undertaking this.

In addition, SBE uses several tools to ensure the excellence of its merit review process. These tools for understanding, safeguarding, and improving the directorate's key processes, such as its management of the merit process include the NSB's Merit Review Report; external Advisory Committees (ACs); COV reports; and the sharing of best practices across divisions and directorates. SBE heavily relies on all of these to ensure that SBE implements the merit review process within a fair, competitive, and transparent manner.

4. SMA Division Management

Recommendation: We recommend that each program in SMA have at least one permanent member. When program officers are responsible for more than one program, we recommend that each managed program has a rotator to assist the permanent officer as needed. The ideal staffing composition is a dedicated, permanent PO and a rotator per SMA program.

Response: We appreciate the COV recommendation. All program officers have multiple activities in which they participate in addition to the main program portfolio they manage. For SMA programs with single program directors, efforts are made to distribute additional obligations in order to permit the time necessary for management of the SMA program. Both proposal load and staffing constraints influence staffing decisions for programs.

Staffing capabilities often rely on many factors outside of the control of the Directorate. SBE however, aspires to ensure each program is fully staffed based on the workload demands for the programs with an appropriate balance between permanent and rotating program officers. The Directorate is active in efforts to expand its staffing levels and capacity within the overall constraints of the Foundation and federal government. This is especially important considering the workload pressures on staff in SBE.

Section B: Program-Specific Issues

Science of Science and Innovation Policy (SciSIP)

1. Quality and Effectiveness of the Program's Use of Merit Review Process:

Recommendation(s):

- 1) SciSIP should strengthen its communications to potential applicants to ensure research goals are clearly stated, that applicants provide clear linkages between research goals and methods, and that applicants must clearly articulate broader impacts and how to bring them about.
- 2) NSF should undertake an analysis of how panels operate, identifying cases where panels recommended funding decisions that differed from what would have been suggested by (e.g.) simple averaging of external scores, and then evaluating those differences in terms of gender and other biases, and ultimate outcomes.
- 3) The program should consider varying key elements of its processes, and then retain and make available for research (subject to appropriate privacy protections) the outcomes of different approaches.

Response: SciSIP was recently repositioned as the Science of Science: Discovery, Communication, and Impact (SoS:DCI) program. A significant part of the rationale for repositioning SciSIP as SoS:DCI was to expand the program's portfolio and to articulate its value to a wider audience of stakeholders. The Directorate believes this recent repositioning will address recommendation 1 above. Among its other objectives, the program seeks proposals that a) provide credible metrics and rigorous assessments of their proposed project's impact, and b) include robust data management plans with the goal of increasing the usability, validity, and reliability of scientific materials. Additionally, the program director(s) plans to emphasize the importance of clear and realistic broader impacts to potential applicants, as we see that as a core element of the repositioned program.

Regarding recommendations 2 and 3: as with the COV's recommendation for SMA overall, it is possible to conduct program-level systematic analysis of panelist reviews and review quality, including conducting experiments by varying key process elements to assess differences in outcomes. The SoS:DCI program director(s) have been encouraged to conduct such an analysis for the program.

2. Selection of Reviewers:

Recommendation(s):

No SciSIP-specific recommendations regarding the selection of reviewers.

3. Management of the Program Under Review:

Recommendation(s):

- 1) SMA should consider having both a rotating and a permanent program officer for this program.
- 2) The program should emphasize extended support of transformative research on complex processes that address understandings of investments in science, engineering, and technology—key to science policy.
- 3) NSF should develop a system for obtaining, tracking, and eventually evaluating long-term outcomes and impacts of its investments. The ‘Science of Science’ cannot be undertaken without such a system, and this program should take the lead in developing it.

Response: In response to recommendation 1, one component of the program’s repositioning involves relocating it to the Social and Economic Sciences division of SBE. There it will be in the company of other, related programs staffed by a mix of permanent and rotating directors and will work closely with allied programs. The Directorate is active in efforts to expand its staffing levels and capacity, which is especially important considering the workload pressures on Directorate staff.

In response to recommendations 2 and 3, we concur with the importance of supporting transformative research on complex processes that address understandings of investment of science. We also recognize the need to develop systems for tracking long-term outcomes and impacts of investments. These objectives are reminiscent of those that originally led to the development of the SciSIP program, and they fall squarely within the scope of the repositioned SoS:DCI program, in particular its emphasis on discovery, communication, and impact. These objectives are also consistent with the expressed priorities of SBE and agency leadership.

4. Program Portfolio:

Recommendation(s):

- 1) Within our small samples of proposals, there appears to be under representation of studies of political institutions, social institutions, and organizations. These would be expanded through wider participation of political scientists and sociologists.

Response: We will consider expanded outreach to political scientists and sociologists to ensure wider participation by these fields. We will also work to understand the mix of institutions and organizations represented in the proposals funded by allied programs such as Science of Organizations (SoO), Accountable Institutions and Behavior (AIB), and Science and Technology Studies (STS), and take advantage of co-funding opportunities by deepening relationships between SoS:DCI and these programs.

Research Experiences for Undergraduates Sites (REU Sites)

1. Quality and Effectiveness of the Program's Use of Merit Review Process:

Recommendation(s):

- 1) The process would be stronger if all members of the panel participated in the discussion and contributed to the summary and placement of the proposal.
- 2) Schedule site visits for the Program Officer and staff.
- 3) High-quality panel summaries should be included for all potential panel scribes.
- 4) Ad hoc/mail reviewers should be used when deemed necessary by the Program Officer.
- 5) The Program Officer Review Analysis is well-written and should be shared as Program Officer notes to the PIs.
- 6) The program officer should provide additional training to ensure that individual reviews, including sharing model panel summaries contain not only critiques and praise, but offer suggestions for improvement.
- 7) Include the program officer review analysis to help the PI improve their work.

Response: The REU Sites panel includes the breadth of disciplines supported by the SBE Directorate. Proposals submitted to the SBE REU Sites program may be single discipline-focused or multidisciplinary. While this is a strength in that multidisciplinary perspectives can be applied to the evaluation of each proposal, there are also some inherent challenges. With regards to Recommendation #1, all panelists are encouraged to participate in the panel discussions for proposals which they may not have been assigned as a reviewer. However, only a fraction of the panel may have the relevant disciplinary expertise or background to contribute to the discussion of a particular proposal. Given the disciplinary make-up of the panel, which is guided by the proposal submissions, the REU Sites program has increasingly used ad hoc reviewers (Recommendation #3) to provide additional expertise that may not be available on the panel. There is also the matter of the potential downside of having panelists comment on proposals that they have not read. This involves the possible introduction of factual errors, misinformation, and opinions.

Regarding Recommendations #5 & #7 (inclusion of the PO's review analysis), since FY 2020, the PO has been utilizing the PO comments section for proposals categorized "Not Discussed in Panel" or "Triaged" since they do not receive a panel summary. This provides an opportunity for the PO to communicate directly with the PI and encourage them to reach out

directly to the PO.

Currently, the REU program provides de-identified examples of high-quality reviews to new reviewers at their request and provides feedback on submitted reviews. To improve upon the quality of the panel summaries, the REU program can institute a similar process during the panel orientation and through provision of iterative feedback during the panel as the summaries are written.

2. Selection of Reviewers:

Recommendation(s): No Recommendations.

Response: N/A.

3. Management of the Program Under Review:

Recommendation(s):

- 1) Enhancing the outreach budget to encourage quality submissions from institutions that have not submitted previously.
- 2) Provide additional administrative support to grow the number of REU sites supported.
- 3) A funding increase to the REU program to increase the number of student spots available and to grow the number of REU sites.
- 4) We continue to support the earlier recommendation for formalized reviewer training.
- 5) We concur, and would encourage NSF to provide more information about the representativeness of Co-PIs and the reviewers.
- 6) More systematic data should be collected and provided on program outcomes and participants productivity.

Response: The REU Sites program is committed to diversifying the portfolio of institutions applying to the program (Recommendation #1). In FY 2019, the PO conducted an outreach presentation at a local HBCU and has plans to conduct similar virtual sessions for MSIs in Georgia (GA) and North Carolina (NC) in FY 2021. As an additional type of outreach, the PO has consistently included panelists from MSIs to serve on the REU panel with the goal of them returning to their institutions with increased knowledge of the merit review process.

With regards to Recommendation #5, the REU Sites program will continue to encourage self-reporting of demographic information as appropriate and stress the importance of this information in informing NSF merit review processes and program developments.

The REU Sites program requires reporting of project outcomes in the annual and final reports (Recommendation #6). The program, with the assistance of a summer student, has informally pulled data from these reports to assess outcomes. The REU program will work with the Division of Information Systems (DIS) to identify ways to systematically pull the data on program outcomes and participants. Of note, the REU Sites program is Foundation-wide, and SBE cannot unilaterally make directorate-specific changes to reporting requirements.

The REU Sites program is constrained by the overall budgetary constraints (Recommendations #1, 2, and 3) impacting NSF and other federal agencies. However, we recognize the changing landscape of institutional housing costs and travel in tandem with the increased student demand. The REU Sites program will examine the budgetary trends and identify opportunities to augment budgetary funding within the constraints of the overall NSF and federal budgetary landscape.

4. Program Portfolio:

Recommendation(s):

- 1) To foster multi-disciplinary projects, each program officer should have a budget set-aside for partnered work.
- 2) Increase the budget of the SBE REU program to offer additional awards and to meet the needs of student costs.
- 3) The map needs to be completely redone, as it is unclear what it is trying to convey. The legends do not match what is visualized.
 - a. Include the Co-PI's geographic information
 - b. Collect location data on program participants.
 - c. Recreate the maps with the assistance of a geographer to more explicitly highlight spatial patterns of interest in the data.
- 4) The REU program must collect data on the home institution for each student participant.
- 5) NSF and the REU program should collect data on the number and success rates of proposals from MSIs.
- 6) The REU program can also encourage submissions from more experienced PIs.
- 7) The SBE REU program could run (or collaborate with organizations like the Council on Undergraduate Research (CUR)) proposal writing workshops for new and early-career investigators.
- 8) We strongly encourage or require PIs/Co-PIs to identify individual characteristics.
- 9) The REU program must collect data on the gender and minority status of student applicants and participants.

Response: The REU Sites program recognizes the need to improve upon the data visualization COV module and will consult with NSF's Division of Information Systems (DIS) to correct the data moving forward (Recommendation #3). We agree that it is important to understand the multilayer geographic trends among PIs, Co-PIs, and participants. At present, all of these data are collected but not easily queried, especially with regards to participant home institution, a variable that is only available in the annual reports. While REU student participant demographic data (gender, minority status) are not currently required to be reported to NSF, PIs do collect these data and often report them in the annual reports (Recommendation #9). Currently, NSF's EAC is piloting a dashboard to allow for more comprehensive reporting and evaluation of REU awards (Recommendation #9).

The REU Sites program does not place restrictions on the types of PIs eligible or encouraged to apply. As aforementioned, the REU program is Foundation-wide with a broad set of eligibility criteria applicable to the participating research directorates. The COV has provided great recommendations to collaborate with organizations such as CUR (Recommendations #7) and to encourage submissions from PIs across all career levels (Recommendation #6) which can be emphasized during outreach events. With regards to Recommendation #8, the REU Sites program will continue to encourage self-reporting of demographic information as appropriate and stress the importance of this information in informing NSF merit review processes and program developments.

SBE Postdoctoral Research Fellowships (SPRF)

1. Quality and Effectiveness of the Program's Use of Merit Review Process:

Recommendation(s):

- 1) We recommend additional reviewer training to increase the likelihood that these problems are corrected.
- 2) We recommend relevant training for preparing the panel summaries and consideration of who should prepare the panel summaries.
- 3) We recommend that reviewer training clearly distinguish between broader impacts and broadening participation, and that reviewers should address each individually.

Response: The recommendation to provide more comprehensive training for reviewers on broader impacts, broadening participation, and panel summaries is an area that can be improved during panel through the PO's panel orientation and through more iterative feedback throughout the panel as the panel summaries are written. The PO will also make additional efforts to ensure that ad hoc reviewers and panelists continue to be made aware of the available merit review resources.

2. Selection of Reviewers:

Recommendation(s):

We appreciated the PO's self-reported efforts to achieve breadth across institutions in the representation of the reviewers (e.g., small, large, PWI, HBCU). We recommend that data be collected and provided to document the extent of breadth.

Response: The SPRF program will utilize the available tools to better characterize the diversity of institutions and reviewers represented on the panel consistent with NSF policies regarding disclosure.

3. Management of the Program Under Review:

Recommendation(s):

- 1) We recommend that that the COV be provided with relevant summary data for all proposals
- 2) We recommend increased efforts at outreach at minority-serving institutions, professional conferences, societies and professional organizations.
- 3) We recommend outreach to not just potential applicants, but also to faculty mentors.

Response: We appreciate the reviewers' positive comments about the current management of the program. The SPRF program understands the need for more

comprehensive data to appropriately evaluate the program and will provide feedback regarding the need to obtain more nuanced data about the institutional and demographic diversity of reviewers. It is important to note that the SPRF program adheres to NSF policy regarding the voluntary nature of self-disclosure.

Expanding outreach to MSIs, professional conferences, societies, and professional organizations in addition to faculty is an excellent recommendation that can be implemented by the SPRF program.

4. Program Portfolio:

Recommendation(s):

“The previous COV for SPRF recommended the following in connection with the BP track: We therefore recommend that the SPRF program officer or her designee extend the program's outreach activities to minority serving institutions to include grant writing workshops...” We recommend the activities identified by the previous COV, along with this COV's relevant recommendation (see section III, #2 above).

Response: The SPRF program is committed to engaging underrepresented and hard to reach populations, especially those groups who meet the aims of the broadening participation track. In FY 2019, the PO conducted an outreach presentation at a local HBCU and has plans to conduct similar virtual sessions for MSIs in GA and NC in FY 2021. Currently, the SPRF program supports two workshop awards that provide grant writing-training and related professional development for early career SBE scientists. Specifically, Kirk Johnson from the University of Mississippi, conducts a week-long “Summer Course on Grant Writing in the Social, Behavioral and Economic Sciences (SCG)” for approximately 40 junior social scientists (Award #1719500). In collaboration with the Society for Social and Personality Psychology, Evelyn Carter leads an award titled, “Workshop: A Retreat to Broaden Participation of Black Social and Personality Psychologists” which aims to address racial diversity through providing intensive programming geared toward fostering community among Black scholars (Award #1847721). Furthermore, the program will be conducting a series of professional development webinars, beginning December 2020, for current awardees in direct response to a query on ideas for program improvement.

Resource Implementations for Data Intensive Research in the Social, Behavioral and Economic Sciences (RIDIR).

1. Quality and Effectiveness of the Program's Use of Merit Review Process:

Recommendation(s): No specific recommendations made

Response: Related to the COV's observation that more assertive measures should be made to involve HBCUs and other MSIs, SBE agrees that there has been a lack of HBCU and MSI participation in the merit review process for RIDIR. This lack is related (see below) to the inherent difficulty in finding reviewers for proposals submitted to this program. The program directors will engage in outreach, including the measures proposed by the front office in the main section of this response, designed to increase the number of panelists from these institutions, particularly early-career panelists who represent underserved research communities.

2. Selection of Reviewers:

Recommendation(s): No specific recommendations made, although the panel notes:

"There is not always a domain expert on the panel. However, we acknowledge that panels cannot handle every domain combination possible. Program managers described the difficulty of finding appropriate reviewers for the panels."

Response: RIDIR, now Human Networks and Data Science – Infrastructure (HNDS-I), did not co-review because of the nature of the proposals submitted, which were highly interdisciplinary, often drawing on Computer Science and Data Analytics expertise. Requiring at least some panelists with technical expertise resulted in fewer panelists with discipline-specific expertise. The HNDS program director will continue to draw on experts outside of SBE as necessary, and will work with other SBE programs to make sure, to the greatest extent possible, that there is adequate domain expertise represented on HNDS-I panels.

The new track, HNDS-R, is structured to involve co-review with other programs and will therefore involve a range of domain expertise.

3. Management of the Program Under Review:

Recommendation(s): The COV made three general observations:

- 1) The COV notes that there were many highly competitive proposals submitted to RIDIR that were not funded due to funding limitations... The COV recommends that NSF works out better structures across Directorates to support multidisciplinary research.

- 2) There are many emerging research and education opportunities in the social, behavioral, and economic sciences due to recent technical developments that enable unprecedented database creations and data analytics. These include new technical tools from (1) machine learning and AI, and (2) data management and privacy. To be able to fund such opportunities, the RIDIR program needs more funding.
- 3) It is important that truly interdisciplinary, high-quality research proposals that involve both social & data/computing sciences are not rejected because reviewers with social science expertise expect fundamental research outcomes in the social sciences, and reviewers with a computing background expect fundamental research outcomes in computing. There must be a place where interdisciplinary research that involves applied computing and social sciences can be funded.

Response: HNDS is a program that can fund the interdisciplinary research that the COV observed is necessary for the advancement of the SBE sciences. HNDS will seek out new opportunities for co-funding research across the agency, including finding relevant collaborations in CISE and ENG where possible. The program directors will also work to construct panels and find reviewers who value interdisciplinary work, ensuring that there are appropriate domain experts for each proposal whenever possible.

4. Program Portfolio:

Recommendation(s): COV recommendations focused on the funding level for the program, the award sizes, and the lack of smaller institutes and researchers from under-represented groups receiving awards. They noted:

- 1) ...The co-funding levels between SBE and ENG, and SBE and CISE are not appropriate. The funding rate for the new HNDS program could likely be increased if co-funding was actively sought.
- 2) ...We recommend considering a mix of award sizes for the new HNDS program
- 3) ...The kind of research supported by the RIDIR program is difficult to conduct by higher education institutes that are not R1 institutes. Perhaps community building efforts could enable smaller universities to become involved in team building earlier so they could join larger proposals.
- 4) Efforts should be made to solicit proposals by members of underrepresented groups. One way to do that is to support team building through workshops in advance of program calls. And also, to more aggressively involve underrepresented groups in the review process.
- 5) The quality of the proposals was very high, and it is important for SBE to reach out to other Directorates, who have multidisciplinary programs for data infrastructure building, for co-funding (CISE & ENG).

Response:

- 1) (and 5.) Of the two tracks offered by HNDS, the core research track (HNDS-R) will use a funding model that is based almost entirely on co-funding with other SBE programs. While HNDS-I has not used a co-funding model in the past, the program directors will work to increase cross-directorate collaborations to pave the way for these kinds of collaborative efforts.*
- 2) Moving forward, HNDS will fund both smaller and larger awards, although HNDS-I will continue to support mostly larger projects.*
- 3) (and 4.) Program directors will continue to try to include researchers from smaller institutions in the review process and will engage in outreach to try to increase the number of these researchers involved in collaborations with larger institutions.*