

Response of Division of Mathematical Sciences to the 2020 Committee of Visitors Report

The Division of Mathematical Sciences (DMS) wishes to thank the members of the 2020 Committee of Visitors (COV) for the time and effort that they devoted to an in-depth and detailed review of the activities of the Division during the period of FY 2016 through FY 2019. There was a great deal of material for the Committee to work through, and the Division appreciates the care that was taken throughout the entire process. DMS wishes to express its gratitude to the co-chairs, Dr. Russel Caflisch and Dr. Tatiana Toro, and the subcommittee co-chairs, Drs. Tara Brendle, Jesús De Loera, Sara Del Valle, Anette Peko Hosoi, David Manderscheid, and Rodolfo Torres, whose effective leadership of the 2020 Committee of Visitors was essential to its success.

DMS is pleased that the committee appreciates the vital work DMS conducts for the nation and the mathematical sciences research community. We view the report as an expression of confidence that the Division is serving the community well. The Committee of Visitors emphasized six categories of primary findings and recommendations (pages 2-3), to which we respond in the numbered sections below. In the following, recommendations from the COV presentation to the MPSAC are italicized.

1. Encourage virtual participation in future panels.

The Division of Mathematical Sciences staff worked effectively in 2020 to shift panel reviews to a fully virtual format in response to the current pandemic. The ability to do so was facilitated by considerable previous DMS experience with virtual (teleconference) panelist participation. This year's experiences due to the pandemic has enhanced these capabilities, and DMS intends to continue use of virtual panels in the future as well. We will also attempt to evaluate the relative advantages and disadvantages of both modes to provide DMS with the optimal balance of the two.

2. Improve the use of the Broader Impacts criterion.

- *The BI criterion should play a stronger role in funding decisions.*
 - *More proposals should be funded, based partly on their BI.*
- *Consistency in evaluating BI would greatly improve the process.*
 - *Stress the importance of BIs.*
 - *Direct PIs and reviewers to the five questions that provide a consistent framework for Broader Impacts (described in the Proposal and Award Policies and Procedures Guide (PAPPG)).*

The Division appreciates the need to use both criteria in all funding decisions and we strongly endorse this recommendation. The Division already has several practices in place and will continue to use them, including briefings at all panels on the importance of using the Broader Impacts criterion given by both the Program Directors and the Division Director. The Division also plans to explore mechanisms to further increase reviewers' consideration of the NSF Broader Impacts review criterion in determining their recommendations and to document the role of the criterion more fully in the DMS Program Directors' funding recommendations.

3. Improve the quality and consistency of reviews and panel summaries.

- *More specific guidelines to reviewers would help them to make their reviews detailed and to address all the review criteria.*
- *Program officers should consistently include details of the decisions in the Review Analysis, especially for potentially controversial cases.*
- *The equalization process should have a set of more explicit "guiding principles" and more documentation of the reasons for funding decisions.*
- *We notice that there has been some grade compression in proposal ratings. Perhaps numerical ratings would be more effective.*

DMS is exploring updated guidance for reviewers to better communicate expectations for NSF reviews, including use of the Excellent to Poor scale. The rating scale falls within the purview of the NSF Policy Office. DMS will convey the COV's suggestion to use a numerical scale to the Policy Office. The Division will also explore ways to improve the level of detail furnished in Review Analyses. The equalization process, used by most of the programs, in which proposals within one program but across several panels are discussed will also be reviewed. The Division plans to investigate the use of formal guiding principles for Program Directors to use during the Equalization process. The Division would like to note that currently documentation for funding decisions made during equalization can already be found in the Review Analysis. Nonetheless, DMS will strive to ensure more consistency among the Review Analyses.

4. Make efforts to increase the response rate to requests for demographic information.

- *DMS (and NSF?) should work to increase the response rate to requests for demographic information (e.g., gender and race).*
- *This is important data for DMS, as well as the math community.*
 - *Assessing the diversity of the community and the equity of funding decisions.*
- *Survey methodologists could possibly provide mechanisms to encourage sharing of this sensitive data.*
- *Modernizing the survey could be an important step.*
 - *E.g., additional options for gender and race.*

As was noted in the COV report there is a significant lack of demographic information at many levels. The Division concurs with the COV that this is important data to have, but we also note that submission of the data is completely voluntary under current policy. Moreover, solicitation of demographic information from Principal Investigators and reviewers falls within the purview of the NSF Policy Office and the NSF Office of General Counsel. The Division will communicate the Committee's recommendations and seek guidance on measures that the Division could take. One possible action (pending approval by the Policy Office) might be to publish a Dear Colleague Letter to the mathematical sciences community stressing the importance of demographic information.

5. Consider implementing a systematic process for handling resubmitted proposals.

- *This could include a concerted effort to provide constructive feedback and encouragement to resubmit.*
 - *E.g., for proposals that are recommended for funding but do not receive it, as well as for proposals from female and URM PIs.*
- *PIs of a resubmission could provide a brief description of the revisions that address comments in the previous reviews (within the 15-page limit).*
 - *Reviewers would assess how well the previous reviews were addressed.*

The Division thanks the COV for this suggestion and we will consult with the NSF Policy Office to consider a systematic process for handling proposals that have been revised and resubmitted. We would also like to note that currently Program Directors have the option of encouraging revision and resubmission via Program Officer Comments and to some extent this option is already being used. Another possibility is for the Program Directors to encourage reviewers to provide more constructive feedback to PIs, especially for early-career researchers. With respect to the recommendation on having the PIs providing a brief description, this option is open to PIs already. However, reviews of prior proposals cannot be made available to current panels, so it could prove difficult to assess how well the previous reviews were addressed.

6. Continue to make significant steps to increase diversity at all levels.

- *DMS has made significant steps to increase diversity, for example among program directors.*
- *The COV notes the following components of a successful approach to diversity, equity, and inclusion:*
 - *Incentivize all PIs to train and mentor members of under-represented groups.*
 - *Provide the scientific community with evaluation tools for identifying excellence in proposals coming from a diverse set of PIs.*
- *The COV commends DMS for these efforts and recommends the following further steps.*

- *Increase the percentages of reviewers who are women or URMs.*
- *Fund more research projects at HBCUs and minority serving institutions.*
- *Ensure that proposals from PUIs are evaluated by at least one reviewer from a PUI.*
- *Better publicize and utilize the ROA and RUI programs.*
- *Put in place metrics to evaluate whether the BPI process is accomplishing its goals.*

DMS thanks the COV for noting the increase in diversity among the current Program Directors. We are proud of this achievement and delighted to have been able to work towards a more diverse working environment. DMS will also continue its efforts to enlarge the pool of reviewers who are members of groups underrepresented in the mathematical sciences and who have affiliations with Primarily Undergraduate Institutions. One recent and particularly successful initiative is the participation of DMS in an MPS-wide Broadening Participation for Young Investigators Workshop. The goal of this workshop was to introduce early career PIs to the panel review process and to enlist them as potential future panelists. DMS plans to continue participation in this workshop as well as investigate the possibility of running a DMS specific workshop. The Division will also look for ways to better publicize the NSF-wide RUI program and its Research Opportunity Award (ROA) supplement mechanism, and to increase funding opportunities for PIs at HBCUs and MSIs. To address the last recommendation, DMS has put a process in place to evaluate the impact of the Broadening Participation Initiative process by the DMS Diversity Committee. A report is expected by the end of FY 2021.

In summary, DMS would like to thank the COV for its excellent work and thoughtful recommendations. We will strive to live up to the assessment provided in their report –

“DMS is a superb organization, and its work is vital for the mathematical sciences. It leads the way for mathematicians and statisticians to engage with some of the most important challenges of our time.”