

AGS DRAFT RESPONSE TO 2020 DIVISIONAL COV

1. Page 7, second para under Management of Program

The COV recommends that, in order to ensure that individual programs have a measure of continuity across expected turnover of program officers, PO staffing levels should be increased. The AGS division relies on mentorship to bring rotating program officers up to speed on agency procedures and protocols, and it is reasonable to expect that each program within AGS have a permanent program officer. Some larger programs would benefit from having 2 permanent POs along with a rotating program officer. Smaller programs would benefit from more permanent and temporary assistance.

Each program within AGS has unique strengths. The COV recommends that cross pollination of successful strategies from specific AGS programs can be applied throughout AGS to research prioritization and the broadening of diversity among researchers within each discipline.

AGS Response:

We thank the COV for its suggestion. We will take a critical look and assess staffing levels in the programs. AGS currently has a staffing plan where the number of POs assigned to a program is based on various factors, e.g. size of the program and associated workload. In addition to their core program responsibilities POs are also expected to work across boundaries of programs and participate in cross-divisional and NSF-wide initiatives.

2. Page 7, last para under Portfolio

Broadly speaking, AGS statistics show that an appropriate balance of awards was distributed between educational institutions and private research institutions. In order to increase collaborations with government scientists, the COV recommends more multi-agency funded solicitations.

AGS Response:

The division is committed to supporting the best science in the Atmospheric and Geospace Sciences and related topics. In this regard, we partner with other agencies as appropriate. We also utilize the most appropriate method for conducting these collaborations. Please see the response to recommendation 15 below for more details.

3. Page 8, last sentence under Question 1.

In some Programs, program officers described in their Review Analysis reports why a particular review modality (panel, ad hoc, or combination) was chosen, although such details were neither found for all proposals nor consistently available for all Programs.

AGS Response:

NSF programs have the flexibility to consider a particular review modality as long as they maintain consistency and deal with submissions that are received in a fair and equitable manner.

Traditionally the programs in GS and NFS rely on panels, oftentimes augmenting with ad hoc reviews as well. Programs in AS rely on ad hoc reviews except in the case of requests related to large field campaigns. Panels are held for the field campaign requests. The cross-divisional P2C2 program also conducts its review using panels; ad hoc reviews are sought as/when additional expertise is needed.

The Context Statement in eJacket describes the review process for the submission under consideration.

4. Page 9, first sentence onwards.

In general, the COV finds that both merit criteria are given close attention at all levels of review. The panel summaries and review analyses explicitly addressed Intellectual Merit and Broader Impacts (BI) in all cases, although some individual reviews neglected to provide comments about the latter. Across all programs, most proposals that did not receive funding were declined due to problems associated with limited Intellectual Merit. Conversely, several proposals were selected for funding on the strengths of their Intellectual Merit, despite having either limited or poorly articulated Broader Impacts. Because the COV also noted cases where proposals were awarded funding on the strengths of their Intellectual Merit and the past productivity of the Principal Investigator, the COV concludes that the Broader Impacts criterion plays only a secondary role in the proposal assessment process for most programs. The COV notes that the EDU program was able to support projects with exceptionally strong BI, largely due to efforts by the program officers to encourage applicants to address intellectual weaknesses identified by reviewers or panels.

AGS Response:

All AGS proposals are evaluated using the NSB-approved merit review criteria; however, in certain instances AGS employs additional criteria highlighting targeted programmatic objectives.

AGS POs are expected to give full consideration to both criteria during the decision-making process. Each criterion is necessary, but not sufficient in of itself. Reviewers as well as PIs are expected to address both criteria. We will continue to get input on both criteria in the reviews, paying due attention to the Broader Impacts criterion in the funding recommendation. We will strive to document both the potential to advance knowledge (Intellectual Merit) and the potential to benefit society and contribute to specific, desired societal outcomes (Broader Impacts) in the Review Analysis of each submission.

It is no surprise that educational projects shine with regards to BI, given much of the educational portfolio is focused on helping students and faculty in a targeted way compared to a typical science proposal. That is not to say that Intellectual Merit is absent but only to say that BI are prominent in most cases.

5. Page 9, Comments to Question 3.

The individual reviews span a wide range of depth. Some reviewers provide substantive and detailed comments, whereas others do not. Towards improving consistency of quality amongst the reviews and diversity of reviewers, the COV suggests, to the extent possible, that AGS maintain a central database of the reviewer pool that can help to track the quality of their reviews. This

would allow the POs to keep track of repeat and brand new reviewers, how often the same people been asked to serve, what factors determine whether a reviewer is or is not invited back, and whether proposers raise issues with particular reviews. In addition, if this database contains information about reviewer demographics, AGS can work to assure the diversity of the reviewer pool, to the extent allowed by law.

AGS Response:

As the COV noted there is a range in the quality and depth of the reviews. Currently, POs have the option to check in eJacket on reviews provided by a specific reviewer. AGS is committed to broadening the diversity of its reviewer pool. We thank the COV for the database suggestion and will look into this.

6. Page 10, Comments to Question 5.

The COV was impressed with the quality of the rationales from the program officers (POs). In some instances where a review panel/set of reviews was on the fence, the PO sought additional input in order to support potentially transformative proposals; that input helped the COV to see the PO's thought process. Some of the in-house decisions (e.g., EAGER) did not necessarily have the same transparency, however, so the COV recommends that the PO provide at least a memo in the jacket that indicates how the decision was made to award/decline.

AGS Response:

We thank the COV for their recommendation. AGS will adhere to using EAGERs to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. PI(s) must contact the NSF Program Officer(s) whose expertise is most germane to the proposal topic prior to submission of an EAGER proposal. Initial inquiries on EAGER requests that are declined by the PO are not documented in eJacket.

Only internal merit review is required for EAGER proposals. Each EAGER award has a Diary Note or Review Analysis that includes a justification of why the project was compatible with the goals of the EAGER mechanism. AGS will make every attempt to ensure that the necessary documentation is in place.

7. Page 11, line 5 under 7. Additional comments on the quality and effectiveness of the program's use of merit review process.

In order to more proactively engage the wider community, the COV recommends that the AGS Director send an (annual) letter of appreciation to heads of all participant institutions. This letter would promote the role of NSF national and global science and highlight the importance of the expert peer-review process in selecting innovative and well-balanced scientific portfolios that ultimately benefit the whole community and the nation. The COV hopes that these letters of appreciation would motivate institutions to recognize, reward, and perhaps compensate their experts, who should be identified by name in these letters if possible. Further, each reviewer

should be individually acknowledged for their participation in a letter from the AGS director and co-signed by the appropriate PO(s). This letter should explicitly identify the circumstances of the reviewer participation including program names, panel type and dates, etc. The COV invites NSF to consult the community on the content of the letter.

AGS Response:

AGS relies on the volunteer service of its reviewer community. We make every effort to thank our reviewer community in professional conferences, PI meetings and similar venues. We thank the COV for its suggestion. Adding specificity as to who served, when, where, and under what circumstances (as requested by the COV) violates the NSF OGC guidance on revealing reviewer and panelist identification to protect their anonymity. This has been ruled on previously by OGC.

8. Page 12, under 3. Additional comments on reviewer selection.

Occasionally there were two or three reviewers from the same institution for one proposal or on one panel. The COV recommends avoiding this situation in the future when requesting reviews. Overall, the sets of reviewers for AGS programs had an adequate balance of men and women.

AGS Response:

AGS agrees with the COV recommendation to avoid having multiple reviewers from the same institution on a proposal review or panel in compliance with the recommendations from the Proposal and Award Manual for the selection of ad-hoc and panel reviewers. Program staff will be reminded of the need to comply with guidance on selection of reviewers and the important factors to consider when composing panels.

9. Page 13, starting second to last line under 2. Responsiveness of the program to emerging research and education opportunities.

The COV noted the dearth of information regarding the career paths of students and post-docs who are supported directly by AGS funding. The COV appreciates that the issue of training efficacy cuts across many or most NSF programs, but also encourage AGS staff to identify useful approaches to determine whether junior scholars funded by AGS programs are transitioning into positions within science, technology, or education fields. In this regard, AGS should investigate how trainee outcomes are tracked by other federal and foreign science agencies.

AGS Response:

Tracking of individual students and post-docs involves privacy and human subject research considerations that are beyond the scope of responsibilities and skills of individual program officers within the division. Through NSF National Centre for Science and Engineering Statistics (NCSES) surveys of the field at large are conducted and relevant reports are produced. We will include such data in the next self-study report.

10. Page 14, second para under 3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

The COV finds that all programs recognize the crucial need to increase a broader range of diversity and reduce underrepresentation across the AGS disciplines in awards and future researchers. Some programs have made efforts toward this goal, and others may need to consider how to set actionable goals and plans in order to achieve this larger goal. Some programs within AGS have developed guidelines and documentation to foster and build more diverse arrays of researchers and programs. An impressive outcome of recent awards in certain programs has been enhanced diversity (female, ethnically Hispanic, and African American scientists). Such planning can be applied to disciplines that lag in diversity. Specifically, these programs should develop action items to achieve particular diversity goals and learn from and leverage the demonstrated success of other programs within the Division and Directorate.

AGS Response:

AGS strongly agrees with the COV on the need to improve diversity and broaden participation of underrepresented communities throughout the Geosciences and within the programs that make up the division. The issue of participation by underrepresented groups is one of concern for all the sciences. While proposal submissions by women have increased in the past three years, submissions from other underrepresented groups have not increased significantly. The Program Directors will continue outreach in a proactive manner such that members of such groups are engaged with the Section as proposers and reviewers.

As the COV notes, programs in the division have different diversity metrics. As part of continual improvement effort of the division, program officers will exchange best practices in order to enhance diversity in the programs.

11. Page 14, third para under 3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

The COV recommends that cross-pollination of successful strategies from specific AGS programs should be applied to research prioritization as well. Notably, the National Academy of Sciences, Engineering, and Medicine (NASEM) published consensus reports in multiple fields that describe compelling research strategies and identify where additional investments in research infrastructure could best advance scientific understanding in those fields. Such reports could be used by AGS to increase funding and support in recommended areas. The COV also recommends that other AGS programs consider this route for seeking external perspectives from a wide sampling of professionals.

AGS Response:

Programs within AGS use NASEM committees for input on research priorities and strategies. Most recently, the Geospace Section had a NASEM committee review the strategies and recommendations of its portfolio review. Input is also sought on a continual basis through annual meetings (e.g. CEDAR/GEM/SHINE).

The Atmospheric Chemistry program solicited a study by the NAS. Released in 2016, it contained numerous recommendations that are currently being addressed. Other venues for community input include Advisory Committee for Geosciences and professional conferences (e.g. annual meetings of the AGS and AMS, U.S. CLIVAR summit, and USGCRP activities).

The Division remains committed to utilizing community input where appropriate for setting strategic objectives and priorities. AGS will also better articulate how such input is sought in the next self-study report.

12. Page 14, second para under 4. Responsiveness of program to previous COV comments and recommendations.

The largest big-picture challenge that emerged, which this COV continues to encourage AGS to work on, is the issue of Broader Impacts. The 2018 COV report recommended "finding ways to communicate this (sic broader impact) information to a wider audience at meetings and elsewhere such as webinars." The AGS response was very positive, with several good ideas and action items. These actions to communicate the broader impacts of AGS research may need to continue, as some proposers and write-in reviewers do not address the broader impacts at all.

AGS Response:

As the committee notes there is a continuing need to communicate with the AGS research community about the Broader Impacts (BI). Addressing broader impacts is an ongoing issue for all of NSF. For its part, AGS will continue to conduct townhalls at meetings in which program officers will present examples of outstanding broader impacts and ways the research community can creatively incorporate BI efforts into their research portfolios. These presentations will draw upon the guidance related to BI provided to scientific community in the Proposal & Award Policies and Procedures Guide. AGS has also begun using pre-panel webinars to communicate with reviewers on a variety of topics related to the review process including BI and will continue to utilize this effective procedure for improving the review process. AGS will continue to strike a balance between being informative and prescriptive with reviewers who graciously and generously donate their time and expertise to the NSF merit review enterprise.

13. Page 16, second para in Question 3.

NSF defines transformative research as: challenges conventional wisdom, leads to unexpected insights that enable new techniques or methodologies, and/or redefines the boundaries of science, engineering, or education. Although the reviewers noted the potential for transformative results in a few proposals, the COV notes that transformative work is most likely to be identified only in hindsight. The AGS management, and hence future COVs, could assess the fraction of transformative awards better by reviewing final and other reports for previously funded and completed projects.

AGS Response:

AGS agrees that transformative work is more clearly identified in hindsight, however as is, the COV report currently reviews a fixed period of time which is beyond the transformative window acknowledged by the COV. If the window is to stay the same, the best the programs can do is to identify projects that they believe have the potential to have transformative impacts. Typically, these fall in the category of EAGER projects.

14. Page 17, line 4 in Question 4.

The COV commends AGS for their efforts and success in promoting inter- and multi-disciplinarity both within and outside AGS. The COV finds that the bottom-up approach that is generally adopted within AGS naturally leads to an appropriate level of interdisciplinarity, which is at approximately 19% when using co-funding rates as a proxy, and thus recommends continuing these practices. The COV encourages more multi-agency collaborations in the spirit of promoting inter- and multi-disciplinarity and addressing the needs of the AGS community (e.g., for data collection, monitoring, modeling, applied research, and theory development).

AGS Response:

AGS appreciates the COV's recognition of the excellent efforts made by program officers to support inter- and multi-disciplinary research projects. In addition to the efforts of program officers, AGS participates in interdisciplinary programs across the directorate (e.g. PREEVENTS, CoPe) as well as Foundation wide programs (e.g. CSSI, CNH, HDR, Convergence). Where appropriate AGS will partner with other federal agencies to support inter- and multi-disciplinary research programs.

15. Page 18 top of the page under Recommendation

Because NSF is not allowed to provide support to scientists from government research labs, which became a barrier for collaboration between universities and government research labs on NSF-funded major projects, the COV recommends more NASA and NSF jointly funded project calls for every funding cycle. This reduces the barriers significantly because, while NASA provides funding for scientists from government labs, NSF will fund researchers from academic or private research institutions.

AGS Response:

The Geospace Section within the division routinely interacts with the Heliophysics Division (HPD) at NASA and enters into formal and informal agreements to support collaborations across the research enterprise. For example, the section is currently participating in the jointly funded [Space Weather for Quantified Uncertainties](#) program solicitation through which successful proposals will be funded by NASA or NSF. Informally, the Section participated with the HPD on the formulation of the call for DRIVE Science Centers recommended by the Solar and Space Physics Decadal Survey. In this case, it was more efficient and effective for NASA to conduct the competition. AGS remains committed to partnering with NASA and other agencies on projects that advance the science utilizing the most effective method for conducting these collaborations.

16. Page 19, answer to Question 9.

The COV finds that AGS award rate is representative of the field as a whole. By comparing submission and award rates with national statistics for PhD graduation rates for women and minorities, the COV verified that these data are consistent. The COV commends the collaboration of AGS with other NSF programs such as Excellence in Research program that fosters efforts at HBCU, and MSIs, as well as the SOARS program that targets diversity. The COV recommends that AGS expand these collaborations and outreach efforts to continue to increase proposal

submission numbers for underrepresented groups. Tracking this information from year to year will also help future COV reviews to assess growth over time.

AGS Response:

AGS thanks the committee for their comments on these topics. AGS will continue to participate in NSF-wide initiatives to expand the diversity of the community of researchers in the field. AGS continues support for SOARS. AGS will track information to assess growth on a year-to-year basis as recommended by the COV.

17. Page 20, under OTHER TOPICS item 3.

The COV expressed some concern about whether mechanisms exist for linking outcomes from one funded proposal to the funding of future proposals. While the COV acknowledges that proposals are required to report on previous support for both intellectual merit and broader impacts, there was some concern that it was possible for individuals to misrepresent their impacts. Of particular note is mentorship of students, which is often an important component of BI statements. Given the lack of representation of women and underrepresented minorities in the geosciences, some COV members suggested that the lack of direct feedback between outcomes from prior proposals and future funding might contribute to disproportionately greater attrition rates of students from such underrepresented groups.

The COV recommends that NSF as a whole develop a clear mechanism for reporting the productivity of individuals who are working with undergraduates/graduates for training of future scientists within communities. Just because one is productive from a publishing standpoint, does not mean this person is a supportive member of the community for preparing the next generation of scientists. While this is not just NSF's responsibility, the COV encourages a component from NSF to take the lead in tackling this challenge. This may start with an investigation of how systemic this issue is and obtaining the perceptions of relevant individuals in programs as well as those who finished/left programs.

AGS Response:

The COV is correct that there is no current mechanism to assess the impact of student mentorship by a PI in a proposal. Current reporting requirements only include a discussion of the Results under Prior NSF Support, and PIs may provide this under Broader Impacts of prior NSF support. A full list of the individual's PhD thesis advisees is also required for the Collaborators and Other Affiliations document, but that is an NSF internal list that the reviewers do not see. In the Annual and Final Reports for awards, PIs are required to discuss "what opportunities for training and professional development the project has provided" and "what is the impact on the development of human resources", but NSF is not able to verify those statements. Student mentorship is a responsibility of the PI as a part of their institutional duties and NSF relies on the awardee institutions to provide oversight.

Nevertheless, AGS and GEO will be sure that this concern is brought to the attention of the Office of Integrative Activities as the organizational steward of the NSF COV process.

18. Page 21, third para from top.

The COV encourages NSF to ensure that reviewers and panelists are in good standing with the community, in line with NSF's policies regarding PIs and co-PIs, as described in Important Notice No. 144, and ODI bulletin No 18-01, [NSF.gov/harassment](https://www.nsf.gov/harassment)

AGS Response:

Program Directors will continue to use their best judgement to select reviewers and panelists given the information available to them abiding by NSF policy. As mentioned in ODI bulletin 18-01, NSF does not tolerate sexual harassment, or any kind of harassment, at grantee organizations, field sites, or anywhere NSF-funded science and education are conducted. AGS program directors will be reminded they need to report any complaints they might receive in this regard during the course of their work, to Office of Diversity and Inclusion.

AGS will convey the COV recommendation to ensure panelists and reviewers are in good standing to the relevant NSF working group to ensure it gets appropriate attention. AGS will suggest to the Deputy Assistant Directors and DIS that in addition to PIs and co-PIs, reviewers and panelists who are not in good standing also be flagged in the NSF internal database. Program directors would get a warning if they tried using a reviewer or panelist who is flagged and would thus not utilize their services either as panelist or ad hoc reviewer.

19. Page 21, second para under item 5.

There is some concern that, while the COV appreciates the importance of getting the larger perspective at a Division level, some of the specificity that occurs at a sectional level in previous COV reports potentially could be lost.

AGS Response:

We believe that the COV did an excellent job assessing the activities of the division while trying to balance the review of the three different sections, especially without guidance from prior division-level COV reports. AGS values the discussion with COV members on those topics. It is likely that the COVs will continue in the future to be at the Divisional level, but we will try to make sure that there is program and section-level discussion that feeds into the overall report.

20. Page 21, third para under item 5.

As a COV, we are incredibly appreciative of the efforts that went into the construction of the Self-Study Report, which was critical for our ability to consider and analyze the work done across the Division. However, the COV recommends that the Self Study Report include a special section highlighting examples of innovative/transformational research from different Programs with time frames to be able to compare research across comparable time frames.

AGS Response:

This is an excellent suggestion. We will look into the possibility of incorporating into the next Self-Study Report.

21. Page 22, top of the page.

Editing the SharePoint templates (including this one) online was frustrating for some COV members. It would be helpful for NSF to demonstrate collaboration tools as some reviewers were not familiar with the resources provided.

Some COV members expressed difficulty with the COI feature of the EJacket system. The COV recommends adding instructions for how to input COI in the EJacket system when the COV members are uploading their profile information. Doing this will flag jackets that are from their institution or have PI/CoPI participation as a COI. Later if a COV member starts to look at a jacket and determines that there is involvement of a collaborator on the project, the COV member can add that proposal to the COI list under the proposal section. Also, please identify all collaborative proposals for which each COV member has COIs instead of just the lead proposal. As it currently stands, a collaborative proposal that is not the lead proposal does not explain why a jacket was unavailable, making it look like a computer error.

AGS Response:

AGS will convey this information to our colleagues at NSF that oversee these aspects of the COV process.