CHE Response to the 2020 Report of the Committee of Visitors
October 27, 2020

The Division of Chemistry (CHE) would like to first thank the members of the 2020 Committee of Visitors (COV) for their time and effort in monitoring and evaluating the program management and investments of the Division. The CHE Division is grateful to Drs. Peter Dorhout, Robert Cave, and Malika Jeffries-EL for their leadership as co-chairs the COV meeting and for putting together a comprehensive and thoughtful report.

We appreciate the recognition by the COV of the integrity and efficacy of CHE procedures to solicit and review proposals and of the processes used to recommend and document proposal actions. We appreciate the favorable comments made about the quality and significance of the results of the Division's programmatic investments; and about the relationship between the portfolio and the missions of the Division, the Directorate, and the Foundation; and about the Division's engagement in and prioritization of research initiatives.

The COV made six main recommendations that we address below:

Recommendation 1: The Division of Chemistry Budget needs to be increased significantly to meet the needs of the community and the nation. The Committee of Visitors (COV) believes that the Division (CHE) is an excellent steward of the funds it receives. The Division is also active in, and successful at, securing co-funding to increase its ability to support transformative science. However, the combination of flat overall budgets, participation in Foundation-wide initiatives, and increasing costs to PI is leading to a tipping point for chemistry funding for the Division. Excellent science goes unfunded each year. An NSF award "buys" fewer person hours, trains fewer people, and limits the number and impact of critical new findings. Support of the core chemistry research that is the heart of CHE is at risk of being contorted as the community attempts to fit into top-down initiatives. Finally, creative risk-taking science is hampered by short award durations. The Division can advocate for resources on behalf of the chemistry community, but this recommendation is aimed squarely at the Foundation and its ability to expand its overall funding.

The Division agrees. Each year there are innovative, high impact proposals that are declined due to limited funding. CHE is actively participating in NSF strategic planning, developing new initiatives that are important to the field, and building new partnerships with other divisions and other agencies to explore opportunities to leverage complementary resources in supporting strong science projects. At the same time, supporting core chemistry research is a high priority for CHE. More than 80% of our annual budget is used to support proposals submitted to the core disciplinary research programs that cover a broad range of topics. The CHE Division will continue to seek an appropriate balance between supporting community-driven broad-spectrum research and participating in new initiatives.

Recommendation 2: Further the impressive moves towards transparency in the review process. The 2016 COV recommended that the Division work to enhance the transparency of the review process. The current COV finds that considerable progress has been made. Panel reviews and summaries are substantive and communicate reviewer and panel rationales. The Program

Officer (PO) Review Analyses (RA) are clear, detailed, and persuasive. The COV found somewhat greater variability in the quality of ad hoc reviews, but they do not comprise the majority of the review portfolio and did not generate deep concern. The thrust of this recommendation is that the COV would like to see PO comments and feedback to PIs expand to include more of the constructive information contained in the RAs. The COV believes PIs would benefit from the PO comments that provided the sort of detailed and reasoned discussions contained in the RAs, because this would not only enhance transparency, but also provide PIs with greater guidance for future submissions.

We thank the COV for noting the quality of the panel review and summaries, as well as the Review Analyses (RAs) prepared by CHE program officers. We agree with the COV that providing detailed and clear rationale for program decisions would no doubt provide PIs with better guidance. We will continue to encourage our Program Directors to include more information in the PO comments section and to share more constructive feedback with PIs, either through writing or phone calls. Working with the NSF policy office and other NSF units closely, the CHE division will also explore options to provide better guidance to our ad hoc reviewers to improve the consistency of mail-in reviews.

Recommendation 3: Employ panels in the review process when possible. The COV finds that the panel process provides excellent feedback to PIs. The Division currently does the bulk of its reviewing by panel, and the COV urges that panels continue to be central to the efforts of CHE. In addition to the benefits to PIs, panels also serve to acculturate new PIs and provide important networking opportunities. Some concerns were raised about the time commitments required of in-person panels on faculty, but other COV members felt that PIs could decide for themselves, and that in-person panels should remain the norm. The COV also urged the Division to seek broader participation from the community in the review process especially noting a desire to enhance the diversity of its reviewers across the many dimensions of diversity. The COV asks that the Division find ways to engage the community in a discussion of panels and the challenges and opportunities they present.

We agree with the COV that panels are of value particularly as they enable in-depth discussion among the panelists and, in this way, provide collective feedback to programs and PIs. That said, the Division notes that in order to insure the required expertise to properly judge all proposals that CHE receives, some proposals are best handled by either hybrid panel/ad hoc review or straight ad hoc review, depending on how specialized those proposals are. We will also continue to work to expand our reviewer pool with the aim of enhancing the diversity of our panels. The importance of a diverse reviewer pool will be emphasized to incoming program directors, who will also be encouraged to recruit new URM reviewers from amongst their professional networks. We also plan to utilize our conference outreach, the virtual office hours, and division websites, etc. to actively reach new URM chemists and encourage them to apply to the Division and consider becoming reviewers and Program Directors.

Recommendation 4: Seek greater community clarity with respect to Broader Impacts. The COV believes that Broader Impacts are a critical part of the assessment of proposals to the NSF.

However, the COV found that the attention paid to Broader Impacts by reviewers and panels varied considerably across the proposals we examined. Further, it was sometimes unclear how the assessment of Broader Impacts factored into the funding decision. The community as a whole has widely varying perceptions of what Broader Impacts are, and how to fulfill them. Finally, the COV believes that the ability to assess Broader Impacts lags the ability to assess Intellectual Merit. The chemistry community seeks guidance and education on this issue, since it is clear that confusion persists among proposal writers and reviewers. The COV suggests that the Division find ways to engage the community in discussions about the Broader Impacts and perhaps use these conversations to further educate the community and generate clarity around what they mean to everyone. For example, a series of workshops should be held, out of which community consensus might emerge. Community norming of this type would be of immense benefit to young PIs and also be helpful to reviewers and POs who are asking those reviewers to assess proposals.

Broader Impact (BI) activities come in many forms. The CHE Division agrees with the COV that it is important for reviewers to embrace a diverse range of ideas in BI and continuously engage the community in conversation. We also need to engage all stakeholders in discussion on how to change our culture on viewing BI activities during promotion and tenure to move the needle in perception. Several activities are planned, including using the division office hours in open discussion of the NSB BI review criterion. This would also be a good venue to ask the question of the community as to how BI activities are considered in promotion and tenure decisions. While such considerations are beyond the domain of the NSF, the more seriously that BI activities are taken in the academy, the more likely that they will weigh in significantly in NSF panel review. We are also committed to improving the training and education of reviewers on how to evaluate broader impacts. Accountability for BI activities will also be a point of emphasis in both panel reviews for renewal applications or new applications from previous awardees and in progress reports for current awardees.

Recommendation 5: Continue efforts to promote inclusion for the scientific enterprise. The 2020 COV echoes the 2016 COV with this recommendation. The Division should continue outreach to institutions that educate historically underserved populations and primarily undergraduate institutions. The COV recognizes that there may be ways for the Division to promote cross-institution mentoring for PIs at small institutions, where their expertise is singular. The COV recommends that the Division encourage and facilitate a new generation of organizations that promote inclusion at the faculty level. As an example, the Division could promote a database of all new hires in chemistry-related departments across from across the country so as to develop formal and informal networks that continue to support and mentor women and PIs from under-represented backgrounds beyond the impressive CAREER workshop the Division holds. The COV recognizes that many of the most creative ideas have come from the community, which is an essential partner with CHE in order to improve access and inclusion, and it would welcome opportunities to be active participants to support these efforts.

The Division of Chemistry is committed to supporting and expanding broadening participation, diversity, and inclusion efforts internally and externally. Broad-based constituencies in the Chemistry Community will also need to become more fully involved if these challenges are to be positively addressed. Students, parents, K-12 school systems, national education agencies, other

funding agencies, higher education systems, and disciplinary associations (such as the American Chemical Society) are among those that have roles to play that are complementary to NSF CHE efforts. The Chemistry Division welcomes discussions with internal and external stakeholders, both public and private, to support appropriate initiatives. This will be an ongoing and evolutionary process.

There are a number of actions that the Division can take now to begin to better address diversity and inclusion issues.

1. Internally, the Chemistry Broadening Participation, Diversity, and Inclusion (BPDI) committee has been formed. Internal discussions are actively occurring at the committee, Division, and Directorate levels, and have been accelerated in response to recent national events. These discussions are addressing internal climate, expanding awareness, staff recruitment, hiring issues, and related topics. The BPDI Committee is revising the Chemistry Division's Diversity Plan, which will address internal and external actions to be taken to promote and support diversity and inclusion.
2. Recruiting a diverse group of program directors remains a priority goal for the Division and efforts to move the needle in this regard are ongoing.
3. Externally, the Division will continue to expand (i) outreach efforts to HBCUs and other MSI or PUI institutions, (ii) outreach efforts at conferences focused on STEM URM, such as NOBCChE, AISES and SACNAS, (iii) CHE office hours focused on topics of particular interest to the STEM URM community.
4. The Division will continue to consider current and future funding initiatives that can serve the needs of a diverse group of CHE URM researchers. The Division participates in the HBCU-EiR (NSF 20-542) initiative. Centers for Chemical Innovation (CCI) awardees have strong and creative broadening participation activities that will continue to be leveraged in new ways. The Division has recently joined CBET in the RARE (NSF 20-586) solicitation that aims to re-engage, retrain, and broaden participation within the academic workforce.
5. The Division will continue to strive to enhance the diversity of reviewers. In addition to what is discussed in the response to R3, the Division was an NSF leader in developing panel briefing materials addressing bias, and is committed to following current NSF guidance and requirements related to reviewer/panelist education regarding bias; however, the Division will consider additional steps that may be taken to improve the equity and transparency of the review process.
6. Broadening participation is one of many ways that a proposal might address the NSF Broader Impacts review criteria. Activities of the Division related to Broader Impacts are addressed above in the response to R4.

Date: November 6, 2020
From: Division Director, Division of Chemistry
Subject: Diversity and Conflict-of-Interest Report for the Division of Chemistry FY 2020 Committee of Visitors
To: Assistant Director, MPS

The Division of Chemistry held its quadrennial COV on June 1-3, 2020. The COV was comprised of 44 members of the research and education community in chemistry sub-disciplines supported through the Division's programs. These individuals were chosen for their scientific expertise and their breadth of understanding of issues impacting research and education in chemistry. Collectively, the COV membership represented a variety of perspectives and was balanced across the various sub-disciplines in the field. Inclusiveness in the COV membership is illustrated by the committee's geographic, institutional and demographic diversity, as shown below:

Category	Number
Member of MPS Advisory Committee	1
Academic Institutional Type	
PhD	36
PUI	8
Public	23
Private	14
Industry	3
Government	
FFRDC	3
Federal Agency	1
Location	
East North Central	5
East South Central	4
Middle Atlantic	3
Mountain	3
New England	5
Pacific	10
South Atlantic	3
West North Central	6
West South Central	4
Canada	1
Gender	
Female	18
Male	21
Unknown/Undisclosed	5
Ethnicity	
Hispanic	9
Non-Hispanic	25
Unknown/Undisclosed	10
Race	
Asian	1

Black or African American	4
Native American	3
White	26
Unknown/Undisclosed	10
No NSF Support in Five Years	13

In late April 2020, prior to the meeting of the COV, four duplicate videoconferences were conducted to prepare the COV members for the review process. These meetings were conducted by the then-acting CHE Division Director, Dr. Carol Bessel; the MPS Staff Associate, Dr. Kathy McCloud; and several others from the CHE Division. At these meetings, the COV was briefed on Conflict of Interests (COIs) for the purpose of the COV's statutory responsibilities, namely the reading of proposals, reviews, and recommendations; commenting on the handling of actions; and reviewing the appropriateness of recommendations. Issues of confidentiality were also discussed. Each COV member completed and signed an NSF Confidentiality and Conflict of Interests form. The COI and confidentiality information was repeated in separate, later videoconference briefings conducted in May by each reviewed program and attended by all COV members assigned to the specific program. These later briefings also provided program data and detailed instructions for using relevant COV software.

The COV videoconference meeting began on June 1, 2020, with a welcome and charge by MPS then-Acting Assistant Director Dr. Sean Jones, followed by remarks from new CHE Division Director Dr. David Berkowitz, Deputy Division Director Dr. Bessel, and by COV co-chairs Drs. Peter Dorhout, Malika Jeffries-EL, and Robert (Bob) Cave. These remarks were followed by a short re-briefing on COIs, confidentiality, and Federal Advisory Committee Act rules by Dr. McCloud. At all COI briefings, COV members were instructed to reveal to the CHE COI Conflicts Official (and the members of their subgroups) any conflicts or appearances of conflicts as described in the NSF Conflicts of Interest Manual 10. If subpanels requested additional proposals for review, these proposals were promptly provided following a review for conflicts of interest. Proposals and files were not available to COV members where the member had a conflict of interest. Furthermore, the COV members did not participate in the discussion of actions with which they had conflicts. Because all co-chairs and MPS Liaison Dr. William Tolman had COIs with the Instrumentation program, COV member Dr. George Schatz prepared and presented the relevant section.

The Division of Chemistry believes that the efforts of the COV and the especially the COV co-chairs, Drs. Dorhout, Jeffries-EL, and Cave, were outstanding in all respects. The Division staff detected no situations in which conflicts of interest were not handled properly. The Division was pleased with the quality, professionalism, and thoroughness of the COV report and its findings.