



**NATIONAL SCIENCE FOUNDATION**

**Date:** March 5, 2018  
**From:** Assistant Director, MPS  
**Subject:** **Response Update to the Division of Chemistry Committee of Visitors Report**  
**To:** Incoming COV, program staff, and Division Directors

MPS continues to address the suggestions of the 2016 Committee of Visitors (COV). The Division of Chemistry drafted the attached Response Update and I concur with its content.

In order to be readily available to the incoming COV, program staff, and Division Directors, as required by policy, the report will be posted on the MPS Committee of Visitors Updates webpage ([https://www.nsf.gov/mps/advisory/cov\\_update.jsp](https://www.nsf.gov/mps/advisory/cov_update.jsp)).

Sincerely,

A handwritten signature in black ink that reads "Anne L. Kinney". The signature is fluid and cursive.

Anne L. Kinney  
Assistant Director, National Science Foundation  
Directorate for Mathematical and Physical Sciences

Attachment: Response of the Division of Chemistry to the 2016 COV Recommendations

## **CHE Response to the 2016 Report of the Committee of Visitors**

FY 2017 Update

The Division of Chemistry (CHE) thanks the members of the 2016 Committee of Visitors (COV) for their review of the processes of the Division. We are very grateful to Dr. Sharon Hammes-Schiffer for chairing the COV, especially her leadership in providing a timely and thorough effort.

The COV provided a detailed report made of three primary recommendations that are addressed below:

**“Recommendation #1: Advocate additional funding for the Chemistry Division overall and maintain focus of existing funds on high-impact fundamental research.** The percentages of funded proposals are low, and many strong proposals cannot be funded. Although the COV recognizes the challenges in the current funding climate, additional funds would greatly enhance the ability of the Division to maintain a strong research portfolio. The COV commends the Division for allocating a substantial portion of the budget to fundamental research and advises against diversion of existing funds from the core mission of fundamental research in efforts to initiate new programs. The highest priority should be funding the best fundamental science and transformative chemistry. In addition, the Division should ensure that the grant sizes are large enough to enable transformative chemistry with broad societal impact and should advocate for additional funds to increase both the number and the size of the grants.”

### **Update**

The Division of Chemistry strives to fund the best transformative, fundamental science. While the Division would very much like to increase both the number and the size of our grants, in times of flat budgets, this is not feasible. We do, however, seek to maximize opportunities to fund transformative science at every juncture. Partnerships, including interdisciplinary, cross-directorate, and interagency activities resulting in co-funding opportunities enable broader community support - increasing the number of grants that would be possible over what CHE alone could fund. Principal Investigators (PIs) are provided with opportunities to further enhance the size of their grants with supplemental opportunities which address areas such as workforce training,<sup>1</sup> international collaborations,<sup>2</sup> and new chemistry discoveries via data science.<sup>3</sup> These supplemental opportunities aid the PIs and address areas that the Division believes are important for moving the field of chemistry forward.

An example of an area in which CHE has worked with other Directorates is the Innovations at the Nexus of Food, Energy and Water Systems (INFEWS) initiative. With strategic partners including the Division for Chemical, Bioengineering, Environment and Transport Systems (CBET) and the Division of Materials Research (DMR), a revised [Dear Colleague Letter \(DCL\): FY 2017 Innovations at the INFEWS Funding Opportunity on Nitrogen, Phosphorus, and Water \(NSF 17-013\)](#)<sup>4</sup> was issued to target significant problems in agriculture and sustainability. This DCL focused on the conversion of nitrogen to ammonia, the selective recovery of phosphorous from agricultural environments, and the remediation of water systems. These efforts are aligned with CHE's strengths in catalysis, supramolecular assemblies, sensing, and analytical methods. Funded INFEWS projects increase our ability to move scientific advances from the

laboratory bench to markets while addressing important societal needs. In FY 2017, CHE leveraged \$4.45 million in efforts related to the CHE/CBET/DMR DCL and the NSF-wide INFEWS Solicitation.<sup>5</sup>

The Division continues to engage in NSF-wide activities such as Understanding the Brain (UtB), which includes NSF's participation in the interagency BRAIN Initiative. In October 2016, CHE sponsored a workshop that focused on identifying new chemical opportunities for measuring brain organization, activity, and function. Such research areas may allow researchers to spatially and temporally map neurochemical signaling within the brain. The workshop brought chemists together with neuroscientists and computer scientists to identify research, education, infrastructure, and outreach activities to support this grand challenge. The workshop report, *Measuring the Brain: From the Synapse to Thought*, is available on the NSF CHE website.<sup>6</sup> This workshop and workshop report prepared and encouraged the chemistry community to participate in interdisciplinary, NSF-wide programs,<sup>7-8</sup> leveraging support from other directorates.

Additional examples of partnerships that provide additional co-funding for CHE investigators include: Department of Defense support for CHE Research Experiences for Undergraduates (REU) sites, NASA support for one of our Centers for Chemical Innovation, and Computer & Information Science & Engineering (CISE) Directorate co-funding for a computational chemistry institute as well as individual investigator grants in data discovery science.

We will continue to strive to identify new routes for partnerships. While the COV encourages a focus on "core areas", CHE also believes that moving chemistry research in new directions such as those arising from NSF's "10 Big Ideas" (i.e., Harnessing the Data Revolution, Quantum Leap, and Rules of Life) are very important.<sup>9</sup> These scientific areas move the field in new direction, while further providing additional routes to leverage CHE funding via partnerships.

**“Recommendation #2: Enhance transparency of the reviewing and decision processes.** To maintain the trust and support of the chemistry community, the reviewing and decision processes must be transparent. Although the individual reviews and panel summaries are sent to the principal investigator (PI), the basis for the final decision is not always clear. The Program Officers write detailed summaries that synthesize the reviews and panel discussions and explain the basis for the final decision in the Review Analysis. However, the Program Officer Comments section sent to the PI is often very brief and less informative. Although the PI is encouraged to talk to the Program Officer by phone, these comments would be more useful if conveyed in writing. Thus, the COV recommends that the Program Officer Comments section contain more information about the decisions for declining proposals, including the allowable comments from the Review Analysis, consistently across the programs. The consistent and effective use of panels across the programs, supplemented by ad hoc reviews as needed to add specific reviewer expertise, is also recommended to ensure greater transparency of the reviewing process. In addition, the COV recommends that the Division better clarify the assessment, weighting, and accountability of the broader impacts to the PIs and reviewers.”

## **Update**

The Chemistry Division agrees that it is important to provide our proposers with substantial

feedback regarding their award and declination recommendations. We also agree that Review Analyses provide insight that should be included in Program Officer (PO) Comments. We have strived to provide more informative PO Comments as a result of the COV recommendations. CHE has provided training to new and continuing Program Officers to write PO Comments that are helpful to the PI by putting decision factors in context. While CHE Staff are mindful that PO Comments can be a useful way to communicate with our community, we are also aware that many investigators do not know that PO Comments are available to them and thus, we have become more active in promoting their existence/usefulness in all our outreach activities (e.g., panelist introduction sessions, phone conversations, presentations at meetings, etc.).

The assessment, weighting, and accountability of the broader impacts criterion is a topic that continues to challenge PIs and reviewers alike. This topic is frequently discussed during formal and informal outreach activities, for instance at the annual Federal Funders' Town Hall Meetings held at National Meetings of the American Chemical Society. The importance of broader impacts is highlighted in the letters to *ad hoc* reviewers and in formal presentations at the beginning of every review panel. Panelists are consistently instructed to discuss broader impacts both during panel deliberations and in the written panel summaries.

CHE has also increased our efforts to provide examples of broader impacts through our highlights and discussions in our quarterly CHE Newsletters.<sup>10</sup> These exemplars demonstrate the diversity of activities that encompass technical, educational, and outreach broader impacts.

**“Recommendation #3: Broaden the representation of proposals across types of institutions and principal investigators.** Inclusiveness at all levels is essential to the mission of the NSF. A wide range of perspectives and narratives provides the substance required to tackle global issues and to exert a significant impact. The COV encourages the Division to continue successful programs and create effective new approaches to increase the number of high-quality proposals submitted from different types of primarily undergraduate institutions (PUIs) and PhD granting institutions. The heterogeneity of institutions within the PUI and PhD communities is significant, and this heterogeneity should be recognized in the creation of solicitations and in the review processes that lead to the funding or declination of proposals. Moreover, the same attention should be given to increasing the number of proposals from underrepresented minorities (URMs) and women, while maintaining the expectation of approximately equivalent success rates across the various groups. Current approaches aimed at increasing the numbers of applications from URMs and women have not been fully successful, indicating that other mechanisms need to be created and launched.”

### **Update**

The Division of Chemistry continues to encourage proposals from a broad variety of institutions. The Division has a large presence at the American Chemical Society (ACS) National Meetings – though Town Hall, Speed Coaching, and Sci-Mix and other poster events. In FY 2017, CHE program directors and administrative staff actively participated events at the National Organization of Black Chemists and Chemical Engineers (NOBCChE) National Meeting by mentoring and coaching students, judging posters, presenting sessions on our Research Experiences for Undergraduate (REU) sites, the Graduate Research Fellowship Program (GRFP), and research grant programs for faculty.

CHE also actively participates in NSF Days held around the country to ensure that faculty members in Established Program to Stimulate Competitive Research (EPSCoR) states are aware of funding opportunities. Such meeting help potential PIs become familiar with NSF Staff and may provide insight to them during the grant-writing process. Research-active chemistry faculty members at primarily undergraduate institutions (PUIs) are actively recruited as panelists. We agree that engaging underrepresented minorities and women is critically important for portfolio balance.

The NSF Chemistry Early Career Workshop has become an annual event encouraging new and perspective faculty members from a broad variety of institutions to learn more about the NSF grant process and new funding opportunities. Participants meet program staff from CHE (as well as the Department of Energy, Department of Defense, and National Institutes of Health), ask questions (speed coaching), and network with one another. This event particularly targets underrepresented minority faculty as well as faculty from PUIs.

Finally, NSF (and CHE) continues to offer supplemental funding opportunities for Historically Black Colleges and Universities (HBCU), and support for researchers through the Alliances for Graduate Education and the Professoriate (AGEP)<sup>12</sup> and the Career-Life Balance Initiative.<sup>13</sup> These opportunities provide many routes to encourage greater diversity and development opportunities within the Chemistry community.

#### Footnotes:

1. Dear Colleague Letter: Division of Chemistry's 2017 Supplemental Funding Requests for International Collaboration
2. Dear Colleague Letter: FY 2017 Improving Graduate Student Preparedness for the Chemistry Workforce
3. Dear Colleague Letter: Data-Driven Discovery Science in Chemistry (D3SC)
4. Dear Colleague Letter: FY 2017 Innovations at the INFEWS Funding Opportunity on Nitrogen, Phosphorus, and Water (NSF 17-013):  
[https://www.nsf.gov/pubs/2017/nsf17013/nsf17013.jsp?WT.mc\\_id=USNSF\\_25&WT.mc\\_ev=click](https://www.nsf.gov/pubs/2017/nsf17013/nsf17013.jsp?WT.mc_id=USNSF_25&WT.mc_ev=click)
5. Innovations at the Nexus of Food, Energy and Water Systems (INFEWS, NSF 17-530):  
<https://www.nsf.gov/pubs/2017/nsf17530/nsf17530.htm>
6. Measuring the Brain: From the Synapse to Thought,  
[https://www.nsf.gov/mps/che/measuring\\_the\\_brain\\_from\\_synapse\\_to\\_thought\\_10\\_2016.pdf](https://www.nsf.gov/mps/che/measuring_the_brain_from_synapse_to_thought_10_2016.pdf)
7. Developing a National Research Infrastructure for Neuroscience (NeuroNex, NSF 16-569):  
<https://www.nsf.gov/pubs/2016/nsf16569/nsf16569.htm>
8. NSF 16-607: Collaborative Research in Computational Neuroscience (CRCNS, NSF 16-607): <https://nsf.gov/pubs/2018/nsf18501/nsf18501.htm>
9. 10 Big Ideas for Future NSF Investments,  
<https://nsf.gov/pubs/2018/nsf18501/nsf18501.htm>
10. CHE Newsletters: <https://nsf.gov/pubs/2018/nsf18501/nsf18501.htm>
11. Historically Black Colleges and Universities Undergraduate Program (HBCU-UP, NSF 16-538): <https://www.nsf.gov/pubs/2018/nsf18522/nsf18522.htm>
12. Alliances for Graduate Education and the Professoriate (AGEP, NSF 13-071):  
<https://www.nsf.gov/pubs/2013/nsf13071/nsf13071.jsp>
13. Balancing the Scale: NSF's Career-Life Balance Initiative:  
<https://www.nsf.gov/career-life-balance/>