

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

2018 Update

**“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 (CHE) strives to fund the best transformative, fundamental science. Many of our disciplinary research programs have actively sought program co-funds with other divisions within the agency to augment the program budget enabling support for additional research awards in chemistry. CHE has also continuously provided opportunities to our principal investigators (PIs) to enhance the size of their grants with supplemental opportunities which address areas such as workforce training,<sup>1</sup> minority student participation,<sup>2</sup> international collaborations,<sup>3</sup> career-life balance,<sup>4</sup> and veteran participation.<sup>5</sup>

To encourage high-impact fundamental research, CHE strategically promotes activities that are in alignment with NSF Ten Big Idea new initiatives.<sup>6</sup> These initiatives leverage CHE funds and enable the convergence of multiple fields to solve the biggest and most difficult problems facing society today. In FY 2018, CHE collaborations included:

- RoL: Forecasting and Emergence in Living Systems (FELS)<sup>7</sup>
- RoL: Design and Engineering of Synthetic Cells and Cell Components (DESYN-C<sup>3</sup>)<sup>8</sup>
- HDR: Partnerships between Science and Engineering Fields and the NSF TRIPODS Institutes (TRIPODS + X)<sup>9</sup>
- QL: Dear Colleague Letter: RAISE on Enabling Quantum Leap: Transformational Advances in Quantum Systems<sup>10</sup>

CHE also issued several independent Dear Colleagues Letters:

- HDR: Dear Colleague Letter: Data-Driven Discovery Science in Chemistry (D3SC),<sup>11</sup>
- QL: Dear Colleague Letter: Enabling Quantum Leap in Chemistry (QLC)<sup>12</sup>

Beyond the Big Ideas, CHE has continuously supported core chemical research that contributes to NSF-wide activities such as Understanding the Brain (UtB)<sup>13</sup>, advanced manufacturing, and clean energy technologies.

We have also pursued interagency partnerships to augment our investment in core research areas as well as workforce development. Example partnerships include: co-funding of several CHE Research Experiences for Undergraduates (REU) Sites with the Department of Defense (DOD), support for the Center for Chemical Evolution (a Center for Chemical Innovation) with the National Aeronautics and Space Administration (NASA), and co-funding for an National Science, Engineering and Medicine study on Separation Science with the Department of Energy (DOE).

Last, but not the least, in 2018, CHE issued a solicitation for CHE-Disciplinary Research Programs (CHE-DRP)<sup>14</sup> to encourage proposers to focus on their best research ideas. We anticipate that by limiting the number of submissions per investigator per year, we may serve a broader community while striving to increase award sizes.

**“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 continued our commitment to enhance the transparency of the reviewing and decision-making processes. CHE has provided training to new and continuing Program Officers to improve our written comments on each recommendation of award and declination. Through these personalized “PO Comments,” we strive to enable informative communication about the major factors contributing to the Program’s decision.

We have also continued our outreach activities at national/regional conferences, university visits, and our Chemistry Early Career Investigator Workshop.<sup>15</sup> We are very excited to be able to offer the latter workshop as a means of educating our less experienced investigators on the review and decision-making processes as well as the preparation of broader impact section, the data management plan, and the postdoctoral mentoring plan. We also greatly appreciate the opportunity to get to know the younger faculty on a personal level and to enable them to network with their peers in informal settings.

We have also updated our online Data Management guideline to provide additional guidance to

proposers.<sup>16</sup>

**“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 encouraged proposals from Historically Black Colleges and Universities Undergraduate Program (HBCU-UP).<sup>17</sup> The new HBCU Excellence in Research (EiR) component supports projects that enable STEM and STEM education faculty to further develop research capacity at HBCUs and to conduct research. In FY 2018, CHE supported five EiR projects to enable faculty members to conduct research in different subareas in chemistry and to expand the existing chemistry research programs at their institutions. CHE continues to offer supplemental funding opportunities for researchers through the Alliances for Graduate Education and the Professoriate (AGEP),<sup>2</sup> the Career-Life Balance program,<sup>4</sup> and the MPS Graduate Research Supplement for Veterans.<sup>5</sup> These opportunities provide routes to encourage greater diversity and developmental opportunities within the Chemistry community.

CHE continues to encourage proposals from a broad variety of institutions by mentoring PIs and coaching students through an active outreach program and through our review process. The Division continues its outreach at the American Chemical Society (ACS) National Meetings, the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCHE) National Meeting, the Society for Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference, the American Indian Science and Engineering Society (AISES) Conference, and the Council on Undergraduate Research (CUR) Conference. At these meetings, CHE staff provide information at exhibition booths, by judging student poster competitions, and/or by presenting seminars on our Research Experiences for Undergraduate (REU) Sites, the Graduate Research Fellowship Program (GRFP), and research grant programs.

The Division has also visited individual universities and colleges, especially the primarily undergraduate institutions (PUIs) and underrepresented minority serving institutions. In 2018, we visited: Spelman College, Clark Atlanta University, Morehouse College, and Morehouse School of Medicine in the Atlanta area; Barry University, Florida Memorial University (FMU), and Florida International University (FIU) in Florida; and the University of Texas, Rio Grande Valley, Texas A&M International University,

Texas A&M University Corpus Christi, Prairie View A&M University, and Texas Southern University in Texas. At each university, CHE staff met with faculty members and/or students and discussed NSF funding opportunities and proposal writing techniques.

CHE has also actively participated in NSF-wide outreach activities, such as NSF Days that are held around the country to ensure that faculty members in Established Program to Stimulate Competitive Research (EPSCoR) states are aware of funding opportunities.

CHE has provided mentoring to the community, especially to inexperienced PIs, through PI phone calls and by inviting them to participate in NSF panels where they receive first-hand experience the proposal review process. Reviews are constantly recruited through our CHE Newsletters.<sup>18</sup>

### References:

1. Dear Colleague Letter: FY 2018 Improving Graduate Student Preparedness for the Chemistry Workforce: <https://www.nsf.gov/pubs/2018/nsf18056/nsf18056.jsp>
2. Alliances for Graduate Education and the Professoriate (AGEP, NSF 13-071): <https://www.nsf.gov/pubs/2013/nsf13071/nsf13071.jsp>
3. Dear Colleague Letter: Division of Chemistry's 2018 Supplemental Funding Requests for International Collaboration: <https://www.nsf.gov/pubs/2018/nsf18037/nsf18037.jsp>
4. Balancing the Scale: NSF's Career-Life Balance Initiative: <https://www.nsf.gov/career-life-balance/>
5. Dear Colleague Letter: MPS Graduate Research Supplement for Veterans (MPS-GRSV): <https://www.nsf.gov/pubs/2015/nsf15024/nsf15024.jsp>
6. 10 Big Ideas for Future NSF Investments, <https://nsf.gov/pubs/2018/nsf18501/nsf18501.htm>
7. Dear Colleague Letter: Rules of Life (RoL): Forecasting and Emergence in Living Systems, (FELS), NSF 18-081, <https://nsf.gov/pubs/2018/nsf18031/nsf18031.jsp>
8. Dear Colleague Letter: Rules of Life (RoL): Design and Engineering of Synthetic Cells and Cell Components (DESYN-C<sup>3</sup>), NSF 18-071, <https://nsf.gov/pubs/2018/nsf18071/nsf18071.jsp>
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10. Dear Colleague Letter: RAISE on Enabling Quantum Leap: Transformational Advances in Quantum Systems, NSF 18-035, <https://www.nsf.gov/pubs/2018/nsf18035/nsf18035.jsp>
11. Dear Colleague Letter: Data-Driven Discovery Science in Chemistry (D3SC), NSF 18-075, [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf18075&org=NSF](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf18075&org=NSF)
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13. 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),
14. Division of Chemistry: Disciplinary Research Programs (CHE-DRP), NSF 18-561, <https://www.nsf.gov/pubs/2018/nsf18561/nsf18561.htm>.
15. 2018 NSF-CHE: Early Career Investigator Workshop, <https://dudnik.faculty.ucdavis.edu/2018/03/31/2018-nsf-che-career-workshop/>
16. Division of Chemistry Advice to Principal Investigators on Data Management Plans, January 2, 2018, <https://www.nsf.gov/bfa/dias/policy/dmpdocs/che.pdf>

17. Historically Black Colleges and Universities Undergraduate Program (HBCU-UP, NSF 18-522):  
<https://www.nsf.gov/pubs/2018/nsf18522/nsf18522.htm>
18. CHE Newsletters: <https://nsf.gov/pubs/2018/nsf18501/nsf18501.htm>