



Report from the 2013

CHE Committee of Visitors

February 19-22, 2013



Charge:

The COV is charged to **address and prepare a report** on

- (1) The integrity and efficacy of processes used to solicit, review, recommend, and document proposal actions.
- (2) The quality and significance of the results of the Division's programmatic investments.
- (3) The relationship between award decisions, program goals, and Foundation-wide programs and strategic goals.
- (4) The Division's response to the prior COV report of 2010.
- (5) Report on any other issues that the COV feels are relevant to the review.



Disciplinary programs:

- Chemical Synthesis
- Chemical Structure, Dynamics and Mechanisms
- Chemical Measurement and Imaging
- Chemical Theory, Models and Computational Methods
- Environmental Chemical Sciences
- Chemistry of Life Processes
- Chemical Catalysis
- Macromolecular/Supramolecular/Nanochemistry



COV Process–Program Review

The 25-member COV, representing a cross section of the chemistry community

- Merging of 1. and 2. Program Review Reports
 - Conducted by the 2 Program Chairs from the 1. and 2. Review
- Question 1: How to assess the realignment
 - Conducted by 5 teams of 4-5 COV members
- Question 2: Portfolio management
 - Conducted by 5 teams of 4-5 COV members
- Merging of Question 1 & 2 Reports
 - Conducted by the 5 Question Chairs for Questions 1 and 2, respectively



Findings: Operations

- The integrity and efficacy of the review process was strong.
- PO's management of the review process is highly effective.
- There has been a smooth transition in the division's reviewing procedures from majority ad hoc reviews to a mix of ad hoc reviews and panels. The change has occurred to various extents depending on the needs of the specific program.
- Challenges exist in establishing the optimal balance in the reviewer pool, but the POs are managing it well.
- There remains a gap in the clarity around “broader impacts” for PI's, the review process and accountability.



Findings: Management

- The PO's are commended on their management of the programs within the chemistry division.
- Considering the enormity of the tasks given to PO's, they do a very good job of. One area of concern is the importance of continuity of POs managing particular programs.
- Having rotators rather than permanent staff in charge of programs causes challenges with continuity, speed with which programs can be developed and the fluidity to fund new ideas.



Findings: Research Portfolio

- With the realignment the COV found that the award portfolio provided an appropriate balance across the disciplines and sub-disciplines.
- The program is struggling with limited budgetary resources, which leads to challenges in balancing the size of awards against the number of awards. Shifting to balance likely would have negative consequences.



Findings: Research Portfolio

- The program includes a variety of innovative and transformative projects. The CCI, EAGER and CAREER programs provided three avenues for making such awards.
- The distribution of awards is consistent with the stated mission and with demographics of the proposals received.
- Majority of awards are going to the top 100 PhD-granting departments.
- The programs fund work that is relevant to national priorities and agency mission.
- Portfolio is interdisciplinary and opportunities for co-funding have been used to the division's advantage.
- There are logistical issues that make co-funding harder than it needs to be.



Additional Findings

- The community (PIs and reviewers) is still struggling with the requirements for broader impacts
- The perception of the requirements for outreach for the CAREER proposal can be too burdensome on young faculty members
- There is general enthusiasm for realignment
- One area of confusion was found in the distinction between the catalysis and synthesis programs



Recommendations for CHE

Find mechanisms to increase the efficiency and efficacy of the review process

- The COV supports the shift of review from ad hoc to panels
 - Work to obtain diversity on panels and among reviewers and engaging more reviewers who are not at academic institutions
 - Concern with respect to narrowly focused virtual panels. Importance of achieving necessary breadth in the virtual panel while getting the appropriate expertise; achieving the appropriate balance.
 - Expand use of virtual panels as appropriate
 - Creation of a database of reviewers with specific expertise, maintaining geographical balance, institutional balance
 - Identifying the members of large panels to improve the transparency of the review process.



Recommendations for CHE

Find mechanisms to increase the efficiency and efficacy of the review process

- Reviewers
 - Establishing a database of reviewers.
 - Explore new strategies for increasing the fraction of solicited reviews that are ultimately received
 - Develop mechanisms for educating the reviewer pool on the importance of substantive reviews that include constructive advice to PI's. This is particularly important for specialized programs
- Expand the number of tiers for the submitted proposals beyond “tier 1”/“tier 2”/“tier 3”- provide more feedback to PI how close they are to funding.



Recommendations for CHE

- Find ways to operate more efficiently so PO's can spend more time managing the portfolio.
 - For example: Streamline co-funding process; fast track reviewer database project; leveraging programs across the NSF (e.g. looking at best practices across the foundation for running large center).
- Maintain continuity of PO's in programs over a period time.
 - Having rotators rather than permanent staff in charge of programs causes challenges with continuity, speed with which programs can be developed and the fluidity to fund new ideas.
- COV recommendation: Hire 1-2 more POs.
 - Places of identified need include centers (as the program size is increasing) and the managing the merged synthesis / catalysis programs, and the growing CLP program.



Recommendations for CHE

- Provide better clarity inside and outside NSF about the distinction between catalyst and synthesis programs. The separation between synthesis and catalysis has introduced artificial boundaries. This is limiting interdisciplinarity of the science. The division should reconsider how these programs are divided.
- Consider merging into a single large catalysis/synthesis program with appropriate resources



Evaluation of realignment

- Is realignment accomplishing stated goals?—best science funded; reflect current research; names meaningful
- How have things changed with realignment?—process; budgets; number of proposals, success rate impact, outcomes
- How are stakeholders affected by realignment?—PIs; students and postdocs/pipeline; NSF; public and government
- Who should be involved in this assessment?/Process—PIs/reviewers; POs; broad scientific community; general public; commission NAS; NSB committee
- Influence of other impacts—ARRA and change in submission windows



Recommendations

- Commission a NAS study with a broad composition
- Need to assess where the realignment is working well (opportunities for orphaned proposals) and where proposals are falling through the cracks.
- Annual check-in on the appropriateness of the program structure of the division with input from community and an evaluation on whether the programs are comparably competitive.



Findings on Program investments and portfolio management

- Managing proposals labeled “tier 2” to balance various aspects in demographics
- Rapid turnover of PO’s
- Broader impact is becoming more and more important, but there remains misunderstanding on what it is and how it is used in evaluation.
- PO’s could be more transparent to the PI regarding how the decision was made.
- The broader impact requirement is not being used consistently in the decision to fund or decline proposals.



Recommendations

- Grant writing workshops or webinars for young and/or new investigators to provide guidance on writing good proposals.
- Provide an accessible, categorized listing proposals funded under a program; highlight projects and participants already funded in program
- Explore a mechanism to obtain feedback from at least one external expert before funding EAGER proposals
- PO's should take advantage of the “creativity extensions” option for extending existing grants
- Increase transparency in the identification and the development of priority areas



Recommendations

- Single window should be reevaluated after it's been in place for several years
- Timing of the window should be reevaluated (Sept. 1- Oct.1 is not optimal for academic chemists, recommend shifting both windows 2 weeks later)
- Current and pending support information should be more informative. The information should be used only by PO's. If reviewers have access to this information direction should be provided on how to use the current/pending information.
- Consider instituting “step-down” or “bridge” funding for mid-career scientists with a single grant whose funding is narrowly not renewed



Looking forward (CHE Strategic directions)

- Push the GOALI program; find out why it is not being used.
- Encourage CHE to use the STTR/SBIR mechanism to establish connections with industry (right now 0 awards in chemistry; 2 and 3 such proposals across MPS)
- NSF-facilitated internships. Encourage PI's to make connections with industry/provide industrial internships/co-ops with a focus on startup companies; use to help young faculty to establish industrial partnership – look at best practices foundation-wide in establishing these connections
- NSF/Industry workshop to identify industrial partners including established and startup companies; possibly partner with SCI
- Can centers be more effectively used to bring in engagement
- Partner with other divisions/directorates in these activities



International partnerships findings and recommendations

Goal: To ensure that the US is the most attractive destination for chemists

- CHE should partner with OISE (Office of International Science and Engineering) at NSF
- Get students involved in projects in other countries
- Get chemists involved globally (currently includes 7 countries - 2 phased out and So. Korea moving in). Done through ICC mechanism
- Development of workshops to provide leadership in establishing ties with strategically chosen countries
- Network of partnering agencies
- Hire rotators with experience in international research
- Explore NSF-Humbolt partnership as well as European Science Foundation and creating partnerships with it.
- Work within the context of federal partnerships – US/Brazil; US/Europe
- Work with and draw best practices from the Materials World Network (DMR)



Summary of Recommendations for CHE

- **Recommendation #1:** Find mechanisms to further increase the efficiency and efficacy of the review process.
- **Recommendation #2:** Maintain continuity of Program Officers in programs over a period of time.
- **Recommendation #3:** Increase the efficiency of operations and the number of Program Officers to improve program management.
- **Recommendation #4:** Reevaluate the distinction between the catalysis and synthesis programs and investigate best ways to categorize the programs in these areas.
- **Recommendation #5:** Reevaluate the timing of the submission windows.
- **Recommendation #6:** Commission a National Academies review/study of the Re-alignment of the Chemistry Division.
- **Recommendation #7:** Work to increase more industrial partnerships. The division should consider: (a) using Centers to even more effectively to bring about university/industry engagement; and (b) examining best practices at NSF to help facilitate faculty/industry partnerships using NSF-facilitated internships.
- **Recommendation #8:** Explore ways to increase global engagement of the chemistry community, especially faculty and students involved in projects in other countries.



Thanks...

The COV members would like to express their appreciation for the hard work of the Division program officers and staff, especially Acting Division Director Tanja Pietraß, for allowing this review to be conducted with exemplary efficiency and transparency.