

## **Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET) Response to the 2015 Committee of Visitors (COV) Report**

### **Introduction**

The Committee of Visitors (COV) met on April 22<sup>nd</sup> and 23<sup>rd</sup>, 2015 to review programs in the Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET) in the Directorate for Engineering (ENG). The COV covered CBET operations for fiscal years (FYs) 2012, 2013, and 2014. The Committee was co-chaired by Dr. Linda Abriola and Dr. Mary Jane Hagenson. They presented the COV report to the ENG Advisory Committee on October 22, 2015. The Advisory Committee approved the report unanimously at the meeting.

CBET wishes to thank the members of the 2015 CBET COV for their time and effort in carefully reviewing the activities of the Division. CBET is especially grateful to Co-Chairs Linda Abriola and Mary Jane Hagenson for their leadership during the COV process. The final report consists of a thorough review with many clear and actionable recommendations.

The COV evaluated over 300 randomly selected proposal actions spanning the fiscal years mentioned above. The COV report addressed five topic areas: I. Merit Review Process; II. Selection of Reviewers; III. Management of the Program; IV. Portfolio of Awards; and V. Other Topics. Our response to each of these areas is listed below.

### **I. Merit Review Process**

- 1. Recommendation/Observation: The COV expressed concerns with the variability of the merit review process and the resulting feedback to Principal Investigators (PIs) regarding funding decisions. More consistent documentation would benefit the community. [I.3, I.4, I.5, III.1]*

*Response:* To address this, in the summer of 2015, CBET established new Panel Summary templates that improve consistency in both the review process and in correspondence to the PIs. The revised Panel Summary templates include a new section that describes the rationale for placing a proposal in a specific ranking category, providing more feedback to the PI. These changes in the panel summary template are designed to ensure that the full nature of the discussion is captured, especially when there are significant discrepancies between reviews, and how the panel ultimately arrived at its final proposal categorization and ranking. Likewise, the Review Analysis templates were revised to require a section that explains the rationale for the Program Director (PD) recommendation, particularly for cases when the PD's recommendation differs from the panel's ranking or when the proposal received an "Excellent" review. These changes are incorporated in the new version of CBET's standard operating instructions, which were distributed to CBET staff in October 2015.

2. *Recommendation/Observation: There are confusion and inconsistencies in assessing the Broader Impact criterion. [I.2]*

*Response:* This is a NSF-wide problem that is being addressed by the Agency. As part of this effort, the Directorate for Engineering will hold a series of workshops to gather advice from the engineering community on how to more clearly define Broader Impacts and how institutions can better respond to this merit review criterion. CBET will be an active participant in this process, particularly to find ways to better communicate NSF's expectations to our proposers, reviewers, PIs and PDs.

## **II. Selection of Reviewers**

1. *Recommendation/Observation: The COV also noted some disparity in the level of justification for internally reviewed proposals. [II.1]*

*Response:* As a result, CBET instituted changes in the Review Analysis template and now requires a section entitled "Why EAGER?" and "Why RAPID?" to clearly justify the rationale for awarding research grants in these categories. These changes are incorporated in the new version of CBET's standard operating instructions.

2. *Recommendation/Observation: The COV acknowledged that the size of review panels spanned a large range, raising concern about the effectiveness of some of the larger panels. [II, Additional Comments]*

*Response:* Following the COV in April 2015, CBET implemented guidelines on the maximum number of proposals per panel.

## **III. Management of the Program**

Many of the COV comments in this section were addressed in other sections of the Division's response. Unique comments from section III.1 are addressed below.

1. *Recommendation/Observation: Due to high staff turnover, CBET would benefit from better planning for the training of division personnel. [III.1, V.4]*

*Response:* In the period between the COV meeting and the time of publication of this document, CBET revised its onboarding process to provide more individual training and orientation activities within the division by the Operation Specialist and Deputy Division Director. Before arrival, a mentor is assigned to each PD. NSF recently formed an Agency-wide task force to create new methods to improve the learning process for recently-hired staff. The Directorate for Engineering has companion efforts underway. CBET will be early adopters of the outcomes from these efforts. CBET assures that new PDs complete the Merit Review Basics Course I and II as soon as it is offered after their

arrival. CBET also holds regular PD and cluster-specific PD meetings with division management where merit review and funding decisions are discussed collectively, allowing new staff to learn directly from the experience and practices of current PDs.

2. *Recommendation/Observation: "The COV noted that the second question of criterion #3 (i.e. plan for assessment of success) was not always addressed. The COV strongly recommends that all proposals clearly describe not only what they propose and how they plan to do it, but also how they will know if they succeed and what technological or other benefits to society could accrue if the project is successful." [III.1 ]*

*Response:* While the Merit Review documentation in the Proposal & Award Policies & Procedures Guide (PAPPG), Chapter III, discusses three merit review "principles", including encouraging PIs to describe methods to assess the success of their proposals, this is not a merit review criterion; reviewers are only asked to judge proposals on two criteria: Intellectual Merit and Broader Impacts.

#### **IV. Resulting Portfolio of Awards**

1. *Recommendation/Observation: The COV recommended improvement to and increased documentation of its portfolio planning and budgeting process. [III.1, III.3, V.1]*

*Response:* CBET continues to refine its formal analyses of the research portfolio through an assessment of funding decisions made in each fiscal year, and identification of emerging opportunities in research directions. CBET will continue to host a variety of workshops and outreach meetings with its community to ensure feedback is received from relevant stakeholders. The Directorate for Engineering adopted a process for standardizing the portfolio analysis tools used across its divisions so that data can be collated and compared across divisions. CBET will participate in the testing of this new process with the goal of continually improving it. In addition, the tools will help archive our portfolio planning so that CBET can refer back to the items and changes made. This is important information given CBET's changing leadership and PDs.

2. *Recommendation/Observation: The COV would benefit from better statistical analyses of COV data. [IV.1]*

*Response:* Other recent ENG COVs have received similar comments. As a result, ENG put together a team to collectively generate best practices and data methods to provide future COVs with the optimal data products that will allow them to conduct their work as efficiently as possible. ENG expects clearer and more consistent COV data products from these efforts.

3. *Recommendation/Observation: The COV expressed concern about the size and duration of CBET awards and low proposal success rates. [IV.2]*

*Response:* CBET continues to be pressured by high proposal burdens, in particular by increases in CAREER proposal submissions. These factors compete with CBET's efforts to lead new NSF initiatives such as the BRAIN, Advanced Biomanufacturing, and Food, Energy, and Water (FEW). As such, CBET continues to seek practical ways to maximally support the CBET community in a climate of finite resources. CBET will continue to leverage partnerships outside the Foundation, for example with EPRI, USDA, etc., to help support research conducted by the CBET community. Regarding the award size, CBET will assess the matter internally to determine if plausible changes can be implemented to provide for larger awards.

## **V. Other Topics**

1. *Recommendation/Observation: The COV continues to be concerned about CBET's high proposal burden. [V.3]*

*Response:* While CBET has implemented some minor changes recently to help alleviate its proposal burden, CBET will continue to investigate ways of streamlining the proposal review processes, leading ongoing, directorate-wide efforts to standardize and simplify wherever possible.

2. *Recommendation/Observation: The COV identified potential improvements in the COV process. [V.5]*

*Response:* The issues the COV raised are common to many COVs across NSF. Recognizing this, the Directorate for Engineering is standardizing instructions, reporting, portfolio evaluation, data products, and data presentation for COVs. The goal is to create a common template for all COV efforts to provide consistency and clarity. The COV particularly asked for more sophisticated metrics of CBET research investments and changes to access of COV data (e.g. the design of COV-related websites). CBET will pass these observations and recommendations to NSF COV working group members for future considerations.

3. *Recommendation/Observation: What role should early career awards play in the division? Are there other ways new researchers can be supported (e.g. small research initiation grants)? The COV recommends defining success of the CAREER program and assessing outcomes to determine early career award efficacy.*

*Response:* CBET believes in strong support of early career faculty. As we receive information from CAREER PIs, and others, CBET will begin to capture that information, in

an informal way, through the inclusion of the information in the annual program/cluster reports on its PIs. Activities in the ENG OAD to follow CAREER awardees via annual ENG “CAREER yearbook” publications and social media will facilitate these efforts.