

# NSF Engineering Directorate COV Report

Based on visit July 13-14, 2009

Presented by Matthew Tirrell

## *Committee Membership*

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William McCarthy, *New Mexico State University*

Robert Powell, *University of California, Davis*

Jocelyn Scott, *E.I. du Pont de Nemours, Inc.*

Joann Silverstein, *University of Colorado*

# Work Plan

- Two preparatory teleconferences: June 15 & 17.
- 144 Jackets examined by four groups prior to July 13 mtg.
- Thorough briefing by CBET Division Director McGrath; Good access to program directors and other division leadership.
- The December 2007 Division Plan, the previous COV Reports (from predecessor divisions) and a wide range of summary and statistical information were provided.

# General Observations

- CBET Division has generally been very successful in meeting its program goals and objectives.
- Division processes are carried out with care and integrity.
- CBET has come through a complex merger and has positioned itself well with respect to addressing important priorities at the Directorate, Foundation and National levels, as well as many of the NAE Grand Challenge areas.

# Specific Observations and Recommendations

- “It is essential that the Division sustain its strong support for core disciplines. CBET has done exceptionally well in supporting interdisciplinary and topical research. This is laudable and should be sustained, but at the same time it should be recognized that research needs to be encouraged and supported in the core engineering sciences, which are not immediately identified with specific topical goals, and that underlie many multidisciplinary, interdisciplinary, application-oriented programs.”

# Specific Observations and Recommendations

- “Program foci developed in strategic plans often are not factored into the review process by panels. Review panels should be made aware of such foci, and be encouraged to balance their recommendations for foci and for core engineering science.”
- “The heavy work loads of Program Officers (POs) argue for consideration of some mechanism to reduce the volume of proposals that is processed by CBET. COV recognizes this need and encourage the Division to propose specific actions to redress the situation, including the possible addition of several new PO positions.”

# Specific Observations and Recommendations

- “Review panels are valuable to the Division’s objective of high quality and timely reviews of submitted proposals. COV does not favor a change to cyber panels which convene only electronically, although we recognize that some portion of the panels may need to participate via video or telephone. COV does favor the concept of multi-year panels, to improve continuity in the performance of reviews.”
- “Stated principles and guidelines for risk management would be helpful to the “investment priorities,” described in the NSF Strategic Plan. There is a clear desire to support some level of high-risk research, which has the potential for high gains. This is especially true if NSF seeks to enable some “transformative” research, defined as “research which promise extraordinary outcomes, such as: revolutionizing entire disciplines; creating entirely new fields; or disrupting accepted theories and perspectives.” A deliberate risk management policy can be effective in balancing risk vs. reward, and promote the community’s response toward this end.”

# Major Points

- “Awards have become, too frequently, inadequate to cover the minimum costs of a project. COV is seriously concerned with the inadequate level of funding for the Engineering Directorate in general and for CBET in particular. Given the importance of the Division’s areas to the nation’s grand challenges (for energy, environment, water, sustainability, healthcare technology, etc.), it is alarming to have funding constraints that cause CBET’s success rates to be in the low teens (lowest in ENG) for submitted proposals, and for proposals to be consistently underfunded. This is particularly damaging to fundamental research in disciplines where the single-PI NSF grant is the canonical manner in which research is supported. *COV feels that the support level for funded programs should satisfy at least some lower threshold, sufficient to provide support for a graduate student, participation by at least one undergraduate student, partial summer salary for PI, and necessary operational costs, consistent with the Division Plan.* This is of sufficient importance that it should be sought even at cost of reduction in total number of funded projects.”



# Major Points

- “The review criterion of Broader Impacts remains uneven in its interpretation (by PI’s and reviewers alike) and implementation. The COV believes that this criterion must be better articulated in instructions to both proposers and reviewers. Better means to assess outcomes of the Broader Impacts criterion would be a helpful step. Just as we use outcomes such as publication productivity, citation impact, presentations, and invitations to speak, to gauge intellectual merit of research, after it has been done, the COV suggests that metrics to gauge broader impacts be developed.”

# Dedication

- We must note a very sad occurrence related to this COV. Our short-time, but influential and well-liked, COV collaborator, Bill McCarthy, passed away on July 28, 2009, just two weeks after our COV meeting. Bill's clearly articulated advice shaped our work in numerous ways. We share New Mexico State's loss of this valued colleague.
- To commemorate our work together, the COV respectfully dedicates this report to Professor William C. McCarthy.