

RESPONSE TO CMMI 2012 COV REPORT

The CMMI Committee of Visitors (COV), chaired by Dr. Julie Chen, met at NSF on May 18th and August 8-9 to review all CMMI programs. The review provided NSF with an independent evaluation of the division's portfolio, the proposal and award process, and program operations and management for FY 2009-2011.

As a result of its review, the COV provided a number of findings and recommendations. The Division has taken action on these recommendations, as described below.

Quality and Effectiveness of Merit Review (Part I)

While the COV found the Division's merit review process to be effective and of high quality, it offered some comments on the overall process. First, the COV expressed the opinion that face-to-face panels are the best approach to proposal review. This COV occurred prior to the current budget restriction on panelist travel, which has had a significant impact on the Division's approach to proposal review. At the encouragement of NSF management taken together with newly imposed budgetary restrictions, the Division has begun to rely much more heavily on virtual panels. In addition, to reduce panelist travel costs, some programs have cut the number of panelists by reducing the number of reviews requested per proposal, while maintaining the minimum requirement of three. See data in Tables 1 and 2.

Table 1: Virtual Panelist Usage by CMMI, FY2010 - FY2013

Fiscal Year	Number of Regular Panelists	Number of Virtual Panelists	Total	Percentage Virtual Panelists
2010	1231	29	1260	2%
2011	1247	69	1316	5%
2012	1233	88	1321	7%
2013	1001	245	1246	20%

Table 2: Average Number of Reviews per CMMI Proposal Reviewed, FY 2009 - FY2013

Fiscal Year	Total Number of Proposals Reviewed	Average Number of Reviews per Proposal
2009	2900	3.99
2010	3483	3.75
2011	3348	3.90
2012	3286	3.83
2013	2910	3.63

Further, in an effort to improve the overall proposal review process, the CMMI Division is spearheading a new approach to proposal review referred to as the Mechanism Design approach. This approach has been approved for a pilot study, which will be conducted using the Sensors and Sensing Systems program for the October 1, 2013, deadline. Although not a face-to-face panel approach, this review mechanism will provide seven written reviews of each proposal, which, we believe, will more than make up for the loss of the discussion in face-to-face panels.

We agree that the Broader Impact criterion has been somewhat misunderstood by the community since its inception. We also concur with the most recent guidance issued by the NSF Policy Office as regards this criterion, which may help to allay some of the misunderstanding.

Finally, CMMI continues its efforts to help young investigators to properly frame their research and write competitive proposals. To this end, the Division has continued support of an annual CAREER proposal writing workshop that provides training to approximately 150 young faculty every year. This workshop not only provides instruction on proposal writing, but also affords access to several CMMI program officers to promote better communication between PIs and Program Directors.

Selection of Reviewers (Part II)

Although the COV applauded CMMI for its reviewer selection, we recognize that more diversity would be better, particularly with respect to reviewers from industry. While the Division places considerable emphasis on the recruitment of new reviewers, certain problems are also recognized. One Divisional goal is to not overwork certain reviewers, particularly women and minorities, and a target of one panel per year is used. Additionally, while industrial reviewers are sought, it is recognized that in many cases conflicts-of-interest prevent them from being effective panelists. The Division uses its proposal writing workshops as a key venue for the recruitment of new reviewers.

The Star Metrics COV module was developed for the 2012 CMMI COV. This gives CMMI a new tool to identify and assess potential reviewers for panels. CMMI leadership will continue to emphasize to Program Officers the importance of panels that represent a broad range of expertise and demographic, geographic, and institutional attributes. The Deputy DD selectively monitors the diversity of CMMI panels.

Program Management (Part III)

While complimenting the Division on the clarity, fairness and transparency of its review process, the COV emphasized its preference for maintaining the strength of the unsolicited programs. It is the continuing policy of the Division to maintain the strength of these programs to the extent possible within the framework of the priorities of the Directorate for Engineering. The Division takes into careful consideration the balance between continued support of core areas and the pursuit of new opportunities, and it will continue to seek the advice of the research communities through outreach efforts and research agenda-setting workshops. At the same time, the Division is engaged in the support of research areas that are part of the Administration's key agenda. A primary focus here is advanced manufacturing.

A key component of the Division's program management and award oversight has been its sesquiannual grantees conference. This has been a large conference, including some 1,400 attendees most of whom are awardees who are given this opportunity to meet their program officers, display their research progress, discuss their work with other researchers and form productive collaborations. Although the per-attendee cost of the conference is quite low, because of its overall attendance, its total cost exceeds \$500,000. Given increased scrutiny on Federal travel and participation in conferences, this event now requires approval by the NSF Director per NSF policy. CMMI has not received approval to conduct its grantees meeting. If approval is granted, it is worth noting that the planning period for the conference exceeds two years, and there is no immediate alternative to the conference that would be as cost effective and efficacious.

It is recognized that many of the problems identified in earlier COV reviews persist, such as diversity of review panels, industrial participation on review panels and superficial reviews. These are systemic problems that the Division will continue to address by the mechanisms noted above.

Portfolio Review (Part IV)

The COV expressed concern regarding the handling of potentially transformative research proposals. They recommend better documentation of successes and failures in attempts to achieve desired results. In the past, the Division has supported outside assessments. These mechanisms will be examined as an approach to evaluating and improving current practice.

The COV noted that CMMI should make efforts to alert the research community about targeted solicitations and other opportunities at early stages as a mechanism to elicit strong proposals. The Division is seeking to make maximum use of its web site to this end.

CMMI is an active participant in ENG evaluation and assessment activities and in international benchmarking efforts through the World Technology Evaluation Center on topics such as the *International Assessment in Research and Development in Simulation-Based Engineering and Science*. CMMI has supported and will continue to support targeted assessments of its role in supporting potentially transformative research in thematic areas such as additive manufacturing, an assessment of which is underway.

CMMI engages in a wide range of activities that promote collaboration with industry and provide opportunities for students to gain exposure to industry. CMMI supplements awards to allow students to work in industry or the national labs (e.g., Sandia National Institute for Nano Engineering). It has also partnered with other federal agencies to support a pilot institute under the National Network for Manufacturing Innovation. CMMI support is designed to give the CMMI community—both researchers and students—access to the facilities and resources of the Additive Manufacturing Innovation Institute. In response to the COV report, the division proposes creating a heading on its website entitled “Industrial Collaboration”. This section would include a list of major CMMI and NSF activities that promote collaboration with industry (e.g., SBIR/STTR, PFI, AIR, ERCs, I/UCRCs, NSF Innovation Corps among others).

The COV noted that CMMI can play a leadership role in helping researchers to cross boundaries, whether they be technical field or geographic in nature. They recommend that CMMI continue to expand its efforts with other divisions, directorates, and agencies to bring researchers from multiple fields together. To this end, CMMI will continue to collaborate actively with other directorates and agencies. When appropriate, CMMI, in collaboration with other NSF Directorates and other agencies, will continue to convene joint sessions at professional meetings to bring together CMMI researchers with researchers in other communities, subject to the availability of travel funds.

CMMI will continue to support focused efforts to promote the development of the next generation of engineers through a variety of outreach activities, grant support for students and post docs, and the Research Experience for Undergraduates program. CMMI will continue to mentor young researchers through proposal writing workshops, and provide support for their participation in technical workshops and one-on-one mentoring activities.

Each year, CMMI supports a substantial number of students through its regular awards, see Table 3. Continuing to encourage proposers to fund students who are broadly representative of the U.S. demographic profile is an effective way to provide opportunities to individuals from underrepresented minorities.

Table 3: Students and Post-docs Participating in CMMI Active Awards, FY2009 - FY2012

Values	2009	2010	2011	2012
Graduate Students	1822	1822	1822	1807
Post-docs	105	105	105	120
Undergraduates (including REU supplement students)	367	367	367	366
Total Number of Students Supported	2294	2294	2294	2293
Data from BFA				