NATIONAL SCIENCE FOUNDATION
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Date: December 06, 2018
From: Dr. Dawn Tilbury, Assistant Director, Directorate for Engineering (ENG)
To: ENG Advisory Committee,
CC: ENG Senior Management (DD, DDD, Senior Advisors),
NSF Senior Management (OD, COO, CFO, OIG, OIIA Director, NSF Committee Management Officer), NSF COV Coordinator

Subject: Response to 2018 Recommendations Report of the Committee of Visitor (COV) for the Division of Electrical, Communications, and Cyber Systems(ECCS)

Please find attached the ENG response to the Committee of Visitors (COV) report from the Division of Electrical, Communications, and Cyber Systems (ECCS) 2018 review (May 21 to 22, 2018). The review was thorough and insightful, and the findings will be very helpful to me and to the Division in fulfilling our responsibilities to the scientific community and to the nation.

The Division of Electrical, Communications, and Cyber Systems has drafted the attached response, and I concur with its contents. I, therefore, adopt it as the official response of the ENG Directorate. The required Diversity and Conflict of Interest Report is provided along with the COV report. I hope the full ENG Advisory Committee finds this COV review and the ENG response useful.

Dawn Tilbury
Assistant Director, Directorate for Engineering

Attachments:

- The response of the Division of Electrical, Communications, and Cyber Systems to the 2018 ECCS COV Report
- 2018 ECCS COV Diversity and Conflict of Interest Report

Division of Electrical, Communications, and Cyber Systems (ECCS)
Directorate for Engineering
National Science Foundation

Date: November 26, 2018

From: Dr. Filbert Bartoli, ECCS Division Director

To: Dr. Dawn Tilbury, Assistant Director, Directorate for Engineering (ENG)

Subject: Response to the 2018 ECCS COV Report

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1. Introduction: The 2018 ECCS COV Meeting, Report, and Associated ECCS Responses

The Committee of Visitors (COV) met at NSF on May 21-22, 2018 to review the programs in the Electrical, Communications, and Cyber Systems Division (ECCS) in the Directorate for Engineering (ENG). The COV committee assessed the Integrity and Efficiency of Processes and Management of ECCS programs over the four fiscal years 2014 through 2017. Professor Carmen Menoni, Colorado State University, served as COV Chair, and Professor Rashid Bashir, University of Illinois, served as Co-Chair.

Twelve COV members representing the three program clusters in the Division (4 members per cluster) evaluated 240 jackets which had resulted in 126 awards, 108 declinations, and 6 proposals returned without review (RWR).

The 2018 ECCS COV Report follows the 2018 NSF template for COV reviews. The Report addresses specifically: (A) Quality and Effectiveness of Merit Review Process, (B) Selection of Reviewers, (C) Management of the Program Under Review, and (D) Resulting Portfolio of Awards. These four parts are followed by a section with additional broad recommendations on areas that need improvement.

The finalized COV Report was submitted to and approved by the ENG Advisory Committee at their Fall 2018 meeting. It is the intent of the ECCS Division to follow up on the recommendations outlined in the COV Report. ECCS will hold yearly retreats at which issues such as improving review processes will be discussed.

The following COV recommendations have been drawn from the Report sections and are responded to by ECCS.

II. COV Report Recommendations and ECCS Responses

A. Quality and Effectiveness of the Merit Review Process

#1: COV Recommendation
The effectiveness of hybrid panels should be studied to ensure that these panels meet the same high-quality standards as on-site panels. A process should be developed to incorporate ad-hoc reviews into the proposal discussion in a uniform way across panels.

ECCS Response to #1:
ECCS has looked carefully at the effectiveness of virtual panels to conduct the NSF merit review process within the Division. In general, ECCS uses virtual panels when the number of proposals is small thus needing a smaller number of panelists. ECCS proposals may undergo, as needed, supplemental ad hoc review by individuals with specific expertise in a field related to the proposal.

#2: COV Recommendation
The PDs should put in place a process to ensure all reviewers provide substantive comments. This is essential not only for a fair review process but also to mentor principal investigators of proposals that do not receive an award. One possible action on this could be that the proposal lead reviewer ensures that the other reviewers substantiate their reviews with meaningful feedback.

ECCS Response to #2
ECCS will document and standardize best practices across the Division and ensure that new Program Directors are informed of these practices when they join ECCS and go through the on-boarding process.

#3: COV Recommendation
There needs to be better transparency, including community discussion, of what Broader Impacts encompasses and its merit to the proposed work. There is still confusion from the standpoint of the PIs, the reviewers and the Program Directors on what BI entails, and how to assess and evaluate it.

ECCS Response to #3:
In 2016, ECCS organized a workshop and received a Report now linkable on our Website, *Defining Broader Impact Activities of ECCS/NSF Grants*, with the goal of promoting consistent practice in applying the Broader Impacts criterion to proposal evaluation. Also, NSF has developed a Reviewer Orientation Video that includes an explanation of the Broader Impacts criterion. ECCS Program Directors are encouraging all reviewers to watch the video "The Art and Science of Reviewing Proposals" (accessed in FastLane through the Panelist Travel and Reimbursement page and the Proposal Review, *Ad Hoc* Reviewers page, and at https://tipsforreviewers.nsf.gov).

#4: COV Recommendation
Criteria for proposals being triaged should be standardized. Triaging could be utilized further to increase the quality of discussions and reviews on the other proposals. Proposals that are triaged should have at least one substantive review that provides constructive feedback.

ECCS Response to #4:

ECCS is implementing the procedure that any proposal receiving three 'G' ratings or below can be automatically triaged during the panel. Panelists are instructed that any triaged proposals may be discussed by the panel if requested. PDs will seek to ensure that there are adequate constructive comments in the individual reviews on the weaknesses of proposals triaged.

#5: COV Recommendation

How differences between reviewers were resolved was not always captured in the panel summary. There should be continued efforts to ensure high-quality summaries that accurately capture panel discussion. The PD should discuss the differentiation factors between the 'recommended' and 'not recommended' decisions. This should include rationale on how the decision fits with the overall portfolio and funding priorities/strategies as well as program broader impacts. In the case of declination, the information provided to the PIs should be more detailed and include information on how the PIs could improve their proposal for a subsequent submission

ECCS Response to #5:

ECCS will document and standardize best practices across the Division and ensure that new Program Directors are informed of these practices when they join ECCS and go through the on-boarding process. ECCS will make a special effort to ensure that panel summaries are thorough and that they accurately reflect the panel discussion.

#6: COV Recommendation

Returning to multiple submission windows should be considered.

ECCS Response to #6:

Through a DCL, the ENG Directorate has instituted a new policy that removes deadlines for submission of unsolicited proposals to all core programs in CBET, CMMI, ECCS, and EEC. This new process will afford the opportunity for PIs to think more creatively, build strong collaborations, and more carefully prepare proposals with the potential to make significant research contributions to engineering. It is also expected that the elimination of deadlines will reduce the burden on institutions and the community.

#7: COV Recommendation

EAGER should be strongly supported, the policies around size and rationale for awards should be further clarified to ensure consistency in the process. While we believe that EAGER should continue to be strongly supported, the policies around size and rationale for the EAGER program should be further clarified.

ECCS Response to #7:

ECCS continues to follow PAPPG guidelines on EAGER awards, which state "Requests may be for up to $300K and up to two years in duration. The award size will be consistent with the project scope and of a size comparable to grants in similar areas." While ECCS often funds EAGERs at an annual award amount consistent with typical unsolicited proposals (approximately $120k per year for ECCS), proposals of greater scope and potential impact may be funded closer to the PAPPG limit.

B. Selection of Reviewers

#8: COV Recommendation
A formal process to train reviewers and to rate the quality of their assessment should be developed. A document containing best practices, a short video with guidelines or other material that will contribute to improving quality of reviews is needed.

ECCS Response to #8:
There is currently an NSF-wide effort to train reviewers, and ECCS will become more engaged in these efforts, and seek new methods to train reviewers through written materials and videos developed by NSF. See Response to #3.

#9: COV Recommendation
As a strategy to reduce the load of a PD in assembling panels, ECCS could implement a process to broadly solicit reviewers (a "call for reviewers"). This would allow prospective reviewers to volunteer for service, thereby enabling the PD to select from this broader pool. This is particularly important in specialized calls for proposals. This would also add transparency to the reviewers' selection process while at the same time allow recruitment of members from the community at large, e.g., early career faculty. ECCS should also continue with its efforts to increase participation of women and under-represented minorities in panels.

ECCS Response to #9:
ECCS will work with the Directorate for Engineering and the Directorate for Education & Human Resources to explore Foundation-wide options for broadening its pool of reviewers, including the use of new tools such as OIA's "reviewer finder" tool in MyNSF. Although NSF cannot mandate that panelists report their demographic information, ECCS will continue to monitor panel demographics to track its progress in increasing participation from these groups.

#10: COV Recommendation
ECCS should produce a best practice document including examples of evaluative and substantive reviews of the technical merit and broader impact of the proposed research activity. Some efforts along these lines are already in place by some PDs. Such a document will contribute to increase quality and consistency of reviews and mitigate other important matters such as implicit or explicit bias.

ECCS Response to #10:
ECCS will closely examine the best practices that ECCS program directors presently implement to encourage substantive reviews that cover both merit review criteria. As appropriate, ECCS will document and extend these best practices across the Division.

C. Management of the Program Under Review

#11: COV Recommendation
ECCS should implement an annual review in thrust emphases and program funding.

ECCS Response to #11:

ECCS refines its program descriptions annually to ensure that its portfolios and their descriptions are aligned with the direction of the research community.

#12: COV Recommendation

ECCS should expand outreach to the research community to engage them in brainstorming activities, for example at IEEE or ECEDHA meetings, to help identify high-impact emerging research areas.

ECCS Response to #12:

ECCS has been actively expanding outreach activities to the research community, beyond traditional conference participation, workshops, and activities intended to mentor early career faculty and inform the research community at large of new funding opportunities. Increasingly, the Division has actively participated in brainstorming sessions aimed at encouraging investigators to identify emerging research trends, explore collaborative research opportunities in areas of growing importance, and conceive new approaches to increasing convergence in research.

#13: COV Recommendation:

The COV recommends that ECCS consider supporting an activity like the Computing Community Consortium (CCC) to promote division-wide efforts and identify emerging topics and new research opportunities

ECCS Response to #13:

The ECCS Division agrees that a CCC-like activity in engineering would be very valuable. This has been under discussion in ECCS over the past several years, and ECCS will continue to look for innovative ways to identify emerging topics and new research areas.

#14: COV Recommendation

An aspect of the management, which the COV considers important, is the solicitation, hiring, training, and evaluation of PDs. Having a website, for example, that includes all materials used for program director training could be considered "best practices" and used within the community, even outside of NSF.

ECCS Response to #14:

The ECCS Division has created onboarding documents on its internal website for new employees to get acclimated to the division and its processes. NSF is still in the process of finalizing the new employee orientation system, and the ECCS Division will be updating the new employee information on its website. The Directorate for Engineering has also been developing new onboarding processes that ECCS will utilize for its Program Directors.

#15: COV Recommendation

ECCS could also evaluate the possibility of graduate student support beyond the typical three-year award, in the form of a continuation grant.

ECCS Response to #15:

ECCS thanks the COV for this suggestion and recognizes the importance of student support through programs such as the GRFP. ECCS will explore additional mechanisms to increase support for graduate students.

#16: COV Recommendation

The COV encourages ECCS to search for a permanent PD for CCSS so as to have a permanent PD in each of its program clusters.

ECCS Response to #16:

As of November 2018, ECCS has begun the recruitment process for a full-time CCSS Program Director.

D. Resulting Portfolio of Awards

#17: COV Recommendation

Co-sponsoring with industry, and/or other agencies and cross-cutting programs with other NSF programs should be strategically explored to increase award size and scope. Moreover, these interactions could help broaden the ECCS interdisciplinary portfolio.

ECCS Response to #17:

In several of its solicitations and DCLs, including those relating to NSF's 10 Big Ideas, ECCS has co-sponsorship with industry and other agencies and NSF Directorates/Divisions. For example RAISE-EQuIP – SBE, IIP; E2CDA – SRC, CISE; SemiSynBio – SRC, IARPA, CISE, BIO. ECCS also includes in its Website language that encourages proposals with international collaborations, industry collaborations through the Grant Opportunities for Academic Liaison (GOALI) program, and cross-disciplinary research and education through other NSF programs.

#18: COV Recommendation

The COV recommends the addition of a Research Initiation grant program to provide support for new and early-career investigators. This program, in combination with the CAREER program. could significantly enhance the opportunities for new investigators, and in particular, those in less research-intensive institutions whose success rate in the unsolicited program is low.

ECCS Response to #18:

ECCS thanks the COV for this suggestion, and also believes that support for young investigators in the early stages of their research careers is of high importance. ECCS will continue to evaluate its programs and look for better ways, including the possibility of a Research Initiation Grant program, to support these investigators.

III. Conclusion

The ECCS Division is appreciative of the constructive feedback from the COV members and will use their recommendations to further improve the Division's program operations and management.