

NATIONAL SCIENCE FOUNDATION
Directorate for Engineering
4201 Wilson Boulevard, Room 505
Arlington, Virginia 22230



MEMORANDUM

TO: Dr. Richard O. Buckius, Acting Assistant Director for Engineering

FROM: Dr. Usha Varshney, Division Director for Electrical and Communications Systems

DATE: December 21, 2005

SUBJECT: Response to the Report of the Committee of Visitors (CoV) for the Electrical and Communications Systems (ECS) Division

I am attaching my response to the comments contained in the CoV report. On behalf of the Division of Electrical and Communications Systems (ECS), I thank the Committee of Visitors (CoV) for their thoughtful and thorough report covering FY 2002-2004, and for their recommendations for improvement that it provides the Division, the Directorate for Engineering (ENG), and the National Science Foundation (NSF). We are delighted that the CoV members judged the ECS Division to be highly successful in meeting its program goals and objectives, and that the Division processes are carried out with the highest integrity. The CoV further commented that the ECS program areas are increasingly important to the nation and the world - from generating fundamental knowledge to creating technological solutions for the benefit of individuals and society. We are also pleased that the CoV commented favorably on the management of the ECS Division.

ECS is also thankful to the Engineering Directorate Advisory Committee for their acceptance of the CoV report, as expressed in a message from the Advisory Committee Chair indicating that the ADCOM has found this program to be of exceptional quality and strongly recommended its continuing support.

The committee of visitors did an excellent job in assessing the performance of this successful program within NSF. The ADCOM has found this program to be of exceptional quality and strongly recommended its continuing support.

The detailed response in the following pages is organized in the order of comments as they appear in the overview of the CoV report, and includes responses by the ECS Division.

I hope these responses are adequate for your purpose.

Comments from the CoV Overview	ECS Response
<p>(1) Impact of program outcomes. The CoV commends the Division leadership for creating and supporting a broad range of relevant and "forward-thinking" ECS programs through the EPDT, CNCI, and IS programs.</p> <p>However, the CoV has major concerns that the ECS budget is not large enough to enable high impact.</p> <p>Discretionary award size is decreasing over time in both absolute and inflation adjusted dollars. Awards now seem to be about as low as possible to support a GRA and any meaningful time for the PI. This situation is particularly troubling in the case of new PIs. The CAREER Award funding rate has declined from 29% in 2002 to only 16% in 2004 and is continuing to decline. NSF used to be thought of as the place where a small amount of funding could be obtained with some reliability, assuming a high quality proposal was submitted. This was perhaps the case when the success rate was 25-30%, but not at the present rate of ~15%.</p> <p>These conditions jeopardize the productivity of the ECS research community, the ability to recruit graduate students into academic and research careers, and ultimately, the competitiveness of the U.S. engineering research enterprise. This problem must be addressed, quickly and decisively. The CoV, therefore, strongly encourages the ECS Division and Engineering Directorate leadership to continue to make the case to enhance the budget (and the average project duration/funding level) to reasonable levels.</p>	<p>ECS is pleased that the CoV considers ECS programs to be relevant and forward-thinking.</p> <p>ECS agrees with the CoV, and will ensure that available ECS resources will be invested productively to enable high impact.</p> <p>ECS and ENG will make a conscious effort to redress the budgetary imbalance between committed funds and discretionary funds, and to improve grant size and funding rate of research grants and of CAREER awards.</p> <p>ECS agrees that the historical image of the agency is important, as is the concern about the productivity of the external community, and will strive to enhance the funding rate and increase the grant size.</p>
<p>2) Appropriate use and support of innovative projects. The ECS Division primarily utilizes the SGER (Small Grants for Exploratory Research) program for the support of innovation projects. This mechanism is effective and allows the support of projects</p>	<p>ECS will continue to utilize SGERs for the support of innovative projects that are high risk and that may not review well in the normal review process. ECS Program Directors will be encouraged to</p>

<p>that may not review well, since innovative projects tend to be intrinsically high risk.</p> <p>One potential concern that was observed, however, is that some SGER proposals may be coded as SGER for unjustified reasons. That is, some SGER awards seemed to be "mainstream" awards for senior PIs. In those cases, it seemed hard to justify the use of an SGER, and in the jackets there was no serious or consistent justification.</p> <p>In addition, the SGER budget is too small, however, to create significant program impact.</p> <p>The CoV encourages the Division, Engineering Directorate, and the Foundation to enhance mechanisms for the support of innovative projects.</p>	<p>support SGER awards, and as incentives the Division Director's discretionary funds will be used for this purpose.</p> <p>ECS will make a conscious effort to ensure that the appropriate documentation is completed to justify SGER awards.</p> <p>The SGER Budget is generally in proportion to the core program budget of the Division.</p> <p>ECS will continue to support innovative projects both through SGERs as well as through other awards.</p>
<p>(3) Breadth of the research portfolio. The present areas of ECS are a subset of the areas found in EE (and related) departments around the country. For instance, there is little emphasis on signal processing theory and algorithms and very little in system theory.</p> <p>On the other hand, some proposals submitted to ECS could very well be funded by CISE.</p> <p>Addressing the boundaries between NSF Divisions may help put more resources in the perceived gaps of ECS.</p> <p>ECS should also increase its emphasis on appropriate aspects of advanced communications to reflect emerging engineering opportunities. Examples include intra- and inter-chip networking and communications, terahertz communications, and ultra-wideband optical and wireless communications.</p>	<p>ECS will continue to include signal processing theory and algorithms, and systems theory areas in the recently named Power, Controls and Adaptive Networks (PCAN) program. These interests will be reflected in postings on the ECS web site.</p> <p>There is a natural overlap between some areas in ECS and CISE. This interface will be managed through collaborative efforts.</p> <p>The proposed reorganization of the Engineering Directorate will provide greater coverage to a wide spectrum of technical areas, such that the perceived gaps will be minimized.</p> <p>ECS has recently reorganized its programs to emphasize Communications in the newly established "Integrative Hybrid and Complex Systems (IHCS)" Program. ECS has identified communications as one of the key technology areas, and a Program Director has been hired with expertise in Communications. To build a strong</p>

<p>Finally, ECS should also be proactive in defining and capturing ECS-specific activities in bioelectrical devices, subsystems, and systems biology.</p>	<p>program in communications, ECS plans to hold a workshop on “Technological Challenges in Integrative Hybrid Communications Systems” that will be followed by an interagency initiative announcement for the FY 2006.</p> <p>ECS emphasis on Bioelectronics and Biosystems will be reflected through the Electronics, Photonics, and Device Technologies (EPDT) program at the device level, and the IHCS program at the systems level. These technical areas will be posted on the ECS web site. “Biology in Engineering” has been identified as one of the five priority areas in Engineering; ECS future investment will be consistent with ENG research priority areas.</p>
<p>(4) Understanding and use of NSF Review Criterion 2.</p> <p>The CoV observed that individual reviews are increasingly responding to the guidance and addressing both intellectual merit and broader impacts. Compliance is now virtually 100%.</p> <p>However, the interpretation of the "broader impacts" criterion (Criterion 2) and relative weight given to the requirement is inconsistent across panels. In some cases, this criterion is given very brief attention by the PI and reviewer. Furthermore, although review analysis forms tend to address both criteria, they place much greater emphasis upon intellectual merit. In many cases, these analyses are duplication of panel summaries. The CoV encourages ECS to continue to elaborate on the review criterion for broader impacts and provide appropriate guidance to PDs and reviewers.</p>	<p>ECS is pleased that the CoV recognizes that Reviewers and Program Directors are responding favorably to ECS requirements to address both criteria in their individual reviews, panel summaries and Program Directors’ review analyses.</p> <p>ECS will continue to strive for uniform interpretation by Reviewers and Program Directors of both criteria in their individual reviews, panel summaries and Program Directors’ review analyses. ECS will make a conscious effort to provide more guidance to reviewers by sending the review criteria information with the panel matrix. Further, the Division Director will emphasize the significance of “the Broader Impacts Criterion” to the reviewers in her welcome remarks prior to the commencement of panel deliberations. The Division Director will encourage Program Directors to give appropriate weight to both review criteria, “Intellectual Merit” and “Broader Impacts” in making their recommendations.</p>

<p>A.4.13 Is the program relevant to national priorities, agency mission, relevant fields and other customer needs? Include citations of relevant external reports.</p> <p>The ECS division funds a great deal of innovative research as defined by the <i>National Innovation Initiative</i> report by the Council on Competitiveness.</p> <p>However, it is not always clear that industrial applicability is well represented. There are several GOALI awards in the portfolio, and these have excellent industrial interaction. However, because there is a low level of follow-up once an award is made, there is no guarantee that the industrial interaction proposed is carried through.</p>	<p>ECS plans to follow-up on industrial interactions by organizing a GOALI Grantees' Workshop in FY 2006.</p>
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