

MEMORANDUM

DATE: May 19, 2005
TO: James Lightbourne, Senior Advisor
 Directorate for Education and Human Resources
FROM: Christopher McRae, Assistant Program Director
 Division of Human Resource Development
SUBJECT: COV for Selected Programs for Minorities and Minority Serving Institutions
 COI and Diversity Memo

The Committee of Visitors report for Selected HRD Programs for Minorities and Minority Serving Institutions was approved at the EHR Advisory Committee meeting held at NSF on May 11-12, 2005. The COV consisted of 13 members selected for their expertise related to the goals of the program. They provided a balance with respect to the type of institutions supported through the program, gender, and representation from underrepresented groups. The following table shows the main features of the COV's diversity.

Category of COV Membership	No. of COV Members in Category
Member of EHR Advisory Committee.....	1.....
Institution Type:	
<input type="checkbox"/> University.....	7.....
<input type="checkbox"/> Four-year College.....	1.....
<input type="checkbox"/> Two-year College.....
<input type="checkbox"/> K-12 School or LEA.....	1.....
<input type="checkbox"/> Industry.....	1.....
<input type="checkbox"/> Federal Agency.....	3.....
Location	
<input type="checkbox"/> East.....	4.....
<input type="checkbox"/> Midwest/North	3.....
<input type="checkbox"/> West.....	5.....
<input type="checkbox"/> South.....	1.....
Gender	
<input type="checkbox"/> Female.....	6.....
<input type="checkbox"/> Male.....	7.....
Race/Ethnicity	
<input type="checkbox"/> White.....	1.....
<input type="checkbox"/> Black.....	7.....
<input type="checkbox"/> Hispanic.....	1.....
<input type="checkbox"/> Asian.....	1.....
<input type="checkbox"/> Pacific Islander.....	1.....
<input type="checkbox"/> Am Indian.....	2.....

The COV was briefed on Conflict of Interest issues and each COV member completed a COI form. COV members had no conflicts with any of the proposals or files. (or, if they did, use 'Proposals and files were not available to COV members in those cases where the member had a COI and members were not allowed to participate in discussions of actions with which they had conflicts.')

**A REVIEW OF PROGRAMS
FOR MINORITIES AND MINORITY SERVING
INSTITUTIONS**

By

Committee of Visitors (COV)

The National Science Foundation

November 18 – 19, 2004

EXECUTIVE SUMMARY

Overview

This Committee of Visitors (COV) report summarizes our review of five programs serving minorities and minority serving institutions. The Committee reviewed the Louis Stokes Alliances for Minority Participation (LSAMP), the Historically Black College and University – Undergraduate Program (HBCU-UP), the Alliances for Graduate Education and the Professoriate (AGEP), the Centers for Research Excellence in Science and Technology (CREST), and the Model Institutions for Excellence (MIE) programs. The Committee evaluated the programs with respect to the quality of their management and review processes, and with respect to the degree to which they are meeting goals and objectives set by the Education and Human Resources Directorate, the Government Performance and Results Act (GPRA) guidelines, and the NSF-wide strategic plan.

Structure of the Review

The National Science Foundation on November 18 and 19, 2005 convened the Committee of Visitors meeting. In the conduct of the COV, the committee considered a number of informational sources, which included the following: 1) a random sampling of award and declination files that accrued since the 2001 COV report; 2) senior administrators and program staff presentations and individual interviews; and 3) extensive printed documentation covering strategic outcomes and evaluation data.

The COV report encompasses the following key areas:

A. The integrity and efficiency of the programs' processes and management

In this section, the COV responded to a set of specific questions provided by the NSF. Rather than provide separate reports on each of the five programs, a combine report has been created summarizing sub-group responses to each question. A great deal of detail about the COV evaluation of individual programs can be found in this section of the report.

B. Results: outputs and outcomes of NSF investments

The COV followed the prescribed NSF template and encompasses the following NSF key goals:

- **PEOPLE:** Developing “a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens.”
- **IDEAS:** Enabling “discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.”
- **TOOLS:** Providing “broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation.”
- **ORGANIZATIONAL EXCELLENCE:** Providing “an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices.”

C. Other topics

This section presents the COV's perceptions of other key issues not incorporated in the previous sections, such as the degree to which HRD programs are effectively inter-connected; the degree to which HRD programs are well-linked to the efforts of other directorates at the Foundation,

whether there are gaps in coverage of existing programs; and agency-wide issues that should be addressed by NSF to strengthen the HRD programs.

COV Membership

The COV was chaired by Dr. Gretchen Kalonji, a member of the EHR Advisory Committee, and comprised of the members listed below under the following sub-groups:

Undergraduate Sub-Group

Dr. Lynette Padmore-Hamilton (Undergraduate Programs Sub-Group Chair)

Dr. Carl Person

Dr. Patrick Weasel Head

Dr. Grayson Noley

Graduate Sub-Group

Dr. William McHenry (Graduate Programs Sub-Group Chair)

Dr. Judy Jackson

Dr. Frank Pyrtle, III

Ms. Theresa Smith

Model Institutions for Excellence Sub-Group

Dr. Robert Harvey (MIE Program Sub-Group Chair)

Dr. Vivian Williamson

Dr. Clifford Poodry

Dr. Milagros Mateu

SUMMARY OF KEY FINDINGS

A. The Integrity and Efficiency of the Programs' Processes and Management

In general, the COV was highly impressed with the professional and effective manner in which the HRD programs are managed. The review processes are appropriate, effective, and timely. One concern that emerged with respect to the review process was the demographics of reviewers; the COV urges HRD to make an effort to involve more Hispanic reviewers in the process and to strive for a greater geographical balance. Otherwise, all aspects of the review process are managed very well. The COV found the overall quality of the projects supported by these five HRD programs to be very high. The distribution of various types of projects within the portfolio was also deemed to be appropriate. The COV was very favorably impressed with the management of the complex, and multi-faceted HRD programs. The program leadership is doing an outstanding job.

B. Results: Outputs and Outcomes of NSF Investments

PEOPLE: Developing “a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens.”

The COV is convinced that the programs we reviewed constitute incredibly important national resources for strengthening and diversifying the US science and engineering workforce. They

are having demonstrably strong and positive impacts; both on the professional development of students and faculty and on the strengthening of institutions serving underrepresented groups. As such, it is of vital national importance that these programs continue to receive high levels of national support. The primary recommendation of this COV is that these programs be further expanded to serve greater numbers of students and institutions.

IDEAS: Enabling “discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.”

There are a number of mechanisms through which these HRD programs contribute to the NSF outcome goal for “ideas.” Firstly, with the focus of many of the programs on broadening participation through engaging students in scientific and engineering research, a lot of important science is being done. Some programs, such as CREST, focus explicitly on developing research capacity at minority-serving institutions, and they have established very impressive track records of catalyzing world-class research communities. Yet another important mechanism in which the “ideas” goal is being served is through the focus of these programs on developing new and creative models for education and professional development. These ideas, tested through the platform of the multiple programs were reviewed, and are of significant value to strengthening learning and innovation in our society.

TOOLS: Providing “broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation.”

The programs reviewed serve the “tools” goal by 1) developing scientific infrastructure at minority-serving institutions; 2) making state-of-the-art facilities more accessible to a broader cross-section of our communities; and 3) building institutional infrastructure to support integration of research and education.

ORGANIZATIONAL EXCELLENCE: Providing “an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices.”

The projects supported under these programs are playing important roles in making our higher educational institutions more creative and adaptive in the design of programs, which broaden participation. They are also making notable advances in working across institutional boundaries, as so many of the projects involve alliances among institutions. There are important lessons being learned that need to be disseminated more broadly, as their potential applicability is profound. Within the NSF, the HRD programs very effectively illustrate how “intellectual merit” and “broader impact” can and must really go hand in hand. The experience gained within HRD of creatively intertwining multiple goals, including strengthening the workforce, enhancing institutional scientific capacity, re-vitalizing curricula, and promoting professional development of faculty, is of broad applicability. The COV emphasizes that increased focus should be placed on assuring that the experience gained within HRD be broadly disseminated throughout the Foundation.

C. Other Topics

The COV addressed the question of the degree of effective articulation and coordination among the various HRD programs. The committee learned of a number of examples of powerful linkages among programs that target populations at various stages of the education continuum. The committee feels that additional focus should be placed on understanding the interactions between the suite of HRD programs on a systems level. Such a comprehensive focus needs support that is sustained long enough to produce viable and reliable data. NSF should implement a strategy to collect the necessary data in a timely manner to assure that the system as a whole is operating as effectively as possible.

As far as gaps within program areas, the COV noted that institutional capacity building programs are in place for HBCU's and for Tribal colleges, and currently no focused effort on institutions serving Hispanic populations. This is a major gap that should be addressed.

The COV addressed the degree to which the HRD programs are effectively coordinated with other programs in the Education and Human Resources Directorate, as well as the connections of the HRD programs with the rest of the NSF. The COV was convinced that the "best practices" emerging from the HRD programs should be shared widely and should inform the structure of a wide variety of other programs. There are a number of sets of powerful lessons being learned through HRD projects, including how to effectively integrate research and education; how to build strong interdisciplinary efforts; and how to form effective multi-institutional alliances. The lessons learned here, again, have wide applicability and it is essential that they be disseminated widely and effectively, both within the NSF and nationally. The HRD staff already has a huge set of responsibilities. If more of their attention is to go into Foundation-wide leadership roles of helping others learn from their experiences, more resources need to be made available to help them in this task. The COV believes that a concerted effort should be made to assist the HRD staff to increasingly link with other directorates across the Foundation.

Overall Conclusion:

The HRD programs reviewed by the COV have demonstrated effectiveness with respect to NSF's goals for people, tools, ideas, and organizational excellence. The funding levels are, however, currently inadequate, even to maintain existing levels of support. The COV also believe these programs should indeed be scaled up. HRD programs need to remain a priority during future NSF budgetary planning.

DETAILED REPORT OF THE COMMITTEE OF VISITORS

A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

The COV addressed a variety of questions concerning the integrity and efficiency of the management processes of the programs under review. These questions were grouped into several broad categories, including:

- A.1: Questions about the quality and effectiveness of the programs' use of merit review procedures;**
- A.2: Questions concerning the implementation of the NSF Merit Review Criteria (intellectual merit and broader impacts) by reviewers and program officers;**
- A.3: Questions concerning the selection of reviewers;**
- A.4: Questions concerning the resulting portfolio of awards, and;**
- A.5: Management of the programs under review.**

Our mechanisms for addressing these questions included interviews with program staff and reviews of randomly selected proposals and associated documentation. In the following section, the COV clustered the findings of the three sub-groups to the specific questions listed above. Where there are general findings common to all of the programs, the COV summarized that information at the beginning of each subsection. Program-specific responses to the various questions follow each overall comment.

A.1: QUESTIONS ABOUT THE QUALITY AND EFFECTIVENESS OF THE PROGRAMS' USE OF MERIT REVIEW PROCEDURES

A.1.1: Is the review mechanism appropriate (panels, ad hoc reviews, site visits)

Overall Comments

The review mechanisms for all 5 programs were deemed to be appropriate and effective, with the exception of one major weakness. It was noted that, at least for the LSAMP program, the racial balance of reviewers is inadequate, most strikingly with zero participation of Hispanic reviewers over the three-year period under review.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes, except for racial balance

According to the document provided, the racial balance of the panels is inadequate. It reports only one American Indian and one Pacific Islander in three years and no Hispanic reviewer at all. Data for ad hoc reviews are not available and no data are given regarding site visits. However, the panels and the process seem to be consistent with the procedure described although the threshold for funding seems to be questionable.

The COV subcommittee on undergraduate programs reviewed a random sample of the 31 proposals submitted during the three cycles under review. The samples were comprised of 12 awards and 3

declinations. The number of reviews for each cycle was commensurate with the number of proposals to be reviewed. Each of the proposals under review was subjected to at least three reviews. In the opinion of the COV, it is clear that the panels received detailed instructions about the review process both prior to and during the review. The overview of the process seems to be well thought out.

Each of the file folders reviewed indicated that they were evaluated by review panels that included ten members with four to five panelists signing off on the reviews of each institution. Panelists receive the applications via mail prior to coming to a panel review session.

HBCU-UP Program: Yes

Everything seems to be in order with timely program solicitations, clear deadlines (October 1 - Optional, November 1, 2000 as final), with program outreaches conferences and site visits for FY 01 and 02. There were no reported outreach or site visits for the third year-2003. No reasons are given for why they had no effort during the third year and that might need to be addressed. However, site-based technical assistance is provided to the institutions throughout the year by the QEM Network.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

Approval process for new programs is appropriate to assist NSF in selecting the most meritorious proposals. Review mechanism for continuing awards could benefit from a reverse site visit focused on the individual project annual report prior to award renewal.

CREST: Yes

The CREST proposal review mechanism has two steps: (1) review of the research productivity strategy and (2) review of the research capacity strategy. The first step involves mail review while the second involves convening a panel. For the proposed goals, this is an appropriate review mechanism.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

The review mechanism appears appropriate for this program. The review criteria in the RFP could be strengthened by the inclusion of a template to log criteria and expected goals. Goals should be expressed in quantitative and qualitative outcomes.

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A.1.2: Is the review process efficient and effective?

Overall Comments

The review process appears to be efficient and effective for all five programs.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes

The review process appears to be efficient and effective with advance availability and one primary and three secondary reviewers leading discussions. The applicants present their goals and objectives in both quantitative and qualitative statements. The documentation provided by the applicants and panelists is quite sufficient for fair and equitable funding decisions to be made. The ratings and comments were consistent. This is a particular strength. There seems to be an effective process of seeking reviewers, process and procedures of reviewing, and a timely process of getting word out to PIs.

One COV member in reviewing jackets noted that in one situation the review process was outlined, reviewers were aware of process, yet there was a telephone conference call with three reviewers that was not adequately explained why this occurred. In this teleconference three reviewers submitted their responses after PI clarifications were received which did not include the one reviewer who submitted the "fair" rating. Even though the comments of these reviewers indicated that appropriate responses were received from the PI to elevate the proposal to funding stage there should have been a statement from the reviewer who made the "fair" assessment that he/she agreed with the new assessment. It would help substantiate the new assessment if this was included and better yet, it would be better if that person was part of the conference call to affirm findings. Staff may be able to provide an appropriate explanation as to whether or not the reviewer who gave the "fair" assessment was available for the teleconference.

HBCU-UP Program: Yes

The process seems to be working and functional. It uses a large panel and a primary and three to five secondary reviewers.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

Process appears to be not only efficient and effective but also fair for prospective PI's.

CREST: Yes

The review process used 49 reviewers to review 38 multidisciplinary proposals. The process yields over three reviews for each proposal. The process was efficient and effective.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

The *Review Protocol and Associated Customer Service Standard* is commendable. A site visit team composed of NSF staff and three non-NSF experts conducts proposal review. There appears to be both a comprehensive review process and balance among reviewers. It would be helpful to the reader if the process was described on the first page rather than in the middle of the document.

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A.1.3: Are reviews consistent with priorities and criteria stated in the program's solicitations, announcements and guidelines?

Overall Comments

The consistency of the reviews with program guidelines is mostly very strong. An exception was noted in the MIE program in which it appears that some reviewers did not consistently address the criteria in the RFP.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes

The reviews are thorough and in at least one case had a teleconference follow-up even though there appears to be no provision for this in the review procedures. They seem consistent with priorities and criteria stated. All of the file folders indicated that the reviews were consistent with the priorities and criteria.

HBCU-UP Program: Yes

All reviewers throughout each fiscal year seemed to perform their tasks consistent with the solicitation.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

Individual reviewer comments seemed internally consistent and enhance the synthesis of the summaries.

CREST: Yes

The reviewers used the NSF CREST review criteria to award 11 of the 38 proposals submitted. The awards are consistent with both the goals of the program and the reviewers' evaluation.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): No

Reviews are inconsistent with priorities and criteria stated in the program's solicitations. It is not clear that the reviewers consistently addressed the announcement criteria in the review process. A review of jackets indicates variable responses to the announcement criteria. (See Form 7 Supplements)
The COV recommends the establishment of guidelines for reviewers that align explicitly to the announcement criteria and to the proposals submitted by the institution.

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A.1.4: Do the individual reviews (either mail or panel) provide sufficient information for the principal investigator(s) to understand the basis for the reviewer's recommendation?

Overall Comments

In general, the feedback to the investigators from reviewers is thorough and consistent, and enables a sound understanding of the basis for the recommendations.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes

The reviewers' comments appeared to be thorough and understandable. They provide a substantial amount of detail in certain instances.

They were very descriptive of the proposal and found issues that needed clarification and this was communicated to PI. The panelists gave adequate documentation for their recommendations.

HBCU-UP Program: Yes

PI's do seem to have sufficient information provided them so that they understand the basis for recommendations made. The data provided them in their communications seem to be quite thorough.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

The COV was also impressed by the quality of reviewers that NSF brings in.

CREST: Yes

The quality of the reviews was adequate to allow the program officer to make informed recommendations.

given to the need to recruit staff and, as well, the academic year. Since the academic year already had begun, there was no opportunity to coordinate student activities with the academic year. This would seem to affect opportunities to recruit potential participants and even appropriate staff. The COV recommend some consideration be given to adjusting the time for awards to coincide with planning for the academic year. In another proposal, the time frames probably were adequate but it was difficult to determine due to errors on the forms.

All proposals received "dwell" time less than 9 months and the time to "dwell" was getting closer to the 6-month range for each additional year after FY 2001. For example, one proposal was received by 1/30/01, was reviewed by March 14-15, and re-reviewed in June 7, with additional information, and an email was sent out July 12, asking for updates (7 months) and was given an effective start date of November 1, 2001 and expiration date of October 31, 2006. Not sure what is appropriate yet, the proposal indicated that they wanted to start on June 1, 2001. This seems like a process of more than 6 months and closer to 9 months. However, of the file folders reviewed, the time to decision ranged from 5 to 6 months for most.

HBCU-UP Program: Yes

The dwell time seemed appropriate. The first FY was 100 percent within six months. Subsequent fiscal years went into 6-9 months with each year having a larger percent with a longer time to decision.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

Despite timeliness of decision, actual notification of award has been consistently delayed beyond NSF's recommended six-month window, due to slowness in the Congressional budgeting process.

CREST: Yes

NSF's review of the proposals appeared to have been completed in a timely manner. The award notifications were dependent on the approval of NSF's annual budget. In one year, this delayed the actual awards.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

Time to decision was excellent. The time to decision is supported by a substantive documentation of the process.

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A.1.8: Discuss issues identified by the COV concerning the quality and effectiveness of the program's use of merit review procedures:

Overall Comments

The COV was, in general, highly impressed with the professional and effective manner in which merit review procedures are applied.

UNDERGRADUATE PROGRAMS

LSAMP Program:

There appear to be no issues regarding the quality and effectiveness of the program's use of merit review procedures except that criteria appear to be poorly applied in the documentation provided in some instances. One COV member indicated that without reading the proposal itself thoroughly, it is difficult to ascertain the extent to which "intellectual merit" is applicable as the reviews, both NSF and outside

LSAMP Program: Data not consistently available

These data were not consistently available. Inadvertently, a question from a review panel requested information caused a response that discussed intellectual merit and this was followed by a discussion of issues related to broader impacts. However, for the most part, whether or not the reviewers addressed these criteria was difficult to ascertain. Although agency data states 100 percent compliance with these criteria, reviewers provided only general references in most instances.

Some have articulated their responses and others merely skimmed the criteria. One COV member suggested a heading with both of the criteria and see how the reviewers responded to this specifically. The merit review criterion on intellectual merit was generally addressed by discussions of the quality of the activity and the commitment to or sustainability of the project. The panel reviews discussed the broader impacts, specifically, how well the proposed activity would broaden the participation of underrepresented groups. Given that the criteria are listed separately on the review sheet, it may be helpful during the orientation session to provide reviewers with specific examples as to how these criteria may be addressed relative to the Program focus.

HBCU-UP Program: Yes

According to data provided by the agency, all contributed to merit review criteria. Review of sample file folders confirms the contribution of proposals to both merit review criteria.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

CREST: Yes

All reviews addressed both merit review criteria.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

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A.2.2: Have the panel summary reviews addressed whether the proposal contributes to both merit review criteria?

Overall Comments

While most panel summaries did a good job in addressing both merit review criteria, there were some exceptions.

UNDERGRADUATE PROGRAMS

LSAMP Program: Data not available

This is a difficult question to answer as the merit review criteria does not seem to fit the intent of the program. It seems the proposals do meet criteria yet not to the definition as provided in the directions for reviewers. Suggest that this area be looked at when it comes to specific program reviews and other scientific reviews. One jacket indicated that panel summaries did not address NSF criteria. The jackets reviewed did not show consistency in the manner in which these criteria were addressed.

HBCU-UP Program: Yes

It seems that all of the proposals considered for each of the three fiscal years involved for HBCUs address both merit review criteria.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

CREST: Yes

All panel summaries addressed both of the NSF merit review criteria.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

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A.2.3: Have the review analyses (Form 7s) addressed whether the proposal contributes to both merit review criteria?

Overall Comments

Almost all of the Form 7s addressed whether the proposals contribute to both merit review criteria.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes

This is not apparent in most of the analyses reviewed. The analyses did focus on the proposals' merits but most were focused on "broader impacts" and procedures.

Yes, they all seem to address whether merit review met the criteria, but in one jacket there is not enough detail to glean this valuable information.

HBCU-UP Program: Yes

In the review analyses available for each year concerned, all proposals seemed to meet both criteria of "intellectual merit" and "broader impact."

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

CREST: Yes

All program officers' Form 7s addressed both NSF merit review criteria.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

The summaries on Form 7 were variable. In one case, the review focused more on need of the institution than on merit of what was proposed.

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All programs used adequate number of reviewers.

UNDERGRADUATE PROGRAMS

LSAMP Program: YES

The number of reviewers on the panels was commensurate with the number of proposals to be reviewed. Primary and secondary reviewers were identified prior to the review. It does seem that there exists a variety of reviewers from a variety of locations and backgrounds. Race and gender of reviewers do not seem to be a problem in obtaining a good mix. There are two issues that need addressing: There are fewer reviewers from the Western states and an abundance from the Eastern states; and although there is only one each American Indian and Pacific Islander, Hispanic reviewers seem to be missing entirely in the process. There was a noticeable lack of Hispanic reviewers for all three years. It should be noted that reviewers from Hispanic-serving institutions were present on the panels for each of the years reviewed.

HBCU-UP Program: Yes

There seems to be an adequate representation of all races, gender, and regions. The COV suggests that disabled individuals be recruited as panelists if this is not already being done.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

Each proposal had a minimum of three reviewers as well as a panel summary.

CREST: Yes

The program officers used 49 reviewers to help form the bases for their recommendations. This appears to be an appropriate balance.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

Upon receipt of a "non review", the COV panel recommends the NSF program officers solicit input from an additional reviewer with expertise in the relevant area. The COV commends the use of NSF Program Officers to augment reviews from external panelists.

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A.3.2: Did the program make use of reviewers having appropriate expertise and/or qualifications?

Overall Comments

Though it is difficult to assess the technical qualifications of reviewers, it seems that the programs recruit reviewers with appropriate expertise. For programs such as the MIE, the COV stresses that it is important to include senior reviewers with expertise in institutional capacity building.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes

It appears that all panelists clearly were qualified to perform the tasks they were assigned. The reviewers have a solid background in science that allows good assessment of program goals in relationship to STEM.

HBCU-UP Program: Yes

There seems to be a wide array of expertise among the reviewers. However, "other sciences" researchers seem to be the norm and not the exception. Maybe this needs to be looked at.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

CREST: Yes

At least 12 discipline areas were represented by the program proposal reviewers.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Yes

Because of the nature of MIE, there is a need for senior reviewers with expertise in capacity building and infrastructure support in order to provide more robust analysis and information to the PI and institution.

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A.3.3: Did the program make appropriate use of reviewers to reflect balance among characteristics such as geography, type of institution, and underrepresented groups?

Overall Comments

As noted above, there is a lack of balance among underrepresented groups in the reviewers recruited for these programs. Efforts should be made to increase the numbers of American Indian, Pacific Islander and Hispanic reviewers. The geographic distribution of reviewers could also be improved by drawing more from individuals from western states.

UNDERGRADUATE PROGRAMS

LSAMP Program: Yes

There appears to be a successful selection of reviewers. However, only one American Indian reviewer and one Pacific Islander were selected for panels during the three years, No Hispanic reviewer was identified and there was a noticeable lack of reviewers from the Western region of the country. Also, the majority of panelists represented the South seemingly created an imbalance. Yet there seems to be a concerted effort to make sure geography, institutions, and underrepresented groups are included.

HBCU-UP Program: Yes

There does seem to be an adequate representation of groups by institution (including HBCUs and TCUs) and underrepresented groups.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Yes

The program made excellent use of a diverse panel of reviewers. This COV recommends that the HRD share its pool of reviewers with other NSF directorates.

CREST: Yes

Other NSF programs would benefit from structuring review panels that were as balanced as the one constructed by CREST.

HBCU-UP Program:

Geographical representation is somewhat minimal for reviewers from the West coast including Alaska and Hawaii. There is no representation of individuals with disabilities among reviewers. "Other Sciences" as an expertise seems to be heavily favored. Is this true science and if not, how do they fit into the mix of reviewers? That category probably refers to the social sciences and one would encourage the participation of those in this group who are concerned with HRD.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

This COV was impressed with the diversity of the reviewers selected by HRD to review its proposals.

CREST:

No concerns identified.

MODEL INSTITUTIONS OF EXCELLENCE (MIE):

For large institutional programs, care should be taken to select experienced senior reviewers with appropriate expertise in pedagogy, management and institution building as well as in scientific discipline. The COV should be provided more detailed information regarding qualifications of reviewers than is currently provided.

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A.4: QUESTIONS CONCERNING THE RESULTING PORTFOLIO OF AWARDS UNDER REVIEW.

A.4.1: Overall quality of the research and/or education projects supported by the program.

Overall Comments

The COV is convinced that the overall quality of the projects supported by these five programs is very high.

UNDERGRADUATE PROGRAMS

LSAMP Program: Appropriate

The major outcome of the LSAMP Program rests mostly with its impact on the number of BS graduates in the STEM areas. Over the period of the COV review, agency data states the total number of underrepresented students in STEM subjects were 21,704 in 2001, 22,057 in 2002, and 25,000 in 2003. The educational projects approved seem to reflect the overall quality sought by NSF. The education projects were generally excellent. The alliance lead by Drexel University focused on recruitment, retention, progression, articulation, and graduate school transition. The alliance members included three states, five research-intensive universities, three HBCUs, and one two-year institution. The COV received highlights of a study that has recently been completed by the Urban Institute. This evaluation indicates that, among other indicators, for graduates over the period 1992-1997; 51% graduated with a GPA of 3.25 or above; 80% have taken additional courses since graduation; and 66% are pursuing a Master's degree or higher.

HBCU-UP Program: Appropriate

The final awardees reflect an array of projects that impact HBCU-UP.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Appropriate

Program is doing an excellent job of broadening participation in STEM fields by students from underrepresented groups.

CREST: Appropriate

The research being supported by CREST is world class and will contribute to the nation's ability to compete in a global economy.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

All of the programs have contributed to the development of underrepresented groups in STEM programs and in increasing research capability.

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A.4.2: Are awards appropriate in size and duration for the scope of the projects?

Overall Comments

All of the awards are deemed to be appropriate in size and duration.

UNDERGRADUATE PROGRAMS

LSAMP Program: Appropriate

Awards appear to be appropriate in size and for the most part cover five years of funding tied to performance which is measured primarily by the number of BS graduates provided by the respective alliance in any given year. Size and duration of the scope of the projects are based on the number of STEM degrees awarded by the alliance. For example, in Phase III Projects, the applicants are awarded \$500,000 for alliance projects that award 1,000 or more B.S. degrees annually.

HBCU-UP Program: Appropriate

The awards seem appropriate as they range from planning grants (\$50K) to special non-solicited research proposals as small grants to major 5-year grants that are multi-million dollar effort.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Appropriate

AGEP appears to be an extremely efficient program, providing maximum benefits to the student participants.

CREST: Appropriate

The awards were appropriate.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

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A.4.3: Does the program portfolio have an appropriate balance of high-risk proposals?

Overall Comments

In general, we found the ratio of high-risk proposals to those employing more time-tested routes to broadening participation in science and engineering, to be appropriate.

UNDERGRADUATE PROGRAMS

LSAMP Program: **Appropriate**

The LSAMP program continues to support an appropriate mix of private and public institutions.

HBCU-UP Program: **Not Appropriate**

The program is designed for HBCUs; therefore they are not high risk.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: **Not applicable**

CREST: **Appropriate**

The program officer utilized a model for establishing the proper balance of the level of proposal risks.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

Within the pool of funded programs there was a range of risk.

Two institutions could be considered as high risk, yet have experience in conducting stem programs, whereas the third institution is a novice in this endeavor.

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A.4.4: Does the program portfolio have an appropriate balance of multi-disciplinary proposals?

Overall Comments

The projects supported in this directorate tend to have multi-disciplinary content, which the COV found to be very consistent with program goals.

UNDERGRADUATE PROGRAMS

LSAMP Program: **Appropriate**

LSAMP proposals are multidisciplinary by the nature of their focus on STEM related-subjects. The nature of the partnerships adds to this characteristic due to the variety of expertise brought together for the purpose of serving diverse students with varying needs. Enhancing the multidisciplinary nature of LSAMP is their relationships with other federal agencies such as NIH, DOE and the Smithsonian Institute.

HBCU-UP Program: **Appropriate**

As indicated in many of the curricula of the HBCUs, activities in the projects address a wide array of STEM offerings.

GRADUATE PROGRAMS AND RESEARCH CENTERS

CREST: Appropriate

AGEP: Appropriate

All proposals were multidisciplinary.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

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A.4.5: Does the program portfolio have an appropriate balance of innovative proposals?

Overall Comments

The COV found a healthy representation of projects undertaking new and innovative strategies.

UNDERGRADUATE PROGRAMS

LSAMP Program: Appropriate

LSAMP is innovative by virtue of the nature of its purpose. Proposals that address its objectives will therefore be innovative because of the manner in which they individually focus on their own needs in their own unique ways. The size, scope and composition of many of the alliances make them innovative (e.g., All Nations, Drexel U., etc.)

HBCU-UP Program: Appropriate

There exist some proposals that are innovative in their collaborative approach, yet many utilize research to promote activities that are time tested and effective.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Appropriate

The review process encourages innovativeness.

CREST: Appropriate

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

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A.4.6: Does the program portfolio have an appropriate balance of funding for centers, groups and awards to individuals?

Overall Comments

By design, some of the programs are targeted at individuals, while others promote institutional capacity building. In general, the COV found the mix to be appropriate.

UNDERGRADUATE PROGRAMS

LSAMP Program: Not applicable

LSAMP uses the Alliance approach.

HBCU-UP Program: Appropriate

Most of the awardees are HBCUs, with a scattering of groups and or community programs.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Not applicable

CREST: Appropriate

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

Though inferred, the COV committee did not have sufficient information to assess whether the program portfolio has appropriate balance of funding centers, groups and individuals.

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A.4.7: Does the program portfolio have an appropriate balance of awards to new investigators?

Overall Comments

Based on the data the COV had access to, this question was difficult to answer.

UNDERGRADUATE PROGRAMS

LSAMP Program: Not applicable

HBCU-UP Program: Not applicable

There is nothing in the system to identify "new PI" as projects are funded. Many of the current PIs in HBCUs have little turnover and as such, would be repeats. However, many of the Co-PIs are new.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Appropriate

Due to the nature of this program, this COV supports the funding of experienced PI's.

CREST: Appropriate

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Not applicable

MIE applicants were limited to renewals.

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A.4.8: Does the program portfolio have an appropriate balance of geographical distribution of Principal Investigators?

Overall Comments

Most of the programs were found to have appropriate balance of geographical distribution. An effort should be made to look critically at increasing participation from western regions.

UNDERGRADUATE PROGRAMS

LSAMP Program: **Questionable**

Geographical distribution is heavily weighted to the South. The program currently supports 32 alliances serving students in 40 states and Puerto Rico.

HBCU-UP Program: **Appropriate**

Geographical distribution reflects the locations where HBCUs exist and as such it makes sense that this is the geographical area in which they are located.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: **Appropriate**

CREST: **Appropriate**

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

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A.4.9: Does the program portfolio have an appropriate balance of institutional types?

Overall Comments

Most of the programs were deemed to have an appropriate balance of institutional types. It was noted that some of the lead institutions in the LSAMP alliances need to do a better job on diversity within their own institutions.

UNDERGRADUATE PROGRAMS

LSAMP Program: **Appropriate**

There appears to be an appropriate balance of institutional types included on an overall basis.

HBCU-UP Program: **Appropriate**

The overwhelming majority are HBCUs: 4-year, 2-year, public and private institutions.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: **Appropriate**

CREST: **Appropriate**

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

The portfolio represents a commendable balance of institutional types: HBCU, HSI, and a Tribal College.

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A.4.10: Does the program portfolio have an appropriate balance of projects that integrate research and education?

Overall Comments

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

Each program documented interdisciplinary activity. Institutions should be encouraged to employ research tools to evaluate the impact of interdisciplinary programming. These processes could be enhanced by additional interaction with NSF program officers.

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A.4.12: Does the program portfolio have appropriate participation of underrepresented groups?

Overall Comments

The programs focus explicitly on underrepresented groups and serve them well. There are concerns, however, about differential participation among underrepresented groups.

UNDERGRADUATE PROGRAMS

LSAMP Program: Appropriate

The program focus is explicit in this regard.

HBCU-UP Program: Appropriate

The program focus is explicit in this regard.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Appropriate

CREST: Appropriate

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

The program portfolio serves underrepresented groups.

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A.4.13: Is the program relevant to national priorities, agency mission, relevant fields and other customer needs?

Overall Comments

These programs are extremely relevant to national priorities; in fact they are vitally important to the future health of the US science and engineering enterprise.

UNDERGRADUATE PROGRAMS

LSAMP Program: Appropriate

The LSAMP Program has developed a special initiative to effectuate the transition from undergraduate to graduate study. Designated as the “Bridge to the Doctorate” this initiative is applicable to Phase 111 LSAMP institutions. In 2003, 130 graduates from 13 LSAMP Alliances received support through this initiative.

HBCU-UP Program: Appropriate

Addressing the under-representation of minorities in STEM careers is a national priority. These programs also help create "a diverse, competitive, and globally-engaged U.S. workforce..."

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP: Appropriate

AGEP has assisted the NSF in ensuring that the country has ample supply of scientists and engineers to meet its STEM work force needs in a global economy. Our view is supported by the BEST report, the NSF strategic plan and other reports.

CREST: Appropriate

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

This program is crucial to the achievement of national priorities, agency mission, relevant fields and by assisting HBCU, HSI, and Tribal Colleges to develop a pool from which NSF and the nation may draw future employees

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A.4.14: Discuss any concerns identified that are relevant to the quality of the projects or the balance of the portfolio.

Overall Comments

The quality of the projects supported by these programs is very high. The level of NSF investment in these programs should be increased. As for balance, increased investment would allow expansion of the programs to include greater focus on Hispanic-serving institutions, which is a vitally important goal.

UNDERGRADUATE PROGRAMS

LSAMP Program:

Concern should be expressed about the regional distribution of LSAMP programs. It is understood that population percentages for minorities are higher in the South. However, actual numbers represent a different distribution.

HBCU-UP Program:

No concerns identified.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

No concerns identified.

CREST:

No concerns identified.

MODEL INSTITUTIONS OF EXCELLENCE (MIE): Appropriate

The COV would have liked a more even response by reviewers in the form of a substantive assessment of scientific merit. For example, the reviews of one project seem to emphasize need over actual proposals and progress.

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A.5: MANAGEMENT OF THE PROGRAMS UNDER REVIEW.

A.5.1: Management of the program.

Overall Comments

The COV was very favorably impressed with the management of these programs. These are large, complex, multi-faceted initiatives that are highly challenging from an administrative point of view. The program leadership is doing an outstanding job. They are very short-staffed though; efforts should be made to increase the level of staff support.

UNDERGRADUATE PROGRAMS

LSAMP Program:

The overall program seems to be very complex but well administered. As the programs expand the number of projects and the size of the HRD staff remain the same, project oversight becomes limited. Site visits might be minimized as well as on-site assistance in program management and goals clarification.

HBCU-UP Program:

As the programs expand the number of projects and the size of the HRD staff remain the same, project oversight becomes limited. Site visits might be minimized as well as on-site assistance in program management and goals clarification.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

This COV is impressed with the competence, commitment, and professionalism of the management team for this program.

CREST:

The program officer reported that 253 awards were made to CREST awardees as a result of the CREST support. Also, over 1,093 papers were published over the three-year COV review period. The program is properly managed.

MODEL INSTITUTIONS OF EXCELLENCE (MIE):

Program Officers are to be commended for management as reflected in Form 7 and site visit reports. Program Officers are encouraged to provide technical assistance where appropriate in order to facilitate institutionalization of the initiatives.

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A.5.2: Responsiveness of the program to emerging research and education trends.

Overall Comments

The programs are notable in the extent to which they cut new territory into models for integrating research, education and diversity goals. Lessons learned through these projects need to be more energetically disseminated to the broader higher education community.

UNDERGRADUATE PROGRAMS

LSAMP Program:

Little evidence to make judgments here. The COV notes that HBCUs are directing undergraduates on the path to professional careers in STEM, but more effort is needed in this area. Although there are a number of efforts already in place, this one certainly can assist in the overall scheme to get more underrepresented minorities into STEM professional careers.

HBCU-UP Program:

The continued efforts of HBCUs to start undergraduates on the path to professional careers in STEM needs more attention. Although there are a number of efforts in place, this one certainly can assist in the overall scheme to get more underrepresented minorities into STEM professional careers.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

The program sustains a timely and informed responsiveness to emerging research and education trends.

CREST:

The research supported was both cutting edge and world class.

MODEL INSTITUTIONS OF EXCELLENCE (MIE):

Data not available to assess.

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A.5.3: Program planning and prioritization process (internal and external) that guided the development of the portfolio under review.

Overall Comments

The program officers have very thoughtfully prioritized and guided the development of the portfolio.

UNDERGRADUATE PROGRAMS

LSAMP Program:

Program activities over the period include solicitations, appropriate site visits, reverse site visits, technical assistance where needed, outreach activities, and joint annual meetings. The Program Director's role and responsibility is paramount to making sure these grants are successful. The keen management, operations and consultations are clearly outlined in the roles of the Program Directors.

HBCU-UP Program:

B. RESULTS: OUTPUTS AND OUTCOMES OF NSF INVESTMENTS

The COV undertook an assessment of the degree to which the programs under review were effective in moving the NSF forward towards its broader Strategic Outcome Goals. For each of the outcome goals, e.g. people, ideas, tools and organizational excellence, the committee provided some overall comments on the portfolio of the programs reviewed. These overall comments are followed by program-specific observations from each of the three sub-groups.

B.1 OUTCOME GOAL FOR PEOPLE: Developing “a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens.”

Overall Comments

The programs reviewed by this COV constitute incredibly important national resources for strengthening and diversifying the US science and engineering workforce. They are having demonstrably strong and positive impacts, both on the professional development of students and faculty and on the strengthening of institutions serving underrepresented groups. As such, it is of vital national importance that these programs continue to receive high levels of national support. The primary recommendation of this COV is that these programs be further expanded so as to serve yet greater numbers of students and institutions.

UNDERGRADUATE PROGRAMS

LSAMP Program:

This program indirectly impacts the K-12 system in that the majority of the jackets reviewed and which were making application for Phase II or III had already established pre-college programs for high school graduates who were admitted to the partner institutions. (See below)

The impact of this exposure was cited in the WESTAT Report as one of the keys to success in the LSAMP projects. In addition, mature LSAMP projects had already established relationships that enabled undergraduates to engage in academic year or summer research activities that have the potential to influence their understanding in STEM areas and their expertise in research. The following LSAMP Projects demonstrate a significant increase of STEM BS graduates during the period under review (2001 to 2003).

[HRD 0115115] "Responding to the paucity of minorities in faculty positions in the university and nationwide, special emphasis is being placed on encouraging students to prepare for a career in academia, and entering the professoriate."

[HRD 0114586] "The development of IT skills in SMET students so they are capable of making effective and more crucial use of accurate and valid information in their professional lives."

[HRD 0217615] "These early experiences (as the propose) with research and teaching are designed to encourage students to forge and sustain an academic and a social identification within their SMET discipline."

[HRD 0217629] "...demonstrable effectiveness in the retention of underrepresented students in science and engineering."

B.2 OUTCOME GOAL for IDEAS: Enabling “discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.”

Overall Comments

There are a number of mechanisms through which these programs contribute to the NSF outcome goal for “ideas.” The focus of many programs on broadening participation through engaging students in scientific and engineering research, important science is being done. Some programs, such as CREST, focus explicitly on developing research capacity at minority-serving institutions, and they have established very impressive track records of catalyzing world-class research communities. Another important mechanism in which the “ideas” goal is being served is through the focus of these programs on developing new and creative models for education and professional development. These ideas, tested through the platform of the multiple programs we reviewed, are of significant value to strengthening learning and innovation in our society.

UNDERGRADUATE PROGRAMS

LSAMP Program:

STEM students in the LSAMP Projects are provided the opportunity to engage in discovery and contribute to innovation through their specific research experiences in conjunction with their mentors. [HRD 0330660] "Education faculty will work with mathematics and science faculty educational research project to find answers..."

HBCU-UP Program:

Students in the HBCU -UP projects benefit from course and curriculum reform, and from faculty development activities in the STEM areas, in addition to the availability to engage in research.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

Although the intended focus of AGEP projects may be on a PEOPLE outcome goal (increasing the presence and participation in STEM by students from groups underrepresented in the US population), the COV was impressed by the wisdom and foresight with which some projects either speak directly to, or have links with that focus on the outcome of IDEAS through their focus on youth as early as middle school. The HRD projects with these activities are the OPT-ED alliance involving NCA&T, NC State and UNC-CH [HRD 9978867, HRD 9978874], the undergraduate summer research activities at the GATech AGEP [HRD 9978868], and the Univ. of Alabama-Birmingham AGEP [HRD 9817296] with STEM collaborations activities between projects.

CREST:

As a result of the CREST/RISE support of sharply focused center and research projects, several minority serving institutions have become increasingly productive in research. California State University, Los Angeles researchers published new methods for testing the complex output of spatially explicit models using high-resolution images of field populations and revealing important differences among ecosystems in mechanisms regulating carbon flux [HRD 9805529]. North Carolina A&T State University initiated the new journal, International Journal of Structural Health Monitoring, Sage Publishers [HRD 0205803]. The Tuskegee CREST developed nano-phased structural composites using two distinct methods [HRD 97062681]. The Tennessee State University (TSU) Center seeks to understand the behavior of complex physical systems by utilizing mathematical models. TSU CREST has published 171 articles, 139 of these in refereed journals or conference proceedings, during its first four years [HRD 9706268].

MODEL INSTITUTIONS OF EXCELLENCE (MIE):

Underrepresented populations comprise a significant percentage of the US population. Their absence in STEM fields represents a deficit for the nation. Programs such as the MIE have the potential to get these students excited about STEM fields and prepare to become involved in innovative ventures, and provide a much needed service to society.

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B.3 OUTCOME GOAL FOR TOOLS: Providing “broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation.”

Overall Comments

The programs reviewed serve the “tools” goal by 1) developing scientific infrastructure at minority-serving institutions; 2) making state-of-the-art facilities more accessible to a broader cross-section of our communities; and 3) building institutional infrastructure to support integration of research and education.

UNDERGRADUATE PROGRAMS

LSAMP Program:

[HRD 021765] "...develop diversity competencies among faculty, administrators, support staff, graduate students, and undergraduate students affiliated with LSAMP Indiana by developing new and innovative workshops that are then adopted and administered on each campus."

HBCU-UP Program:

LSAMP participants have access to state-of-the-art science and engineering facilities through research faculty at their individual institutions and at their respective internship sites. There are several examples of LSAMP students collaborating with faculty or others or making individual presentations based on their research projects.

[HRD 0207965] "Students will be provided with hands-on research opportunities on campus and at research institutions under the tutelage of practicing scientists."

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

We find AGEP projects inapplicable regarding focus on the NSF outcome goal for TOOLS.

CREST:

California State University-Los Angeles established a molecular genetics lab built supported with a high capacity automated DNA sequencer and a full complement of DNA manipulation equipment for RFLP, PCR and cloning [HRD 9805529].

MODEL INSTITUTIONS OF EXCELLENCE (MIE):

One of the biggest impacts that the MIE program can have is to promote the incorporation of research into STEM educational programs in order to facilitate an interdisciplinary approach to education among STEM disciplines across all disciplines.

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B.4 OUTCOME GOAL FOR ORGANIZATIONAL EXCELLENCE: Providing “an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices.”

Overall Comments

Our response to this question has two main components: the degree to which the programs under review promote organizational excellence at participating institutions, and the degree to which the HRD efforts promote organizational excellence at the NSF itself. With respect to the former, projects supported under these programs are playing important roles in making our higher educational institutions more creative and adaptive in the design of programs to broaden participation. They are also making notable advances across institutional boundaries, where many of the projects involve alliances among institutions. In this regard, there are important lessons being learned that need to be disseminated more broadly, as their potential applicability is profound. Within the NSF, the HRD programs very effectively illustrate how “intellectual merit” and “broader impact” can and must really go hand in hand. The experience gained within HRD of creatively intertwining multiple goals, including strengthening the workforce, enhancing institutional scientific capacity, re-vitalizing curricula, and promoting professional development of faculty, is of broad applicability. The COV believes that increased focus should be placed on assuring that the experience gained within HRD is broadly disseminated throughout the Foundation.

UNDERGRADUATE PROGRAMS

LSAMP Program:

[HRD 0115115] "The CAMP mission: Scientists and engineers are best prepared by other scientists and engineers who exhibit and expect scholarly excellence."

HBCU-UP Program:

LSAMP has performed an important service by bringing together diverse institutions for the purpose of enhancing the education of students who are under-represented in STEM disciplines. The impact of LSAMP's success is demonstrated at both the intra- and inter-university levels. The Alliance format has provided opportunities for faculty and students at two-year colleges to participate in activities that allow students to progress toward B.S. degrees.

[HRD-9815514] Promotes collaborations with other institutions and private organizations.

GRADUATE PROGRAMS AND RESEARCH CENTERS

AGEP:

Organizational excellence is achieved through the effective participation and interaction of key personnel at the program institution of the AGEP project. The involvement of department heads, deans, and others strengthens the partnerships made with other programs that seek to increase the number of STEM discipline graduates. At the University of Alabama, Birmingham, extensive networking with other large HRD-funded projects have significantly increased the professional opportunities its students have once they prepare to enter the STEM workforce or graduate school (HRD 9817296). At the University of Maryland, Baltimore County, the AGEP project is structured based on the past successes of established programs for minority students (HRD 0202169). In particular, the Graduate Meyerhoff Program at UMBC is being used as a model from which the best practices are incorporated into the AGEP project.

CREST:

CREST makes it possible for institutions to establish multidisciplinary research centers that cross conventional departmental organizations. During the last four years, Tennessee State University has established an interdisciplinary center, The Center for Systems Science Research [HRD 9706268]. CREST also allows institutions to develop research capabilities in their specialized area. The University of Puerto Rico-Rio-Piedras Center is established to utilize its unique position within the Caribbean and strong ties with Central and South America to become a dominant research center in applied tropical ecology and conservation [HRD 0206200].

MODEL INSTITUTIONS OF EXCELLENCE (MIE):

COV does not have adequate documentation to assess.

C. OTHER TOPICS

C.1 Please comment on any program areas in need of improvement or gaps (if any) within program areas.

The COV found each of the five programs reviewed to be strong, well managed, and effectively contributing to the Foundation's goals for ideas, tools and people. One area that could be strengthened is the articulation and coordination among the various HRD programs.

The HRD programs reviewed cover a broad spectrum of educational and professional levels, spanning programs which indirectly and directly address the needs of the pre-college sector and programs that focus on transition to the professoriate. The COV was interested in addressing the question of the linkages among the various HRD programs focusing on various stages of the educational continuum. The committee found some good examples of these effective linkages among the programs, for example, the articulation between the undergraduate-focused LSAMP and the graduate-focused AGEP programs. The COV feels that additional focus could be placed, on understanding the interactions between the Suite of HRD programs on a systemic level. This comprehensive focus would need sustained support to allow for the production of viable and reliable data. NSF needs to implement a strategy that would help collect this data in a timely manner and assure efficiency in its operation.

As far as gaps within program areas are concerned, the COV noted that institutional capacity building programs are in place for HBCU's and for Tribal Colleges. There is no focused effort on institutions serving Hispanic populations. This is a major gap that should be addressed.

C.2 Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

The COV addressed the question of the degree to which the HRD programs are effectively coordinated with other initiatives in the Education and Human Resources Directorate, as well as the connections of the HRD programs with the rest of the NSF. The COV was convinced that the "best practices" emerging from the HRD programs should be shared widely and should inform the structure of a wide variety of other initiatives. COV also noted some promising inter-connections. The Science and Technology Centers (STCs), the Engineering Research Centers (ERCs) and the Materials Research Science and Engineering Centers (MRSECs) all have incorporated cooperative agreements to increase diversity through working with AGEP. The AGEP Program Director is on the steering committee for the Integrated Graduate Education and Traineeships (IGERT) program. There are many other examples in which the research directorates are increasingly interacting with the HRD program staff, awardees and students. All of these are promising developments, which should be continued and strengthened.

One of the most powerful sets of lessons learned from the HRD projects is how to effectively integrate research and education. It is vitally important that the Foundation maintain focus on the dissemination of these lessons. There are some notable accomplishments in this regard. The CREST program has recently created a "Best Practices Manual", which is posted on the CREST website. HBCU-UP has also created a printed and web-based "Best Practices" document. The

NSF should continue to emphasize ways in which the valuable experiences gained by the community of HRD awardees have had a very broad influence on the practice of science and engineering education and research in the U.S.

Another interesting and powerful aspect of the HRD initiatives is their very powerful interdisciplinary characteristics. HRD programs tend to bring together scholars and students from a wide variety of fields. The Foundation as a whole can increasingly learn from the experiences generated in the HRD programs, in particular, how to operate effectively in interdisciplinary environments.

The third domain in which HRD programs have been breaking ground is in the area of forming multi-institutional alliances. Several of the programs, including AGEP, are intrinsically multi-institutional. They have mandated diversely integrated education, research and human resource development frameworks within multi-institutional platforms. The lessons learned here have wide applicability and it is essential that they be disseminated widely and effectively.

One of the key challenges facing HRD programs is the question of institutionalization of innovation. Documenting institutional change is challenging. Typically, institutions are asked to provide evidence of change based on the efforts of a single program. There are also many institutions that enjoy the benefits of having multiple, interacting awards. The COV believes that more should be done to understand the interactions between multiple programs on individual campuses as it relates to the sustainability of institutional change.

C.3 Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

As mentioned above, the HRD programs have tremendous catalytic potential for strengthening programs throughout the NSF. The other directorates can learn from the HRD program experiences in designing effective models for broadening participation. They can also learn from HRD's experience with models for multi-institutional alliances, interdisciplinary collaborations and integrating research and education. The HRD staff has a huge set of responsibilities. If the HRD staff is directed at the Foundation-wide leader in helping others learn from their experiences, then more resources need to be made available to assist them in this task. The COV believes that a concerted effort should be made to assist the HRD to increasing linkages with other directorates across the Foundation.

C.4 Please provide comments on any other issues the COV feels are relevant.

The COV is concerned about the long-term existence of the HRD programs given current budgetary constraints. The programs that the COV reviewed have demonstrated effectiveness with respect to NSF's goals that focus on, people, tools, ideas, and organizational excellence. The funding levels are, however, currently inadequate, to do more to maintain on-going projects and expand to support new projects. The COV believes these programs should indeed be scaled up. Priority should be given the HRD programs during future NSF budgetary planning.

Signatures of COV Members:

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Dr. Patrick Weasel Head

Dr. Grayson Noley

Dr. William McHenry (Graduate Programs Sub-Group Chair)

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