

## **CORE QUESTIONS and REPORT TEMPLATE for FY 2012 NSF COMMITTEE OF VISITOR (COV) REVIEWS**

**Guidance to NSF Staff:** This document includes the FY 2012 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2012. Specific guidance for NSF staff describing the COV review process is described in Subchapter 300 - Committee of Visitors Reviews (NSF Manual 1, Section VIII) that can be obtained at <[www.inside.nsf.gov/od/oia/cov](http://www.inside.nsf.gov/od/oia/cov)>.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) – Web COV module, which can be accessed by NSF staff only at <http://budg-eis-01/eisportal/default.aspx>. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

For section IV addressing portfolio balance the program should provide the COV with a statement of the program's portfolio goals and ask specific questions about the program under review. Some suggestions regarding portfolio dimensions are given on the template. These suggestions will not be appropriate for all programs.

**Guidance to the COV:** The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the **processes** related to proposal review. Discussions leading to answers for Part A of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. **COV reports should not contain confidential material or specific information about declined proposals.** The reports generated by COVs are made available to the public.

*We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see <http://www.nsf.gov/od/oia/activities/cov/covs.jsp>.*

## FY 2012 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

<b>Date of COV:</b> April 17 and 18, 2012
<b>Program/Cluster/Section:</b> Advanced Technological Education(ATE)/Workforce Cluster
<b>Division:</b> Division of Undergraduate Education (DUE)
<b>Directorate:</b> Directorate for Education and Human Resources
<b>Number of actions reviewed:</b>  <b>Awards:</b> 21  <b>Declinations:</b> 16  <b>Other:</b>
<b>Total number of actions within Program/Cluster/Division during period under review:</b>  <b>Awards:</b> 228  <b>Declinations:</b> 494  <b>Other:</b> 11
<b>Manner in which reviewed actions were selected:</b> <p>Committees of Visitors (COVs) review a random selection of program awards and declines. To assure the randomness of the selection, the COV Chair, Dr. Richelle Blair, was asked by ATE staff to provide two one-digit numbers from zero to nine; she chose 7 and 3. Thus every new proposal funded in the ATE program in FY2009 to FY2011 whose identification number ends in 7 is presented in a list. Due to the large number of proposals that every decline whose identification number that ends in 7 would produce, by using the other number chosen by the Chair, the number 3, we extracted only every third unfunded proposal whose identification number ends in 7 to be the random sample of unfunded proposals. These lists of proposals are given as a sample of proposals and awards to be looked at by the committee, however, any project funded from fiscal years 2009 to 2011 can be requested for the committee's viewing.</p> <p>In addition, Program Officers chose 13 projects funded in FY2009 to FY2011 that they consider examples of exemplary ATE projects and centers. These 13 exemplary awarded projects consist of five centers, five projects and three small projects. A list of these projects along with a short description for each are provided.</p>

## INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

### General broad comments from COV members to NSF:

- Conclusions drawn in this report are based on a review of a very limited number of randomly drawn jackets given time constraints and should be taken as suggestive, but not definitive, evidence of the issues discussed.
- COV comments are based on data when available, but also recognize that COV members' personal experience in the field impacts analysis and conclusions.

**I. Questions about the quality and effectiveness of the program's use of merit review process.** Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <p>ATE review methods include panel and ad hoc reviews. Site visits are generally only used as a review tool at national centers. The selected group of awards reviewed by the COV did not contain any site visit reports. However, there do appear to be appropriate reviews in place for various types of proposals/projects.</p>	YES
<p>2. Are both merit review criteria addressed</p> <p style="padding-left: 20px;">a) In individual reviews?</p> <p style="padding-left: 20px;">b) In panel summaries?</p> <p style="padding-left: 20px;">c) In Program Officer review analyses?</p> <p>Comments:</p> <p>Based on the review of several proposals, reviews address both merit criteria:</p>	YES

<p>intellectual merit and broader impact. Individual and panel reviews take into consideration the projects' technical merit, the qualification of the Principal Investigators (PIs), as well as the projects' intellectual merit, educational impacts, and potential benefits to society.</p> <p>Strengths and concerns were addressed in reviews, and suggestions for improvement were provided when needed.</p> <p>Program Officers' (POs') comments are appropriate and sufficiently complete to inform the proposers about the reasons for the decisions made and to serve as the records of the recommendations made.</p>	
<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>Based on the COV's review of proposals, the majority of the reviewers' comments were substantive. However, a few included only brief summary judgments of the proposal quality with minimal explanation of strengths and weaknesses. Substantive comments are particularly important for proposals that are declined to help prepare them for future submissions.</p> <p>Individual reviewers provided substantive comments of their assessment of the proposals, including information about specific concerns and strengths, as well as summary statements. For example, one reviewer noted, "All in all, a good proposal with some real strengths. The PI team has clearly based the project on a regional need and in creating the project has looked at the needs of students, educators, and industry. They are bringing in trainers from a highly recognized program and the home institution seems committed to the project (given that they are not asking for any salary for either PI). More information on the project team, a management plan, an outline of goals, and a time line would have strengthened this proposal."</p> <p>Additionally, a sample review of nine jackets (three funded, three declined, and three exemplary) showed that, in general, reviewers provided detailed and thoughtful comments on the strengths and weaknesses of the proposal.</p> <p>Although most reviewers are submitting substantial feedback, some reviewers are not providing significant documentation/substantive comments to justify their assessment of the proposals. NSF does offer a training Webinar for reviewers; however, the importance of substantive review comments and checks and balances of assuring that the comments are substantive could be improved.</p> <p><u>COV Recommendation I.3:</u> The COV recommends that POs provide effective guidance to review panel chairs to ensure consistency of reviews and panel summaries and more strongly request substantive comments from panel members. This will require added responsibility on both the chair and the reviewers themselves. It may be helpful for NSF program staff to look at the panel summary comments both after reviews are completed but also to look overall to see if it is a consistent issue.</p>	<p>YES</p>

<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments:</p> <p>In general, panel summaries provide the rationale for the panel consensus or the reasons consensus was not reached. For example, one panel summary noted, "There was some disagreement amongst the panel about whether the proposal was clearly responsive to the ATE program solicitation; one reviewer in particular didn't feel the PI made a clear connection between robotics, the increase in math skills and the link to workforce development or technician training. Overall, most panelists felt there just wasn't enough detail about important project components included in the proposal and that the activities felt somewhat disjointed."</p> <p>Of the nine sample jackets reviewed, in only one case did the summary indicate panel support but refer the reader back to the individual reviews for details with little panel-level summary.</p> <p>The COV feels this process works well and agrees that the rationale provided for the process used in cases of disparate opinions among panel members is appropriate.</p>	<p>YES</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>(Note: Documentation in jacket usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.)</p> <p>Comments:</p> <p>In the COV review of the nine sample jackets, the PO Review Analysis was thoughtful and thorough for the six funded and exemplary proposals.</p> <p>For declinations, some PO Review Analyses were fairly basic. (Additional comments provided in Section II, Question 6.)</p> <p><u>COV Recommendation I.5:</u> The COV suggests some consistency and more specific language be applied to communications for declinations as opposed to relying on standardized or boilerplate-type language.</p> <ul style="list-style-type: none"> <li>• While the COV recognizes the extensive workload of POs, a sufficiently thorough and independent summary of the proposal's strengths and weaknesses should be included by the PO in all official summaries of the review process, including the PO Comments.</li> </ul>	<p>YES</p>
<p>6. Does the documentation to PI provide the rationale for the award/decline decision?</p>	<p>YES</p>

<p>(Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written or telephoned with diary note in jacket) of the basis for a declination.)</p> <p>Comments:</p> <p>A review of three sample jackets of declined proposals showed that in two of the cases considerable detail was provided to the PI and was sufficient for making subsequent revisions to the proposal and to reconsider the planned work. In both cases, the material in the PO Comment was substantially more than the perfunctory statements included in the PO Review Analysis. The PO Comment was adequate, although less detailed, in the third case. As noted in Section II, Question 5, the COV would, generally, like there to be more detail provided in PO Review Analysis of declined proposals.</p>	
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p>	

**II. Questions concerning the selection of reviewers.** Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

<p><b>SELECTION OF REVIEWERS</b></p>	<p><b>YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE</b></p>
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments:</p> <p>Reviewers appear well-distributed geographically; reviewers are predominantly from the university/college setting; and reviewers are representative of an array of degree-granting institutions. The geographic and institution breakdowns are provided below.</p> <p><b>Reviewer Geographic Information – FY 2009-2011</b></p> <ul style="list-style-type: none"> <li>• Northeast – 22%</li> <li>• Midwest – 15%</li> <li>• South – 35%</li> </ul>	<p>YES</p>

<ul style="list-style-type: none"> <li>• West – 25%</li> <li>• Outside contiguous US – 2%</li> </ul> <p><b>Reviewer Institution Information – FY 2009-2011</b></p> <ul style="list-style-type: none"> <li>• 66% - 73% of reviewers are from Public university/college</li> <li>• 8% - 17% of reviewers are from Business/industry</li> <li>• 2% - 3% of reviewers are from Government</li> </ul> <p>Regarding <b>Highest Degree Offered by Reviewer's Institution – FY 2009-2011</b>, 42-43% of reviewers were from institutions at which a two-year/Associate degree is the highest degree offered, 20-25% of reviewers were from institutions at which Doctoral/Ph.D. is the highest degree offered, and 5-10% of reviewers were from institutions at which four-year/BS/BA or MS/MA is the highest degree offered.</p> <p>The program develops a pool of potential reviewers by recruiting them from the following sources: faculty, in general, and from AACC, ASEE, STEMtech Conference, Hi-Tech Conference, NISOD Conference, NSF Library Expert Search Portal, and AAAS.</p> <p>There are reviewers from 31 different disciplines, but the majority (51%) come from these four disciplines:</p> <ul style="list-style-type: none"> <li>• Computer Science &amp; Engineering – 15%</li> <li>• Engineering/Engineering Technology – 11%</li> <li>• Life Science Biological – 11%</li> <li>• Other Sciences – 14%</li> </ul> <p><u>COV Recommendation II.1.a:</u> The program should provide a more detailed breakdown of reviewers from four-year and two-year institutions within the public universities/colleges category.</p> <p>Additionally, no evidence was provided in the “COV book” – the book provided to the COV members containing pertinent data regarding the ATE program – about reviewer diversity; such as percent of reviewers who were women, people of color, persons of disability, etc. Reviewer diversity information does not appear to be available in the project jackets (except for reviewer gender in some cases). Given NSF's priorities, it is important to promote the involvement of such individuals in the review process and to record and report evidence relevant to their participation. It is important to document these data when possible. ATE might consider aggregating the data in a similar manner to the PI data.</p> <p><u>COV Recommendation II.1.b:</u> The program should collect and provide more detailed information about reviewer diversity to COVs when possible.</p> <p><u>COV Recommendation II.1.c:</u> The proposal review panels should include reviewers with evaluation expertise who can focus on the evaluation elements of submitted proposals.</p>	
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments:</p>	<p>YES</p>

<p>Reviewers and panel chairs are given instruction about conflicts of interest (COI), and reviewers are asked to complete the <i>Conflict-of-Interests and Confidentiality Statement for NSF Panelists</i> form (NSF Form 1230P).</p> <p>Over 100 cases of COIs were reported for FY09-FY11. However, no systematic or additional information was provided to the COV regarding the extent or nature of questions that may have arisen concerning COI during review procedures, percent completion of the COI form, assertions that non-reported incidents of COI occurred or how they were dealt with. Thus there was no relevant evidence available to assess the extent to which the program recognized and resolved conflicts of interest.</p> <p>Although COI forms are filled out (self-reported), the COV does not have a good understanding of how NSF/ATE addresses conflicts of interest.</p> <p><u>COV Recommendation II.2:</u> The “COV book” should contain materials that document COIs and the process for how these incidences are handled.</p>	
<p>Additional comments on reviewer selection:</p>	

**III. Questions concerning the management of the program under review.** Please comment on the following:

<p>MANAGEMENT OF THE PROGRAM UNDER REVIEW</p>
<p>1. Management of the program.</p> <p>Comments:</p> <p>Management of the ATE program appears to be sound, with multiple opportunities in place to evaluate the program and its processes. The program has a clear set of goals and supporting strategies – some arise from congressional mandates, others from the NSF's overarching goals. The program needs to maintain its ability and independence to develop forward-looking strategies of its own to look beyond mandates. Based on the COV members' experiences, the ATE program is perceived as a well-recognized program that makes the significant connections between education and industry and tries to maintain flexibility and responsiveness to new and emerging technologies and issues.</p> <p>The COV acknowledges that, through no fault of the ATE program, it is clear the development of management plans have been hampered to some extent by an incomplete knowledge of future budget levels for the program. The 2011-13 management plan does offer possible budget allocation scenarios. The NSF leadership is encouraged to give the POs as much knowledge of the budget projections as possible to help the program balance its portfolio.</p>

The ATE program is encouraged to explore additional opportunities for co-funding promising projects within the directorates. It appears the current approach relies on identifying opportunities at the PO level. The NSF should consider encouraging a more systemic approach to leveraging co-funding efforts across its directorates, including incentivizing from top NSF leadership co-funding between programs, divisions, and directorates. These incentives could be individual or program based, linked to agency strategic goals.

The data below show that a number of awards were co-funded by more than one NSF division:

- 2009: 17/69 involved two divisions (\$6.08mil)
- 2010: 22/84 involved two divisions (\$5.2 mil)
- 2011: 19/75 involved two divisions (\$916 k)
  - Note: The significant co-funding activity in 2009 and 2010 was the result of S-STEM-ATE collaborations.

COV Recommendation III.1.a: The COV would like to encourage co-funding activities and pursuing these opportunities purposefully. This would include co-funding between programs, divisions, and directorates as well as other federal agencies. Although co-funding may be difficult between federal agencies, alignment of programs, strategies, and activities should also be considered.

The management approach has, importantly, allowed the cessation and sun-setting of certain strategies and activities. For example the elimination of the preliminary proposals. This decision appears to have been made in part on the basis of expediency and budget constraints.

COV Recommendation III.1.b: The COV acknowledges the need for the NSF and POs to be able to be responsive to changes in the management of grant processes that appear to be appropriate. However, these changes should be thoughtful, discussed with appropriate stakeholders, and thoroughly documented. For example, the Committee encourages a prospective and retrospective look at the impact of the decision to eliminate preliminary proposals so that the quality of proposals prior and post decision can be evaluated. It would be useful to understand the process that led to this change, rationale behind it, and how the impact will be measured. Additionally, the COV would like to see an explanation of this decision (as well as any future data on its outcome) be provided to future COVs.

One of the hallmarks of the ATE program has been the quality of interaction and engagement between prospective applicants/grantees and Program Officers. This has reaped benefits within the review process and post-award management and compliance efforts. Grantees value these relationships and the opportunity to think through the issues in addition to the grant proposal process. As a result, at least in part, the program has an enviable record of effective and positive grants' management.

COV Recommendation III.1.c: The COV encourages the NSF to continue to recognize the value-added relationships with prospective applicants/grantees with POs. The COV recommends that NSF offer additional support in terms of alternative staffing mechanisms to enable more frequent interactions with grantees to include site visits, conferences, regional meetings, and – very importantly – the continued growth and development of the annual PI conference. This suggested allocation of time and funds will mean POs must be freed of some of their current tasks.

- Sub-recommendation III.1.d: The program is encouraged to increase the use of rotator-like programs and potentially create new categories of rotators who can complete specific tasks working on a part-time basis from remote locations, utilizing today's remote working tools and technologies. This would provide the program with a chance to re-think ways to utilize rotators

to both reduce workload for full-time POs and bring fresh ideas from the field into ATE.

The NSF program has looked at impact from a process-oriented prospective and has some very positive data on grantee deliverables and outcomes. There is still a need to understand the short and long term employment outcomes of students in these technician education programs to fully understand the impact of the program from both an employer and student prospective. There is also a need to gain feedback from employers on the preparedness of new graduates entering the workforce. There may be gaps between employer expectations and the skills being developed by students. It is important to collect data to identify potential gaps and ways to address them. This would allow the program to more specifically identify how projects activities meet industry need.

COV Recommendation III.1.e: Metrics are in place to monitor grants, but the program should consider adding student employment outcomes, including job placement, wage gains, and advancement and employer validation of program expectations. This would provide an opportunity to look at the impact of the program on student learning and successful employment.

- It may be useful for the program to devise a pilot program that adds student employment outcomes, including job placement, advancement, credit hours completed, and other related measures, to proposals and evaluations.
- The potential pilot program should investigate ways to more effectively measure post-program data on employment figures.

The COV did not really explore the grants management aspect of ATE's program management responsibilities (including monitoring of awards) in detail beyond the initial documents that were provided. It would be recommended that there also be an emphasis placed on both the award process and post-award for the COV review.

COV Recommendation III.1.f: The COV should consider having an equal emphasis on pre- and post-award policies and practices by providing further information on evaluation results from grants, monitoring, and other types of visits and other critical information. This would allow the COV to look at the impact of the decisions that were made for an award and provide the COV with an opportunity to give important feedback to the program.

## 2. Responsiveness of the program to emerging research and education opportunities.

### Comments:

The program appears to be responsive to emerging trends as evidenced by the evolving nature of the program solicitation and list of potential appropriate technologies. New focus areas, in entrepreneurship, for example, mirror the industry's need for a workforce with entrepreneurial skills. Additionally, the program showed responsiveness on leadership by funding alternative energy projects.

It is not clear from the COV's observations as to how the program identifies potential emerging opportunities – through research, outside expertise, labor market information, or other sources.

The solicitation encourages emphasis on important community college issues such as persistence, retention, and completion. The program's track on targeted research in technician education provides insight into future directions that are emerging and, in principal, provides evidence to support those emerging trends.

The flexibility of the program has been essential to being responsive and the ability to build new

relationships with organizations, like the Gates Foundation as well as other federal agencies. The program clearly works to create strategic partnerships, which leads to new opportunities.

POs and directors are in a good position to identify emerging research and education opportunities for funding. POs are encouraged to continue their role in being proactive by identifying emerging technologies for the future; however, the COV feels that experts external to NSF could provide important input into future solicitations.

COV Recommendation III.2: The program should consider forming an independent task force to develop a report and offer suggestions of future emerging trends and opportunities. Task Force members could also provide guidance to POs about challenges in developing new program tracks and program emphases and inform the decision-making processes for future solicitations.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

ATE's program planning clearly aligns with legislative mandates and works to align with current priorities; although it is not completely clear to the COV as to how these funding priorities are determined and weighed or how the program identifies best practices from these mandates and priorities.

COV Recommendation III.3.a: As part of program planning, the ATE program should look within their portfolio of awards to identify design principles and determine best practices and project/program impacts. These design principles would be used to inform future solicitations, provide guidance to review panels and proposal writers, and provide models for the STEM community.

COV Recommendation III.3.b: Use the suggested independent task force – from the recommendation in Section III, Question 2 – to help with program funding prioritization.

Based on the opinion of the POs, one of the most unique and apparently successful programmatic elements is the “Small Grants for Institutions New to the ATE program.” This initiative significantly builds the diversity of the program and the portfolio.

COV Recommendation III.3.c: The COV recommends that the “Small Grants for Institutions New to the ATE program” element be expanded and broadened. This could mean broadening the eligibility requirements to allow proposals from departments that have not have had prior submissions even though the institution itself may have prior submissions. The program is best positioned to decide how the program can be expanded.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

Generally speaking, the program is very responsive to comments of the previous COV.

Examples of responsiveness include:

- Changes to the program solicitation;
- Expansion of partnerships, including foundations;
- Proven success rate of small institution grants; and
- New activities for learning communities, such as synergy.

COV Recommendation III.4: The COV recommends the following two areas of consideration for clarification to ensure responsiveness:

- Use and expansion of employer participation on review panels; and
- Present examples of how the program is increasing technician research opportunities.

**IV. Questions about Portfolio.** Please answer the following about the portfolio of awards made by the program/s under review.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
<p>1. Does the program portfolio have an appropriate balance of awards across disciplines and sub-disciplines of the activity?</p> <p>Comments:</p> <p>Based on the solicitation and the number of awards, the list of awards represents a broad representation across 15 multi-disciplinary areas, many of which are listed in the program solicitation.</p> <p>In 2009, the largest number of awards was in the area of engineering technologies and the least in chemistry technologies. In 2010, the highest number of awards was in energy technology and the least in chemistry technology. In 2011, computer technologies represented the highest number of awards and teacher preparation and mathematics the least.</p>	APPROPRIATE
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments:</p> <p>The awards in 2009, 2010, and 2011 were similar in size, funding, and duration. (It should be noted that the duration of awards is dependent on the type of project.)</p> <ul style="list-style-type: none"> <li>• 2009: 69 awards, \$307K, 2.95 years</li> <li>• 2010: 84 awards, \$253K, 2.69 years</li> <li>• 2011: 75 awards, \$278K, 2.82 years</li> <li>• Overall: 228 awards, \$277K average, 2.81 years average</li> </ul>	APPROPRIATE

Types of Awards	Number of Awards	Total Months - Duration	Average Months - Duration
National Center	12	457	38.08
Project	161	5530	34.35
Regional Center	21	669	31.86
Resource Center	6	224	37.33
Special Activities	4	154	38.50
Special Project	1	23	23.00
Teacher Preparation Articulation	3	93	31.00
	9	228	25.33
<b>Grand Total</b>	<b>217</b>	<b>7378</b>	

Based on a sample review of the jackets, the COV felt that the size and duration of awards seemed consistent for particular types of projects (e.g., centers, special activities, projects, teacher preparation articulation). The COV would like to note that time did not permit a review of *all* projects and their budgets.

The COV would like to add that it is possible that small projects with high potential might have budgets and durations that might not demonstrate the real potential of the project (i.e., the skills are on demand). Projects where classroom coursework could be combined with more hands-on internship projects, more budget, and longer duration, might better address technical, business, and industry demands.

APPROPRIATE

3. Does the program portfolio include awards for projects that are innovative or potentially transformative?

Comments:

The program solicitation states that “The ATE program is responsive to its goals as the program prepares well-qualified science and engineering technicians for existing and emerging advance technological fields as well as preparing effective teachers for these fields.”

Given the program solicitation and jacket review, the portfolio appears to include projects that are innovative and/or potentially transformative.

COV Recommendation IV.3: It would be helpful for NSF to provide clear criteria and procedures regarding the terms “innovative” and “potentially transformative.” This information would be very important in providing guidance to proposers, reviewers, and future COVs.

The awards appear to meet the goal of the solicitation. A review of 23 proposals found the following projects as examples of “innovative” or “potentially transformative” works:

- The Synergy Collaboratory for Research, Practice, and Transformation: how to scale-up innovations (0903224)
- Wind energy (1003452)
- Gas Chromatography (1003564)
- Photonics (0901172)

<ul style="list-style-type: none"> <li>• Cyber-security (0903228)</li> <li>• Other proposals focused on systems thinking in energy management, engineering mechatronics, conference for undergraduate to share STEM research, energy sustainability, marine ecosystems, information technology, biotechnology, integrated web portal</li> </ul> <p>ATE activities seem to align with innovative and transformational characteristics referenced in national reports, for example the <i>Report to the President – Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America’s Future</i>, by the Executive Office of the President President’s Council of Advisors on Science and Technology in September 2010.</p>	
<p>4. Does the program portfolio include inter- and multi- disciplinary projects?</p> <p>Comments:</p> <p>Based on a sample review of the jackets, the COV felt that the presence of inter- and multi-disciplinary awards seemed consistent. The COV would like to note that time did not permit a sufficient review of all projects and their inter- and multi-disciplinary elements (e.g., project activities and departmental diversity among faculty members). Data were provided about the number of co-funded awards, but co-funding from more than one NSF division does not necessarily mean that the project is inter- or multi-disciplinary in nature.</p>	APPROPRIATE
<p>5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators?</p> <p>Comments:</p> <p>There is an almost equal distribution across the west (29%), midwest (23%), south (23%), and northeast (25%) regions for FY2009-2011. Additionally, all states were represented in the 2009-2011 portfolio except Alaska, North Dakota, South Dakota, Maine, and Tennessee.</p>	APPROPRIATE
<p>6. Does the program portfolio have an appropriate balance of awards to different types of institutions?</p> <p>Comments:</p> <p>The program solicitation states that the “ATE program focuses on two-year colleges and expects two-year colleges to have a leadership role in all projects.”</p> <p>Two-year colleges were the majority of awardees in each of the three years:</p> <ul style="list-style-type: none"> <li>• 2009: 42 awards to two-year colleges / 69 total awards</li> <li>• 2010: 58 awards to two-year colleges / 84 total awards</li> <li>• 2011: 51 awards to two-year colleges / 75 total awards</li> </ul>	APPROPRIATE

<p>Other awards were well distributed among other institutions (four-year/BA; Masters; Ph.D./Research-Intensive Ph.D; and Business, State, and Local).</p>	
<p>7. Does the program portfolio have an appropriate balance of awards to new investigators?</p> <p>(NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant.)</p> <p>Comments:</p> <p>More than half of the awards were to new PIs. The COV believes that funding new PIs is a positive component of the program and shows that the same PIs are not being repeatedly funded.</p> <ul style="list-style-type: none"> <li>• 2009: 36 new PIs/ 69 total awards</li> <li>• 2010: 49 new PIs / 84 total awards</li> <li>• 2011: 38 new PIs / 75 total awards</li> </ul>	<p>APPROPRIATE</p>
<p>8. Does the program portfolio include projects that integrate research and education?</p> <p>Comments:</p> <p>The following sample of projects provides a wide variety of examples that either enhance the infrastructure for research and education – such as facilities, instrumentation, networks, and partnerships; have particular activities or components that are clearly articulated and informed by the research literature and the work of others; provide the number of faculty and students they will impact directly or indirectly, as well as how those individuals were impacted; and/or provide specific measures of the effectiveness of their activities on students, faculty, and employers.</p> <ul style="list-style-type: none"> <li>• Targeted Research on Technician Education: Community College Partnership Models for Workforce Education Sustainability and Integrated Instruction</li> <li>• The Synergy Collaboratory for Research, Practice and Transformation</li> <li>• Collaborative Research – Marine Career Tech (MCTech): STEM Careers in Shipbuilding and Marine Industry</li> <li>• Geospatial Technician Education Through Virginia Community Colleges (GTEVCC)</li> <li>• Water and Wastewater Technician Training Institute</li> <li>• Salinas Valley Consortium for Sustainable Energy, Education and Research</li> <li>• Promoting STEM Research to College Freshmen and Sophomores</li> <li>• Continued Analysis and Study of the Sustainability and Impact of the Advanced Technological Education Program</li> <li>• Meeting 21st-Century Cybersecurity Needs Through Advanced Technological Education</li> </ul>	<p>APPROPRIATE</p>

9. Does the program portfolio have appropriate participation of underrepresented groups?

Comments:

Since many two-year colleges enroll large numbers of underrepresented groups of students, the fact that two-year colleges are awardees helps to assure that underrepresented groups of students are involved.

The ATE program has served a student population that was 45% nonwhite and 23% female.

However, the race/ethnicity of the more than half of the ATE PIs in 2009, 2010, and 2011 are white or non-Hispanic. The percentage of white or non-Hispanic Co-PIs is even higher.

Regarding gender among PIs, females were well represented: in 2009 66% of PIs were women and in 2010 and 2011 76% of PIs were women.

**Table 2. Demographic Characteristics of ATE Students**

<i>Demographic Characteristic</i>	<i>Number</i>	<i>Percentage of category</i>
<b>Gender (N=111)</b>		
Male	49,420	77%
Female	15,100	23%
<b>Race/ethnicity (N=103)</b>		
Hispanic/Latino	10,370	18%
American Indian/Alaska Native	320	1%
Asian	3,500	6%
Black/African American	8,980	16%
Native Hawaiian/Pacific Islander	640	1%
Multiracial	2,070	4%
White	31,670	55%
Students requesting accommodation under the Americans with Disabilities Act (N=32)	420	-

(Source: From the “COV book”: Lori Wingate, Carl Westine, and Arlen Gullickson. (July 2011). *EvaluATE*. “Advanced Technological Education Survey 2011 Fact Sheet,” p. 11.)

The COV notes that there are no data available regarding age, disability, or industry sector for either PIs or students served by the program.

COV Recommendation IV.9: The COV encourages NSF to continue its efforts to increase the participation of underrepresented groups in STEM initiatives as both PIs and project participants by

- Identifying demographics beyond the data given to include age, disability, and industry sector and encourage involvement of all underrepresented groups.
- Collecting data about students’ completion of program and job

<p>placement outcomes related to these demographics to see if the ATE program truly impacts the diversity of the workforce.</p>	
<p>10. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports.</p> <p>Comments:</p> <p>In reviewing the 13 exemplary ATE projects and centers and an additional 10 jackets, the foci of the grant activities addressed national priorities; agency mission; and relevant fields such as automotive technology, aerospace technicians, information technology, educating the deaf and hard-of-hearing, wind energy, manufacturing workforce needs, chromatography, photonics, and cyber security.</p> <p>The exemplary projects also included initiatives directed toward the professional development of faculty, including scaling of innovative practices, Web 2.0 technologies, and problem-based learning.</p> <p>Justification of appropriateness of the ATE program initiatives:  Executive Office of the President President’s Council of Advisors on Science and Technology. (September 2010.) <i>Report to the President – Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America’s Future.</i></p> <ul style="list-style-type: none"> <li>• “Information and computation technology can be a powerful driving force for innovation in education, by improving the quality of instructional materials available to teachers and students, aiding in the development of high-quality assessments that capture student learning, and accelerating the collection and use of data to provide rich feedback to students, teachers, and schools. Moreover, technology has been advancing rapidly to the point that it can soon play a transformative role in education.” (p. xi)</li> <li>• “Furthermore, employment in STEM fields is increasing at a faster pace than in non-STEM fields.<sup>36</sup> Even during the recent recession, companies in STEM-related fields, such as in the aerospace, defense, life sciences, and energy sectors, reported shortages of skilled workers, and these shortages are expected to persist.<sup>37</sup> Moreover, many professions once perceived as not requiring STEM skills, such as agriculture and law, increasingly require technological and scientific proficiency.” (p.16)</li> </ul> <p><i>NSF Strategic Plan for Fiscal Years 2011-2016.</i></p> <ul style="list-style-type: none"> <li>• “Three interrelated strategic goals – transform the frontiers, innovate for society, and perform as a model organization.” (p. 5)</li> <li>• “The Foundation embraces our unique role in supporting the fundamental, interdisciplinary, high-risk, and potentially transformative research and education that are central to the discovery of emergent properties and structures in physical, living, human, and engineered systems.” (p.6)</li> <li>• “The Foundation promotes inquiry-based instructional practices and</li> </ul>	<p>APPROPRIATE</p>

<p>ongoing research on the process of learning and the practice of education to improve the nation’s capacity to draw in and retain students in STEM fields, including students from underrepresented groups and institutions.” (p.7)</p> <p>Terry O'Banion and Laura Weidner. “The Nature of Innovation in the Community College.” (December 2009). <i>Leadership Abstracts, Volume 22, Number 12.</i></p> <ul style="list-style-type: none"> <li>• “The nature of innovation in the community college depends, in part, on the resources available in the college. But in great part it depends on the culture and climate created by leaders to encourage, support, and celebrate the individuals and teams who design and implement the innovations.”</li> </ul>	
<p>11. Additional comments on the quality of the projects or the balance of the portfolio:</p> <p>Comments:</p> <p><u>COV Recommendation IV.11:</u> The ATE program should continue its efforts to increase the number of technicians in emerging technologies. The COV encourages the ATE program to find ways to be responsive to business and industry and find ways to encourage participation of diverse populations (e.g., adult learners, immigrants, and other groups).</p>	

**V. OTHER TOPICS**

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

COV Recommendation V.1.a: NSF and the ATE program should develop a process that considers a long-term view of emerging issues and needs in STEM and incorporate that process into the planning and management of the ATE program.

As previously stated, the COV recommends (V.1.b) that the ATE program engage a group of external experts in a thoughtful discussion about the future of emerging technologies.

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.

COV Recommendation V.2.a: The COV would like to see documentation/data on the time-to-award in the “COV book” to determine dwell time.

As stated previously, the COV is unsure of what criteria were used to determine “exemplary” proposals. Do reviewers have any involvement in making this determination or is this based on only PO analysis? These types of procedures should be made more explicit to future COVs.

There is no description of what NSF considers an “exemplary” project, although the COV was provided with a list of 13 projects deemed “exemplary.”

COV Recommendation V.2.b: The COV recommends that ATE develop characteristics of exemplary projects.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.
4. Please provide comments on any other issues the COV feels are relevant.
5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The COV process would benefit from a longer period of time for the COV meeting and review (rather than one and a half days) and suggests that the extra time prior to meeting could be through a virtual review experience.

- The first day of the COV process would be virtual – where the committee spends half a day reviewing the COV responsibilities, program solicitation, program data, proposal jackets, and the template and then participates in a conference call or WebEx.
- The second day and a half would be held onsite and provide the COV with a chance to discuss and review their findings.

Additionally, some of the information from the “COV book” or the jackets (e.g., PI demographic data) required for answering specific template questions could be more explicitly provided within an annotated template to make the process of finding and reviewing data more streamlined.

The COV would appreciate the opportunity to review the “COV book” and the COV report template in advance of the meeting so as to be better prepared for the COV meeting at NSF.

The members of this COV appreciate the opportunity to learn more about the ATE program and be involved in an important, productive process that is beneficial to the NSF.

**SIGNATURE BLOCK:**

*Richelle (Kikki) Blair*

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Dr. Richelle Blair, Chair  
April 30, 2012  
For the  
Advanced Technological Education (ATE) Program FY 2009 – FY 2011  
Committee of Visitors held on April 17 and 18, 2012