FY 2008 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV:
April 22-24, 2008

Program/Cluster/Section:

Division:
Office of International Science and Engineering (OISE)

Directorate:
Office of the Director

Number of actions reviewed:

Awards: 67

Declinations: 57

Other: 8 Pre-proposals and 1 Returned without Review

Total number of actions within Program/Cluster/Division during period under review:

Awards: 1047

Declinations: 1266

Other: 479 Pre-proposals (invite/do not invite), 103 returned without review, 250 withdrawals

Manner in which reviewed actions were selected:

A list of actions for the period of 2005-2007 was generated by Program Element. An individual who was not familiar with the actions then 'randomly' selected awards and declines across programs while trying to provide a broad representation of institution types, U.S. geographic distribution, gender and international geographic distribution. "Borderline" proposals (highly rated declines and mixed review awards) were specifically targeted to provide the COV a greater understanding of the role of the Program Officer.

Following the initial selection, additional proposals were added by Program staff to provide a broad representation across disciplines (i.e. NSF Directorates/Divisions).

The sample was 176 proposals, of which:
81 were awards,
67 declines,
20 "borderline" (a mix of awards and declines),
4 return without review, and
4 withdrawals.

When entering proposals in the E:Jacket Module, a collaborative proposal was included, bringing the final count to 177 proposals.

PART A. 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.

A.1 Questions about the quality and effectiveness of the program's use of merit review process. Provide comments in the space below the question**.** Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	**YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE[1]**
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: No data was available to us on site visits. We understand that site visits for PIRE projects were to begin in spring 2008.	yes
2. Are both merit review criteria addressed a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? Comments: Comments: A very respectable ninety-seven percent of reviews address both criteria. However, some individual reviewers still do not have a full understanding of what fulfills broader impacts in proposal evaluation. *RECOMMENDATION 1: OISE should continue its efforts to train reviewers for*	yes

[1] If "Not Applicable" please explain why in the "Comments" section.

more specific and relevant responses to the review criteria. In particular, program officers should be more proactive in educating external reviewers and panelists on the "broader impacts" review criterion.	

3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals? Comments: Some reviewers are more thorough than others in their analysis and evaluation of proposals. Overall, however, the comments were substantive.	yes
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments:	yes
5. Does the documentation in the jacket provide the rationale for the award/decline decision? (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.) Comments: Changes in the system for management of jacket review appear to have led to some inconsistency in documenting the review process. *RECOMMENDATION 2: Programs necessarily entail review or handling by several program officers. Consistency of review analyses among program officers within a program should be improved. A common template could be developed to ensure this consistency.*	yes

6. Does the documentation to PI provide the rationale for the award/decline decision? (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.) Comments: The PI should be provided with a uniform final documentation template (context statement) along with the award/decline decision. This should be in addition to and independent of any individual reviews and panel summary, and is especially important when a proposal is declined despite excellent external reviews. *RECOMMENDATION 3: OISE should maintain a uniform reporting process for the results of reviews and program officer summary comments. The denial letters/reports should contain more detailed explanation for denials of highly rated proposals. Adequate information should be provided to investigators in order to guide their future efforts and expectations.*	yes
7. Is the time to decision appropriate? Note: Time to Decision --NSF Annual Performance Goal: **For 70 percent of proposals, inform applicants about funding decisions within six months of proposal receipt or deadline or target date, whichever is later**. The date of Division Director concurrence is used in determining the time to decision. Once the Division Director concurs, applicants may be informed that their proposals have been declined or recommended for funding. The NSF-wide goal of 70 percent recognizes that the time to decision is appropriately greater than six months for some programs or some individual proposals. Comments: Dwell time for programs in OISE has been reduced over the past three years. We commend OISE for this.	yes
8. Additional comments on the quality and effectiveness of the program's use of merit review process: See Recommendations 1 through 3.	

A.2 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	**YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE[2]**
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: Although there seems to be quite a bit of divergence in how critical reviewers are of the science described in proposals, in general, the reviewers do have appropriate expertise and/or qualifications. OISE has developed strong relationships with program officers throughout NSF who often recommend reviewers with appropriate scientific expertise.	yes
2. Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups? Note: Demographic data is self reported, with only about 25% of reviewers reporting this information. Comments: In general, there appears to be an effort to balance the reviewers between male and female, which depends to some extent on who returns mail reviews and agrees to serve on panels. To the extent that names indicate ethnic diversity, there appears to be an effort to include reviewers of varied ethnicity. According to program-supplied data, 35 percent of reviewers are from underrepresented groups, a very commendable percentage. Data provided by NSF indicates that geographical representation of reviewers is adequately addressed. However, data on "type of institution" could be further enhanced by identifying minority serving institutions. Representation of the business sector is included in the NSF data. However, as it is combined in the "business, state, local, foreign, and other" category, it is difficult to assess the level of industry participation. Few reviewers appear to come from primarily undergraduate institutions, community colleges, or industry. Research/education international partnerships and OISE review processes could benefit greatly from the involvement of more reviewers from these sectors. NSF data on reviewers shows that OISE has maintained representation of underrepresented groups as reviewers, with 34% in 2005, 38% in 2006, and	yes

[2] If "Not Applicable" please explain why in the "Comments" section.

36% in 2007. We applaud OISE for its success in this area. However, the data does not disaggregate by gender or ethnic diversity, which would be helpful.	
3. Did the program recognize and resolve conflicts of interest when appropriate? Comments: There is evidence of recognizing and resolving conflicts of interest in a number of the proposals reviewed by the COV. In addition, the e-jacket software enables identification of COI for reviewers and panel members.	yes

4. Additional comments on reviewer selection:

While we were pleased to see improvement in the number of OISE reviewers from underrepresented groups, overall data on reviewers indicate the need for continuous improvement in increasing participation of underrepresented groups to serve as reviewers. NSF program officers need to be more proactive in recruiting reviewers from underrepresented groups, including relevant industry and representatives from minority serving institutions.

RECOMMENDATION 4: We recommend that reviewers should be strongly encouraged to provide information on their race and ethnicity.

RECOMMENDATION 5: NSF should further refine its data base by (1) adding minority serving institutions in "the type of institutions" category; and (2) separating "business" from the "state, local governments and others" category.

A.3 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE[3], OR DATA NOT AVAILABLE
1. Overall quality of the research and/or education projects supported by the program. Comments: COV was impressed by the overall quality of awards and the higher success rate in funding of all program activities of OISE with the exception of PIRE. Nonetheless, the COV noted that due to insufficient funds many strong proposals had to be rejected.	Appropriate
2. Does the program portfolio promote the integration of research and education?	Appropriate

[3] If "Not Appropriate" please explain why in the "Comments" section.

Comments: The COV noted that the program portfolio promotes the integration of research and education as exemplified by programs like PIRE and IRES that clearly require the integration of both components in funded projects. The COV was pleased to learn that site visits to PIRE projects are planned, and recommends careful evaluation of this program. The COV believes that OISE/NSF should clarify the meaning of "integration of research and education." It would be useful to include clear examples of integration of research and education in proposal solicitations. It would also be useful to document how the integration is being accomplished by the funded projects. For example, few proposals that we reviewed demonstrated impact on curriculum development, one possible element of integration. *RECOMMENDATION 6: OISE should benchmark integration of research and education with other NSF programs to find examples in proposal solicitations and funded projects. The now-defunct Recognition Awards for the Integration of Research and Education (RAIRE) and Awards for the Integration of Research and Education (AIRE) may also provide useful examples.*	
3. Are awards appropriate in size and duration for the scope of the projects? Comments: The COV believes that a summer experience of two months seems reasonable, as does the PIRE duration of five years. Based on our sample, the COV concluded that funded projects are appropriate in size and duration. *RECOMMENDATION 7: In order to increase size and duration of grants, the COV urges OISE to proactively explore collaborations with other funding organizations, public and private.*	Appropriate
4. Does the program portfolio have an appropriate balance of: • Innovative/potentially transformative projects? Comments: Clear-cut data for the period under review showing how a project is transformative is not readily available since this review criterion has only recently been added. Assuming that reviewers have successfully applied the intellectual merit criterion, then the portfolio has a good balance of innovative/potentially transformative projects. The PIRE program, because of the amount of support available and the goals of the program, is a very good step towards encouraging transformative research. We encourage OISE to provide clear guidance on the definition of transformative research as well as examples in future solicitations.	Appropriate

5. Does the program portfolio have an appropriate balance of: • Inter- and Multi- disciplinary projects? Comments: Since interdisciplinary and multidisciplinary projects are new in the OISE portfolio, it is not clear what should be appropriate. Of the 2007 PIRE awards, 20 % were multidisciplinary and 10 % were interdisciplinary. We recommended that OISE encourage more multi- and interdisciplinary proposals. The COV noted that PIRE and PASI awards should be sensitive to whether the collaborating country or countries prefer to focus on a specific disciplinary area or on an inter- or multi-disciplinary approach to a problem. We commend OISE's tracking the relative numbers of multi- and interdisciplinary projects.	Appropriate

6. Does the program portfolio have an appropriate balance considering, for example, award size, single and multiple investigator awards, or other characteristics as appropriate for the program? Comments: Some of the programs are by their nature single investigator (e.g., the fellowships and undergraduate experiences). All of the PIRE projects involve multiple investigators by definition. The balance seems appropriate.	Appropriate
7. Does the program portfolio have an appropriate balance of: • Awards to new investigators? NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant. Since the PIRE, PASI, and Planning Visits are major programs involving extensive collaborations, it makes sense for fewer new investigators to be involved. However, the IRFP program is largely for "new investigators" and this is a very active component of OISE. The OISE data indicates that 638 new PIs received 65% of the total OISE awards. This high percentage is due to the fact that OISE treats both individual PostDoc applicants in IRFP and individual graduate student applicants in EAPSI as new PIs. A review of Planning Visits and Workshops Program shows that New PIs received 27% of the 380 awards. They also did well in IRES and DDEP receiving about 25% of the total awards. New PIs were less involved in PIRE and PASI because these programs require building extensive international collaborations. Overall, awards for new PIs are well balanced.	Appropriate
8. Does the program portfolio have an appropriate balance of: • Geographical distribution of Principal Investigators? Comments: The distribution by states seemed reasonable and was reflective of the participation of higher education institutions across the nation.	Appropriate
9. Does the program portfolio have an appropriate balance of: • Institutional types?	Data not available

Comments The COV was concerned that data on institutional type are inappropriately aggregated (see Chart 12 in material supplied to COV). For example, the category of "business, state, local, foreign and other" appears to have received the highest number of OISE awards. Data for FY2007 indicate that 184 awards were given to this category of institutions, while research intensive institutions received 64 awards, Ph.D. institutions received 28, Masters institutions received four, and four-year institutions received one award. However, in reviewing each of the OISE funded programs, the "business, state, local, foreign and other" category did not receive a high percentage of program awards. Instead, individual awards to students and faculty appear to have been placed into this category, thus creating a misleading statistic. It would be helpful to separate each type of institutions in this category and clarify the type of awards they received in the OISE overall award data. We are concerned that there is little representation in the OISE portfolio of primarily undergraduate institutions or community colleges. Applicants for OISE funding should be encouraged to partner with primarily undergraduate institutions and community colleges when appropriate. *RECOMMENDATION 8: Data aggregation and reporting for business, state, local, foreign and other institutions should be revised to clearly separate categories, including individual graduate students, postdocs, and faculty.* *RECOMMENDATION 9: Applicants for OISE funding should be encouraged to partner with primarily undergraduate institutions and community colleges when appropriate.*	
10. Does the program portfolio have an appropriate balance: • Across disciplines and sub disciplines of the activity? Comments: Conversations with program officers and our examinations of the sample jackets indicated that the program portfolio involved a range of disciplines and sub disciplines. Data on the disciplines of the PIRE projects showed good balance. However, data on the disciplinary composition of the OISE portfolio in general was not provided. OISE data on co-funding contributed from other directorates to OISE (Chart 7) and OISE contributions to other directorates (Chart 8) indicated international participation across disciplines. *RECOMMENDATION 10: OISE should provide disciplinary data on all awards.*	Data not available

11. Does the program portfolio have appropriate participation of underrepresented groups? Comments: The overall OISE 2005-2007 aggregate data indicated that female and minority PIs received 40% of the total awards, a commendable percentage. OISE has made positive strides since 2005. While both women and minorities were successful in obtaining funding for planning visits and workshops, as well as in IRES and DDEP, minority PIs received fewer awards in IRFP and EAPSI. Neither group was well represented in PIRE and PASI. *RECOMMENDATION 11: OISE should continue its efforts to encourage more women and minority investigators to participate in the PIRE and PASI programs.*	Appropriate
12. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports. Comments: OISE is highly relevant to US national priorities. Its efforts support the NSF mission of promoting US global competence in science and engineering. According to NSF *Science and Engineering Indicators 2006*, future S&T jobs are projected to grow at a faster rate than the number of US students going into these fields. The Organization for Economic Cooperation and Development (OECD) reported recently that US investment in R&D abroad nearly doubled during the period from 1994 to 2002, while domestic investment did not increase nearly as rapidly. According to Maire Thursby and others, the role of the U.S. as the pre-eminent player in the process of globalization is being challenged for many reasons. The Sigma Xi report, *Embracing Globalization: Meeting the Challenges to U.S. Scientists and Engineers,* called for NSF to take a proactive role to meet the challenges and help develop a globally competent S&E workforce. The NSF strategic plan for 2006-2111 called for preparing a diverse and globally engaged STEM workforce. The National Science Board set a goal to actively promote and fund U.S. scientists and engineers to engage in and sustain international S&E partnerships throughout NSF. NSF Director Arden Bement has clearly stated the NSF mission--international cooperation in science is not a luxury; it is a necessity--and the foundation for the future.	Appropriate

13. Additional comments on the quality of the projects or the balance of the portfolio:

We commend OISE's leverage of its limited budget across a wide range of disciplines and geographic regions.

OISE has made great progress toward establishing systematic review and evaluation of all programs to ensure quality and efficiency.

A.4 Management of the program under review. Please comment on:

1. Management of the program.

Comments:

NSF has recognized the value of OISE. The OISE budget has increased consistently from 2005-07. In addition, the visibility and status of the office has been increased by its move to the NSF Director's office. We commend OISE's initiation of a strategic planning process.

See Section C.

Please see Recommendation #20 in Section C3

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

Comments:

The current portfolio of programs addresses many vital international research and education needs; others still need attention (for example, research and education needs in developing regions). OISE staff has deep understanding of the scope of those needs. It is noteworthy that in cases of unexpected natural phenomena, funding has been rapidly assembled to support needed fieldwork. Nevertheless OISE staff time and operational resources (especially travel funds) are strained.

See Section C.

RECOMMENDATION 12: NSF should increase the budget for OISE operations to permit timely response by OISE staff to international opportunities as well as participation in meetings and workshops held by other directorates.

RECOMMENDATION 13: OISE should continue its catalytic role in facilitating and expanding the development of programs to address emerging global research "grand challenges"

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

Comments:

See Section C.

See Recommendation 22 in Section C3

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

Comments (These were developed with reference to the *OISE 2005 COV Recommendations with 2008 Updates* document). The numbering system here ties to the recommendations in that document.

The COV was generally pleased with the responsiveness of OISE to the 2005 COV comments and recommendations. Our observations and recommendations are noted below for each recommendation.

1. The request for a mission statement and action plan is addressed by the current OISE strategic planning process.
2. Efforts to identify research centers and connections abroad should be expanded and prioritized
3. Outreach on OISE's mission and programs to both NSF and external audiences should be continued and expanded. Funding of smaller grants has continued as recommended in 2005.
4. Several key activities respond to the 2005 recommendation on developing countries.

    a. The new position of Program Manager for Developing Countries has expanded OISE's role in collaboration with developing countries.
    b. The intra-OISE working group on Developing Countries meets monthly and will be proposing for FY2009 the global extension of PASI.
    c. The seminar series at NSF on science in developing countries was initiated in 2007 and will continue in 2008.

5. Plans for PIRE reverse site visits are in place for Spring 2008 for 2005 awardees. We urge the site visit teams to thoroughly review all aspects of the PIRE projects. The COV recommends at least one site visit during the life of a PIRE project, recognizing that this has financial implications.
6. The COV was pleased to see that a new staff member has been hired to track outcomes of OISE programs, including IRFP. In addition, OISE is working to improve the administrative efficiency of the US-based EAPSI program.
7. The need to shield OISE discretionary budget demands has been discussed with the Deputy Director. Payments will be prorated throughout NSF so programs that are impacted by these organizations will pay their share. Some of these dues will continue to be the sole responsibility of OISE.

8. A new web-based version of the NSF Enterprise Info System includes reports on co-funding from contributing organizations, and data from this was available to the COV.
9. A new data management system to improve the reviewer data base has been established, and this is a goal of the NSF OIRM/DIS initiative. Reviewer data provided was very helpful to the COV in its program review. Improved demographic information would be helpful.
10. Tracking of PIs and geographic distribution is in place, as is disciplinary focus for PIRE.
11. The COV commends the appointment of the PM for Developing Countries position. The preliminary list of agencies and contacts made is impressive. In addition to expanding these efforts to include other partners (such as industry), an identification of priorities among them for focus is important.
12. Present approach to ensure that international program reviewers understand NSF's scientific merit and broader impact criteria is satisfactory, though we recommend that efforts to educate reviewers, especially about the broader impacts criterion, continue. This COV did not observe the deficiencies in international reviews that were noted in 2005.
13. We commend the hiring of a manager for broadening participation in OISE activities. ~~.~~ In addition, OISE has given outreach presentations to increase awareness of the issue and programs addressing the issue. The result of these efforts show that in PASI 21% of the awards were given to HSI and 47% had a Spanish-surname PI. For sub-Saharan Africa female participation increased by over 20% to a total of 29% of all of the sub-Saharan Africa awards in the 3-year period. With the exception of the PIRE program, OISE awards to underrepresented groups and involvement of reviewers from under-represented groups appeared acceptable or better.
14. We commend OISE's improvement in proposal dwell time, which is satisfactory and meets Foundation goals.
15. Non-award/service activities are a large and essential part of OISE's activities and should be documented and included in the strategic plan. Communication of the importance of these activities within NSF and to others is essential. Travel allocations to support non-award activities and for outreach should be increased.
16. See 15.
17. See 15
18. The COV encourages adoption of additional best practices in managing large projects (in addition to reverse site visits) and involving PM from other directorates in these visits.
19. The OISE director should continue to attend the Assistant Director meetings.
20. The present OISE Director was appointed February 2006. Succession planning for a position of this importance is essential to the continued high quality of the program.

5. Additional comments on program management:

Considering OISE's limited budget, the COV was pleased that OISE chose to address several 2005 recommendations by designating staff for the specific purposes of broadening participation, working with developing countries, and tracking outcomes.

The COV was very pleased with the progress that OISE has made in the collection and availability of data on its programs. This represents marked improvement since the 2005 COV. The e-jacket system facilitated the work of the COV. We encourage development of consistent practices for data entry and maintenance in this system.

PART B. RESULTS OF NSF INVESTMENTS

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The NSF mission is to:

- promote the progress of science;
- advance national health, prosperity, and welfare; and
- secure the national defense.

To fulfill this mission, NSF has identified four strategic outcome goals: Discovery, Learning, Research Infrastructure, and Stewardship. The COV should look carefully at and comment on (1) noteworthy achievements based on NSF awards; (2) ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcome goals; and (3) expectations for future performance based on the current set of awards.

NSF investments produce results that appear over time. Consequently, the COV review may include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made.

To assist the COV, NSF staff will provide award "highlights" as well as information about the program and its award portfolio as it relates to the three outcome goals of Discovery, Learning, and Research Infrastructure. The COV is not asked to review accomplishments under Stewardship, as that goal is represented by several annual performance goals and measures that are monitored by internal working groups that report to NSF senior management.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes ("highlights") as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 OUTCOME GOAL for Discovery: "*Foster research that will advance the frontier of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering."*

Comments:

A **PIRE award** (0530203) to Mohammad Faghri at the University of Rhode Island has enabled collaborative research with a German team at the Technical University in Braunschweig. They have so far shown that Quartz Crystal Microbalance technology can be used to obtain rapid mass measurement of viruses, improving production speed and quality of virus manufacture. This in turn enables reduced cost and throughput time for distribution of vaccines. A dual master's and Ph.D. program between the two universities also contributes to cultivating a world-class, inclusive science and engineering workforce.

An **International Research Fellowship** (0107347) allowed Dr. Laura Molles to work with Dr. Joe Waas at the University of Waikato in New Zealand. Their research suggested that duets of the endangered kokako bird are a cooperative effort on the part of mating pairs that serve a variety of communications functions, including territorial defense and pair bonding. The work led to a unique application combining behavioral ecology and conservation – the use of song playback as an "anchor" for kokako during reintroduction to restored habitats. Due partly to the strength of her

research program, Dr. Molles obtained a faculty position at New Zealand's Lincoln University, where she teaches courses in ecology and conservation and supervises graduate students. Thus the collaboration she established continues to benefit her career, and her current work contributes to the development of a global scientific workforce.

Funding of an **SGER planning visit** (0630474) enabled Dr. Marte Gutierrez at Virginia Polytechnic Institute and Dr. Vern Schaeffer at Iowa State to visit Leyte, Philippines immediately following the February 17, 2006 landslide. They worked with colleagues from the Philippines, Japan, and New Zealand in order to collect evidence and data on possible causes prior to removal of debris and rebuilding. This study will likely result in a better understanding of the geological effects of severe weather conditions due to global warming. It has fostered the formation of an international partnership, as well as the development of geotechnical graduate students.

Another **planning visit** grant (0514309) enabled Dr. Jingpu Liu and David DeMaster from North Carolina State University to travel to Hanoi to plan future research cruises to study the dispersal and accumulation of Mekong River-derived sediment in shallow coastal seas. The timing of the visit allowed the researchers to participate with NSF in US-Vietnam Science and Technology Days in order to illustrate the potential benefits of international research collaboration and promote contact with Vietnamese researchers.

B.2 OUTCOME GOAL for Learning: "*Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens."*

Comments:

Many of the projects funded by OISE address this as a primary goal, and contribute to preparation of students for participation in the global workplace. For example, an **international supplemental award** (0125582) to Marianne Krasny's Garden Mosaics project (Cornell University) enabled two graduate students to work with teachers and youth near Durban, South Africa on a community gardening project. "Gardener stories" from this project have been added to the collection of educational materials available to the public on Garden Mosaic's web site (www.gardenmosaics.org). Jamila Simon, a graduate student on the project, then conducted a study in the U.S. to determine whether local or international content was more motivational for minority youth, and found that an international context may be an important factor in motivating students to engage in science activities.

A **Pan American Advanced Study Institute** on Energy Conversion and Environmental Protection was organized by Professor R. P. H. Chang of Northwestern University (0220839) in Rio de Janeiro. This Institute assembled forty Pan-American students from various engineering and physical sciences fields, along with twenty lecturers from industry, academia and government. New research in the areas of fuel cells and catalysis for emissions control was planned by eight student groups, who developed joint proposals for funding to carry out projects. The lecturers presented materials on advanced topics and served as mentors to the student groups. Participation in the Institute improved research and management skills for the students, which should enable their leadership in a global workforce.

A team of US graduate and undergraduate students traveled to the Joint Polish/US Atomic Physics and Photonics laboratory at Jagiellonian University in Krakow, funded by an **IRES award** to Dr. Dmitry Budker of the University of California at Berkeley (0456141). They participated in a collaborative US-Polish project (0338426) to develop and apply a novel atomic physics technique for magnetic field measurements. This new technique, nonlinear magneto-optical rotation with Amplitude modulated light (AMOR), can be applied in a wide variety of disciplinary research.

Prior to initiation of the **IRES program, similar funding** to the Pacific Rim Undergraduate Experience Program (PRIME) (0407508, Gabriele Wienhausen, UCSD) enabled nine US students to develop cyberinfrastructure applications in biological, chemical, and environmental sciences and engineering, working with researchers in the Pacific Rim Applications and Grid Middleware Assembly (PRAGMA). This work was conducted at Monash University, Osaka University, and the National Center for High Performance Computing in Hsinchu, Taiwan.

B.3 OUTCOME GOAL for Research Infrastructure: "*Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools."*

Comments:

OISE **collaborative research** funding to Peter Arzberger (0314015) of UC San Diego and Stephen Carpenter (0217533) of the University of Wisconsin enabled the Global Lake Ecological Observatory

(GLEON) to deploy wireless sensor networks for the study of lake metabolism in Taiwan and Wisconsin. This sensor network builds on NSF investments in long term ecological research, the Pacific Rim Application and Grid Middleware Assembly (PRAGMA), investments by the Taiwan Forest Research Institute and the Taiwan National Center for High-performance Computing, and funding by the Gordon and Betty Moore Foundation. Field biologists and ecologists are able to record observations at a scale that was previously difficult or impossible to study. For example, recently, this network enabled measurements of dramatic lake changes during a typhoon in Taiwan and the resulting effects on the algal and microbial community structure.

Prior to initiation of the **IRES program, similar funding** to the Pacific Rim Undergraduate Experience Program (PRIME) (0407508,**Cooperative research funding** to James Rose of the University of North Carolina (0114536) enabled him to work with Indian colleagues at the Inter-University Center for Astronomy and Astrophysics to create the world's largest star library. They have developed a high-resolution database of spectra for 1273 stars, far exceeding the size of current star libraries. This provides a unique data resource for international scientific collaborations, for example, in studying the evolution of galaxies. Six graduate students and three undergraduates were trained in the course of this work.

OISE **international organization funding** to Meredith Lane (0301149) for the Global Biodiversity Information Facility (GBIF) provides an example of investment in data infrastructure. The goal of this international consortium is digitization and availability of biodiversity data and software tools for its analysis. The easy availability of species-level data promotes insight and understanding, leading to new research directions.

PART C. OTHER TOPICS

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

In our meeting with program officers from other directorates, they were uniformly positive about their interactions with OISE and appreciative of OISE's efforts to facilitate international collaborations.

Continued improvement of communications between directorates and OISE is important. Significant progress has been made in educating other NSF directorates on OISE program's and vision since the last COV. Building relationships with program officers in the directorates is an established responsibility for OISE program officers, but the reverse is not as generally accepted or practiced. All directorates need a mechanism(s) to encourage new and experienced program officers to establish relationships with OISE.

The current international program committee could be strengthened as an agency-wide coordination committee to address agency wide international activities and foster coordination.

The IREE program in the Engineering Directorate is a best practice that could be emulated by other directorates/divisions foundation-wide. Other current best practices include the appointment of an international coordinator for a directorate and the involvement of OISE staff in directorate meetings and workshops as appropriate.

Now that there is an OISE staff member designated to promote work with developing countries, we encourage the development of guidelines and informational resources to support this work across the Foundation, in collaboration with NSF grants and contracts staff.

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.

OISE has done a great job in defining and improving its program offerings since 2005, while retaining the flexibility to provide *ad hoc* funding in response to emerging opportunities and to co-fund projects with other directorates.

Expansion of EAPSI and increases in PIRE and IRES offerings will further facilitate increased international experience of U. S. science and engineering students.

RECOMMENDATION 14: Funding permitting, OISE should explore the expansion of EAPSI-like programs into additional geographic regions.

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

Resources

The COV applauds the increases in funding that have been provided for OISE. However, we urge attention to two areas.

Travel Funding

RECOMMENDATION 15: NSF should seek increased funding for OISE program officers for travel to "their" regions especially in conjunction with project visits by directorate program officers or senior staff, as well as travel to domestic conferences, professional meetings, site visits and workshops.

Staff Support

OISE has done a great job in supporting directorates in coordinating international visitors, facilitating international agreements, and leveraging program funding. According to program staff, this work consumes over fifty per cent of their effort. They would greatly benefit from additional support staff.

RECOMMENDATION 16: Science assistant and program assistant support is needed to enable program managers to focus on programs and catalytic activities.

Strategic planning, development and alignment

NSF should implement the recommendations of the National Science Board, *International Science and Engineering Partnerships: A Priority for US Foreign Policy and Our Nation's Innovative Enterprise*. The NSB has established a goal to actively promote and fund U. S. scientists and engineers to engage in and sustain international S&E partnerships throughout NSF. It provides guidance to NSF in four areas:

- Better publicize opportunities for supplemental funding for PIs to encourage international collaboration
- Encourage directorates to develop specific plans and programs to support international partnerships
- Link international S&E research partnerships with curricular pathways for students; and
- Continue to provide support service in support of international partnerships through OISE.

RECOMMENDATION 17: Additional international perspective should be added to the overall vision and goals of the NSF strategic plan for 2006-2011, and international strategic planning activities across the Foundation should be aligned.

We are pleased to see that OISE has begun the strategic planning process as recommended by the 2005 COV. This will be critical to the future impact of OISE.

RECOMMENDATION 18: Building on the recommendation of the 2005 COV, we urge OISE to make the strategic planning process a high priority, and develop a vision, mission, goals, strategies and metrics, linking the strategic plan with operations, outcomes assessment, and budget. This effort will enhance OISE credibility both internally and externally. It will aid in accruing resources and ideas from sister organizations and the private sector worldwide for the development of transformative programs.

OISE needs to carefully prioritize its investment decisions, and to ensure that the programs it establishes are appropriate to the regions in which they are located.

RECOMMENDATION 19: Although there is broad participation across NSF in the newly created OISE Strategic Planning committee, OISE should involve external stakeholders (industry, academic institutions, funding organizations, geographic regions) in the process at the appropriate time.

RECOMMENDATION 20: Given the growing importance of the Office, NSF should implement succession planning for the position of Director of OISE. Visionary leadership and proactive strategies are needed to serve OISE well in the future. Careful thought should also be given to

succession of OISE program officers, whose expertise is often deep and difficult to duplicate within the general community served by NSF.

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

RECOMMENDATION 21: OISE should articulate and highlight the importance of its non-award-related activities in its new strategic plan. The extent of these activities and the time devoted to them should be documented, and this documentation provided to the next COV. Metrics should be developed to assess the impact of "facilitation" relative to distribution of awards, to determine an appropriate balance between these two types of activities in OISE.

C.5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The COV would like to express its thanks to the OISE staff whose work supported our visit, especially Vanessa Richardson, Director of Operations and Analysis, and Rebecca Gaul, Computer Specialist. Our discussion sessions with OISE program directors and program directors from other NSF directorates were most helpful.

More time should be devoted to clarifying various background data at the beginning of the COV review session. Perhaps OISE staff could walk the COV through a jacket review and focus on the key elements.

Graphical presentation of key data would be helpful.

SIGNATURE BLOCK:

For the Office of International Science and Engineering (OISE)
Barbara M. Olds
Chair

Charge to the Committee of Visitors
Office of International Science and Engineering
2005-2007

BACKGROUND

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 Visitors (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 managerial matters pertaining to proposal decisions; and
2) comments on how the outputs and outcomes generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals.

COV reviews are conducted at regular intervals of approximately three years for programs and offices that recommend or award grants, cooperative agreements, and/or contracts and whose main focus is the conduct or support of NSF research and education in science and engineering.

Each COV review should provide NSF with results and other information that can be integrated at the Foundation level, as specified in NSF's Strategic Plan. COVs may also be requested to evaluate other aspects of program management and organizational performance.

CHARGE TO THE COV

The COV review of program management will consider proposal actions that were completed during the three previous fiscal years: FY 2005, FY 2006 and FY 2007.

The COV review of awardee results will consider examples of the direct accomplishments of projects supported by the programs under review that are either currently active at the time of the COV review or were closed out during the previous three fiscal years.

The COV Core Questions and Reporting Template will be applied to the program portfolio and will address the proposal review process used by the program, program management, and the results of NSF investments. Specific questions to be addressed and reported on are:

a. the integrity and efficiency of processes used to solicit, review, recommend, and document proposal actions, including such factors as:

    - selection of an adequate number of highly qualified reviewers who are free from bias and/or conflicts of interest;
    - appropriate use of NSF merit review criteria;
    - documentation related to program officer decisions regarding awards and declines, and the scope, duration, and size of projects;

- balance of awards in terms of subject matter; emerging opportunities; high risk and innovation; size versus number of awards; new investigators; diversity of underrepresented groups; geographic distribution of principal investigators; and
- overall technical management of the program.

b. the relationships between award decisions, program goals, and Foundation-wide programs and goals.

c. results, in the forms of outputs and outcomes of NSF investments for the relevant fiscal years, as they relate to the Foundation's current strategic goals and annual performance goals.

d. the significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when these investments were made. Examples might include new products or processes, or new fields of research whose creation can be traced to the outputs and outcomes of NSF-supported projects over an extended period of time.

e. response of the program under review to recommendations of the previous COV review.

Memorandum

Date: 01 July 2008

To: Director, National Science Foundation

From: Acting Director, Office of International Science and Engineering

Subject: Demographics of the OISE Committee of Visitors

The Committee of Visitors for the Office of International Science and Engineering met on April 22-24, 2008, to review the activities of the Office for Fiscal Years 2005, 2006 and 2007. The composition of the Committee is presented below.

Gender	6 Female, 5 Male
Geographic Distribution	Northeast-1, Southeast - 3, Midwest - 5, West -1, Puerto Rico-1 Included in the count are 3 EPSCoR States (AL, OK and PR)
Minority Representation	African American – 2, Asian-American – 1, Hispanic – 3
Institutions	Public – 8 (including 1 HBCU), Private (Undergraduate) – 1, Non-Profit – 1, For-Profit – 1
Recent OISE Awardees	3
Number with No OISE Support in Past Five Years	5
Number with No NSF Support in Past Five Years	3

Two members of the NSF Advisory Committee for International Science and Engineering served on the COV, one of which was the Chair.

The OISE COV members were advised about confidentiality and conflicts of interest both prior to arriving at NSF and at an introductory session that included a conflicts briefing and review of confidentiality requirements by Jim Lightbourne, Office of Integrative Activities. None of the COV members had pending proposals. The selection of jackets looked at did not include any proposals for which COV members had been reviewers. All files presented to the COV were first scrutinized for possible conflicts with Committee members. While the selection did include some proposals that posed conflicts of interest for COV members, they did not review those proposals.

It should be noted that due to a family emergency, one member of the COV was only able to participate in the first day of the meeting.

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