

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2008 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2008 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2008. 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>.

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

Many of the Core Questions are derived from NSF performance goals and apply to the portfolio of activities represented in the program(s) under review. The program(s) under review may include several subactivities 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 subactivities 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.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the **processes** related to proposal review; and (B) the quality of the **results** of NSF's investments that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. 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.* Discussions leading to answers for Part B of the Core Questions will involve study of non-confidential material such as results of NSF-funded projects. The reports generated by COVs are used in assessing agency progress in order to meet government-wide performance reporting requirements, and are made available to the public. Since material from COV reports is used in NSF performance reports, the COV report may be subject to an audit.

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

The table below should be completed by program staff.

<p>Date of COV: April 1-3, 2008</p>
<p>Program/Cluster/Section: All of Office of CyberInfrastructure</p>
<p>Division: N/A</p>
<p>Directorate: Office of CyberInfrastructure</p>
<p>Number of actions reviewed:</p> <p>Awards: 73</p> <p>Declinations: 69</p> <p>Other: 18 (supplements and returns)</p>
<p>Total number of actions within Program/Cluster/Division during period under review: 657 total over the period FY05, FY06, FY07</p> <p>Awards: 187</p> <p>Declinations: 365</p> <p>Other: 105 (supplements and returns)</p>
<p>Manner in which reviewed actions were selected:</p> <ul style="list-style-type: none"> - large awards - award diversity (cooperative agreement, grant, workshop, SGER, supplements) - institutional diversity - geographic representation - program director representation - random

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
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments: The number of reviewers reviewing specific proposals in each area was usually appropriate, at least for the jackets reviewed. However, in cases of highly multidisciplinary proposals the number of reviewers might be larger to provide greater disciplinary coverage. Commend OCI for pioneering use of virtual panels at NSF – should be encouraged. Mail reviews for HPC was a good idea. Other program(s) in NSF have data base of possible reviewers; should explore this and see if it can be applied to cutting down workload. The use of site visit for Track I proposals was appropriate and is to be encouraged.</p>	Yes
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>b) In panel summaries?</p> <p>c) In Program Officer review analyses?</p> <p>Comments: Reviewers tended to be more supportive of proposals in which each area of broader impacts was addressed directly and clearly. Large solicitations in OCI would benefit from having specific criteria provided in the RFP/Solicitation process for how proposal discussion of broader impacts will be reviewed. For accountability purposes, it is recommended that</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p>

¹ If “Not Applicable” please explain why in the “Comments” section.

milestones and deployment be required for broader impacts.	
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<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>Comments: There is some variance; this is to be expected. Critical comments are useful, but constructive comments are also important and tend to be less evident. Program officers should give more careful instruction on the criteria set out in the RFPs and how those should be used to evaluate proposals. Best practices for reviewing – assessing criteria, writing constructive comments – should be shared across the programs. More consistent culture of performance on reviews.</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: None</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: Review analysis in some cases did not address conflict of interest issues. Would be helpful if the most specific information about the recommendation to award or decline was in one place; it is now in a few cases scattered in the review analysis, sometimes elsewhere such as diaries. This is not an issue of process quality control, per se; it is an issue of ease of oversight and audit. For example, the COV would find it easier if there was consistency.</p>	<p>Yes</p>

<p>6. Does the documentation to PI provide the rationale for the award/decline decision?</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: None</p>	<p>Yes</p>
<p>7. Is the time to decision appropriate?</p> <p>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.</p> <p>Comments: On average it seems fine; harder to tell whether there were any outliers that took too long. But no evidence that there is a problem. Would be useful to have data on time-to-decision for proposals that one would expect to take a long time (e.g., Track I and II) as opposed to others.</p>	<p>Yes</p>
<p>8. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>Overall, the quality of the reviews is of high quality. To the extent that there are shortfalls, they are in the comparative lack of constructive commentary (i.e., helpful to the proposer) vs. critical commentary on why the award should not be made. Individual reviews could in some cases be more carefully done; it would be helpful in some cases to better educate and prepare reviewers for the tasks at hand. It is acknowledged that finding reviewers and panelists willing to serve is a challenge, and making the task of serving more demanding will not help with this. It is a balancing act.</p>	

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
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: There are some areas of concern. For example, in some of the CI Team reviews there could have been more participation by people with expertise in education. This echoes the challenge of getting enough reviewers representing all the areas of expertise for proposals that are interdisciplinary in character.</p>	Yes
<p>2. Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups?</p> <p>Note: Demographic data is self reported, with only about 25% of reviewers reporting this information.</p> <p>Comments: There appears to be a genuine effort to include reviewers from underrepresented areas (e.g., female, minority), but the in some cases it is difficult to determine from the data given how well the process of inclusion is working. By law, reviewers cannot be required to provide personal information for this purpose, so it is not easy to solve.</p>	Yes
<p>3. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments: None.</p>	Yes

² If “Not Applicable” please explain why in the “Comments” section.

4. Additional comments on reviewer selection:

Maintaining the reviewer pool grows increasingly difficult as the number of reviews to be done grows. There is no simple solution to this; it is an observation. Looking at practices across NSF might be helpful for ideas to address this. Goal of maintaining a distribution of senior and junior reviewers is good, and seems to be working well.

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.

<p style="text-align: center;">RESULTING PORTFOLIO OF AWARDS</p>	<p style="text-align: center;">APPROPRIATE, NOT APPROPRIATE³, OR DATA NOT AVAILABLE</p>
<p>1. Overall quality of the research and/or education projects supported by the program.</p> <p>Comments: It can be difficult to evaluate the quality of research based on inputs (proposals and awards are inputs); quality of research ultimately rests on outputs, results of research that are not available to the COV. The review process is resulting in awards for research that looks promising. Given that OCI addresses infrastructure issues, and infrastructures tend to be persistent, downstream reviews of outcomes of infrastructure-creation project would be useful.</p>	<p>Appropriate</p>
<p>2. Does the program portfolio promote the integration of research and education?</p> <p>Comments: There is great variability across OCI areas; one would expect different integration of research and education for high-performance computing as opposed to that found in virtual organizations. It might be useful to develop expectations and metrics that would help OCI determine what forms of integration are expected for different areas, and how they could be measured.</p>	<p>Appropriate</p>

³ If “Not Appropriate” please explain why in the “Comments” section.

<p>3. Are awards appropriate in size and duration for the scope of the projects?</p> <p>Comments: Generally, they are appropriate as far as the programs go. However, infrastructures have to be sustainable, and there is little attention to sustainability. Also, in some cases three-year awards are simply too short to affect the course of things in the ways needed. OCI might need to think differently about these issues in comparison to other areas of NSF.</p>	<p>Appropriate</p>
<p>4. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Innovative/potentially transformative projects? <p>Comments: Insufficient use of mechanisms such as SGER awards to incentivize out-of-the-box thinking and exploration for projects that could be transformative. Also, for most areas, very few REU awards. This might raise the question of the appropriateness and/or efficacy of such mechanisms within OCI, given its unusual mission within NSF. If so, perhaps new mechanisms should be created that are appropriate to OCI. This is probably at least to some extent an artifact of a larger challenge for OCI related to the scope and scale of the vision and need, on one hand, and the availability of resources and routine operating procedures of OCI and NSF on the other. These are addressed below in section B.</p>	<p>Not Appropriate</p>
<p>5. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Inter- and Multi- disciplinary projects? <p>Comments: While OCI is inherently oriented toward multi- or inter-disciplinary work, not everything has to be of this character.</p>	<p>Appropriate</p>

<p>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?</p> <p>Comments: This question seems misplaced in the sense that it is more relevant to programs found in the disciplinary directorates than to OCI. There is an important question of whether the overall character of projects reflects the vision for OCI and the needs the OCI programs are intended to address. This is addressed in greater detail below in section B.</p>	<p>Appropriate</p>
<p>7. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Awards to new investigators? <p>NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant.</p> <p>Comments: This question seems aimed at more traditional, disciplinary programs where the “old player” network problem is an issue because junior investigators are excluded. It is not clear that such metrics apply in the same way to OCI, but it would be a good idea for OCI to develop strategies for getting junior investigators into the game early and successfully, and appropriate metrics to measure the success of such strategies. OCI ought to consider establishing something like the CAREER award for people in this area. Also, something like the old research initiation award and/or the minority research initiation award structure would be worth exploring. The participation of both older and more junior people in the review process is commended.</p>	<p>Appropriate</p>
<p>8. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Geographical distribution of Principal Investigators? <p>Comments: None</p>	<p>Appropriate</p>
<p>9. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Institutionnel types? <p>Comments: There seems to be opportunity for more industrial partners for some initiatives such as CI Team, as well as a need for more meaningful participation by Minority Serving Institutions across the board.</p>	<p>Appropriate</p>

<p>10. Does the program portfolio have an appropriate balance:</p> <ul style="list-style-type: none"> • Across disciplines and sub disciplines of the activity? <p>Comments: This question is difficult to answer given that OCI is inherently cross-disciplinary, and people from many different disciplines do participate. The challenge would be in answering the question of whether all of the disciplines that <i>ought</i> to be involved <i>are</i> involved. The question of appropriate mix of disciplinary participation is important, and needs attention, but this is not a question amenable to a simple answer of “appropriate” or “not appropriate” at this time. In addition, there is an important distinction between who is building the infrastructure (a group that might be more narrowly represented) and who is using the infrastructure (presumably a much more heterogeneous group). Finally, the ultimate question is whether the <i>right</i> people from different disciplines are involved, such that the work of the OCI is transforming science and engineering research and education. This is an open research question.</p>	<p>Data Not Available</p>
<p>11. Does the program portfolio have appropriate participation of underrepresented groups?</p> <p>This question cannot be answered “Data Not Available” because data are available to provide a sense of participation by underrepresented groups. It cannot be answered “Not Appropriate” because OCI has been particularly attentive to increasing participation. Yet, it is not right to say that the level of participation is “Appropriate” because participation remains far below what it should be. This is not a problem unique to OCI; it is endemic in the computing-related fields of research and application, where participation by women has fallen steadily for many years, and participation by minorities is historically low. The COV commends OCI for its attention to the need to broaden participation, and for the efforts it has made in this regard. The challenge remains daunting, but there is real promise in the vision of cyberinfrastructure to increase participation by parts of the population that traditionally have had difficulty getting access to opportunities to join in science and engineering activity. Such participation is needed if science and engineering are to meet social objectives. This makes it especially important to pursue a creative and aggressive agenda for broadening participation within the OCI and among the community OCI serves.</p>	<p>See Comments</p>
<p>12. 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>Appropriate</p>

<p>The Blue Ribbon report that recommended the creation of the OCI and the Cyberinfrastructure Vision for 21st Century Discovery both make eloquent and powerful arguments for the relevance of OCI to national priorities, agency mission, relevant fields and other constituent needs. These arguments are bolstered by arguments made by the PITAC/PCAST reports, the Rising Above the Gathering Storm report, and elements of the American Competitiveness Act. OCI is relevant; the investment in OCI is inadequate. This is discussed next.</p>	
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13. Additional comments on the quality of the projects or the balance of the portfolio:

There are important questions about the level of investment made in OCI, given the needs. At present, the shortfall in resources to address all the elements of OCI articulated in the Cyberinfrastructure Vision for the 21st Century results in significant program imbalances. The important national investments in high-performance computing are well-established, and are continuing through OCI. They are expensive, and rapid technological progress makes it necessary to re-invest in this infrastructure frequently. The shortfall in resources is exacerbated by the disconnect between the expectations of the various directorates relative to the vision of what CI can deliver to them and the reality of how these expectations can or should be met fiscally.

The shortfall in resources makes it difficult for OCI to address needs in other program areas such as networking, data, virtual organizations, learning and workforce development. Failure to address this imbalance imperils the overall program, as well as the needs the program is addressing in the interest of national competitiveness. OCI has established itself as program with core research strengths, and is developing a workforce to address the challenges faced by the nation. OCI is vital and must continue. The OCI program is doing very well given the constraints it faces; the program staff face the impossible situation of trying to meet genuine needs with insufficient resources.

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

1. Management of the program.

Comments:
 The program management is highly dedicated to the vision and mission of OCI, and has been doing an excellent job of in carrying forward the long-established mission coming out of CISE (high-performance computing and networking) as well as building the missions in data, virtual organizations and workforce development. Indeed, their efforts overall have been heroic. Therein lies the real risk facing NSF. OCI cannot continue through heroic efforts. Ideally, the heroic investment of effort made thus far will be matched with sufficient resources to deliver on the vision and mission that mobilized the heroism, thereby making the early heroic effort worthwhile and the hope of achieving the vision real. Alternatively, the resources will not rise to the need, and one or both of two problematic outcomes will ensue. In one, the expectation of the vision will continue without sufficient resources, leading to burnout of the staff and eventual failure in expectations, probably permanently damaging OCI as an office. In the other, more rational outcome, the vision

will be scaled back to fit the resources available. The downside of this outcome is that the core work of OCI would probably default to the long-established NSF role of building/maintaining high-performance computing facilities, losing the vital attention to the other areas of networking, data, virtual organizations and workforce development essential to the success of the cyberinfrastructure vision over the long run.

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

Comments:

The program has been more than responsive; it has been creating those opportunities. The whole concept behind OCI's programs is to enable a new and powerful era of science and engineering, one that has the potential to transform research and education. The program's management has done an excellent job of pursuing these opportunities.

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

Comments:

Program planning and prioritization is handled very well by the management team, and the resulting portfolio is particularly impressive given the constraints on resources.

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

Comments:

The 2005 COV occurred before OCI was created. It is not easy to determine the responses of OCI to an organizational structure that no longer exists. One point worth noting is that earlier COVs recognized the serious staff shortage for managing projects of the size and complexity involved in cyberinfrastructure. That staff shortage still exists and is a source of continuing difficulty in OCI meeting its objectives. This is particularly problematic in that many OCI projects require considerably more project management than regular research awards.

5. Additional comments on program management:

None

PART B. RESULTS OF NSF INVESTMENTS

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:

There is no question that OCI fosters research that advances the frontier of knowledge. It does so by creating and sustaining essential infrastructure for research, but also by participating directly in that research. The precursor organizational structure to OCI located in CISE has played this role for decades, and the role continues in OCI. The important question is whether OCI is, itself, a research organization. It is the view of the COV that OCI must be a research organization as well as a research infrastructure organization. It is not possible to create cutting-edge research infrastructure, especially infrastructure that will transform research, without active and deep engagement in the research itself. To some degree OCI's engagement with research occurs almost automatically through interactions with programs within the major research directorates. This was true when cyberinfrastructure was located in CISE. However, this mechanism does not work as well as it could due to fragmented funding mechanisms that segregate infrastructure from the research, as well as ongoing challenges of disciplinary stove-pipes that separate key communities from each other. If the vision for transformative research from cyberinfrastructure is real – and the COV thinks it is and should be – considerable and sustained effort must be devoted to bridging remaining divides between the infrastructure programs and research programs. Cyberinfrastructure initiatives have

already been remarkably successful at building interdisciplinary teams containing individuals at the cutting edge of research fields and cyberinfrastructure to support and transform research. Finally, the infrastructure itself is a direct and immediate product of ongoing research. Unlike most realms of infrastructure, cyberinfrastructure is special in that it is tightly coupled to the research frontier and must be updated constantly to remain effective. In the case of data management, virtual organizations and workforce development, the creation of new capability is a kind of research in its own right. The OCI management has done an excellent job of handling the challenges inherent in this situation, but the challenges remain daunting.

The COV points to one example among many of how OCI has stepped up to the challenge thus far. The Track I and Track II infrastructure programs provide essential hardware, but this hardware by itself cannot be expected to foster cutting-edge research. Complementary assets in the areas of networks, applications, and collaboration support are required. The investments in the International Research Network Connections are addressing networking needs. The PetaApps program is attending the challenge of applications. The Virtual Organizations initiative is addressing the collaboration needs. However, as mentioned elsewhere in this document, the resources required to meet these needs are far from secure. This latter point remains a central concern of the COV. Failure to address this will result in major opportunity losses.

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:

This is one of the most important objectives for OCI and for NSF’s investment in OCI. There is evidence that OCI can have major effect in this area in the CI Team initiative, which has been highly successful. Other initiatives, such as the recent creation of the first Masters program in cyberinfrastructure, point to the promise for OCI.

There is a major challenge with respect to the pipeline. As cyberinfrastructure becomes essential to sciences and engineering, it will be necessary to begin educating students earlier in the essentials of computational approaches. This faces major bootstrapping problems given the lack of expertise available to create appropriate curricula and populate the instructional programs. In addition, curricula for science and engineering programs are already filled with requirements established over the years, and that have constituencies that are not readily willing to give up their slots to accommodate cyberinfrastructure instruction. The transformative challenge that OCI attempts to address is threatening to the existing order.

The question of broad inclusion remains a concern. In addition to the aforementioned issues in broadening participation, there is a question of whether OCI’s programs have engaged international efforts in cyberinfrastructure as aggressively and beneficially as they might. Similarly, the great promise for increased citizen engagement in science and engineering will falter unless it is addressed by sustained and effective effort that will include extensive workforce development. Three examples are relevant.

Acevedo is a CI Team demonstration project that engages local governments, teachers and students in cyberinfrastructure for environmental monitoring and modeling. The projects integrates research and education activities of multiple stakeholders using a wireless sensor network to monitor soil moisture in a watershed. A web portal supports modeling and analysis tools as well as educational modules. Stakeholders are trained in wireless sensor use and deployment, database use and documentation, analysis and modeling, and environmental decision making. The project prepares next-generation scientists and engineers, policymakers, and general citizens for use of cyberinfrastructure for immediate needs.

Nanohub is a science gateway that provides simulation tools used in nanotechnology. It integrates the tools, resources and communities in ways that permit users such as teachers to develop and provide through the gateway their lesson strategies and plans for use by others. It is connected to the Teragrid and provides simulation support that allows real-time demonstration of research work for instruction. It has been taken up as a general model for other research communities wishing to exploit cyberinfrastructure for learning. It is also a leveraged investment, bringing resources from many players.

The International Research Network Connections project allows partners from around the world to join in construction of global research networks that facilitate collaboration in science and engineering research and education. OCI led the way in creating the model and providing initial funding. To date, other countries have contributed fifteen times the original OCI investment in developing and extending the network.

Unfortunately, the success of CI Team is overshadowed by the fact that CI Team initiative is being discontinued because of insufficient funding. This is but one instance of the ongoing concern the

COV notes with respect to funding for the full vision of OCI. As noted earlier, the comprehensive vision for OCI is aimed at providing all of the complementary assets required to produce the great benefits promised by cyberinfrastructure. Failure to address all of these complementary assets will result in large opportunity losses. The promise in learning could be the first casualty unless increased investments are made in this specific area.

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:

OCI directly engages one of the most perplexing challenges facing science and engineering research and education: the explication of and understanding of the role of infrastructure in advancing knowledge and learning. Infrastructure itself is not new, but the explicit labeling of infrastructure is new. Many fields of science and engineering have incorporated infrastructure into the heart of the work for decades, in the form of specialized laboratories, instruments, sailing vessels, aircraft, spacecraft and so on. These have been seen as simply part of the research endeavor, indistinguishable from the work itself. They have not been thought of as infrastructure. Those fields of science and engineering have not thought about the peculiar nature of infrastructure and the challenges of infrastructure sustainability. The practical consequence of this for OCI is that, by calling out cyberinfrastructure as a special focus, infrastructure is seen to be something new and different from what the sciences have been doing all along. Infrastructure is often seen as in direct competition with research instead of an essential and inseparable part of research. This has practical consequences for OCI.

Directorates have long paid for infrastructure essential to the research objectives of given fields without explicitly calling such investments “infrastructure.” They balk at the idea of paying for cyberinfrastructure for their fields because such infrastructure competes with real research. This mistaken notion is reinforced by the budgeting conventions of NSF that assign to directorates the resources to pay for such hidden infrastructure, while assigning to some other entity such as OCI the resource to pay for overt infrastructure. Of course, this is direct NSF support for the research programs that make use of cyberinfrastructure provided by OCI, but the research programs do not see that support as “their” money. Their money is for research; OCI’s money is for cyberinfrastructure to support their research. This sets up an artificial and destructive pattern of conflict over who should pay for what. As long as cyberinfrastructure was limited to a few fields of research and/or was not essential to the core research of any field, this problem was manageable. As cyberinfrastructure has become increasingly vital to many fields, the problem becomes serious. Under normal budgetary conventions, this problem would be addressed by the directorates shifting resources from lower-value uses toward higher-value cyberinfrastructure uses. Under the cyberinfrastructure model the directorates are reluctant to spend their money on essential cyberinfrastructure under the expectation that OCI will simply pay for it. In an expanding-sum game it might be acceptable among the directorates for the NSF leadership to simply allocate the necessary resources to OCI to meet the needs. In a zero-sum game this is not politically tractable: the directorates are unlikely to give up resources so OCI gets more.

A possible remedy would be to place all the resources of OCI in the directorates, and let the directorates sort things out. However, in addition to the obvious problem of figuring out how much each directorate should get, this remedy would lose the substantial economies of scale that come from creating resources such as the Track I and Track II sites. In principle, the directorates could get together and build common resources, but given the difficulty of getting the directorates to

cooperate with significant investments in OCI, this outcome would be doubtful. In addition, this distributed remedy would set back significantly the opportunity to treat cyberinfrastructure comprehensively, including building and sustaining the complementary assets in networking, virtual organizations and workforce development. Each directorate would have an incentive to sit-out such investments, hoping that other directorates would make the required investments and provide opportunities for free riding. In short, the long-established tradition of treating cyberinfrastructure as a community level activity (first in the supercomputer centers of the early 1980s, then in CISE, and now in OCI) was and is the right way to go. The problem is in creating the right mechanisms to align interests across the directorates and OCI.

As a practical example of this problem, consider the current budgetary dynamics. OCI and one or more directorates might share a vision about what new capabilities are needed. They might all agree that OCI should take the lead on developing those capabilities, perhaps with direct participation from the directorates. However, unless there is an effective and binding mechanism to ensure sufficient resources for the effort – either through direct NSF funding of OCI or through contributions from the directorates – the endeavor will falter. Such contracting must happen up-front, before substantial investments are made, or OCI will be left holding the bag. Only a few incidents of this will cause OCI to become significantly less aggressive about partnering with the directorates.

It should be noted that the experience of OCI should inform other infrastructural activities of NSF and other research funding organizations. Cyberinfrastructure is not the only kind of infrastructure that benefits from collaborative strategies. The development of new infrastructures creates the need and the opportunity to develop new ways of doing science and engineering research and education. These are disruptive, and often result in considerable turmoil. OCI is at the leading edge of this phenomenon. OCI is, itself, a kind of experiment for creating new and better ways of developing infrastructure to support work on new frontiers and the creation of new ways of doing such work.

PART C. OTHER TOPICS

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

The complementary assets beyond HPC are at risk due to insufficient funding. The HPC trajectory is well established from decades of support and experience in CISE. The newer areas are less well developed, and are, in effect, competing with HPC for the scarce resources. This is a bad situation and needs attention.

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.

Previous statements address the challenges OCI faces.

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

NSF should take the innovation of OCI very seriously. OCI is not merely a convenient organizational strategy for service provision. It embodies the changes underway in the very conduct of science and engineering research and education – a fundamental transformation. The creation of OCI was a good step, but much more needs to be done.

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

The OCI staff has done an heroic job in difficult circumstances, and deserves special commendation. The staffing levels remain a serious concern.

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

The COV template used here appears to have been developed for more traditional research programs, and does not include questions particularly relevant for the innovations embodied in OCI. Revision of the template is recommend. Otherwise, the COV process is effective. The data management and records systems are quite supportive. The COV recommends against NSF moving to grants.gov

SIGNATURE BLOCK:

For the Office of CyberInfrastructure COV
John King
Chair

OCI COV Members

First Name	Last Name	Institution	COV Working Group	Area of Expertise
John	King	University of Michigan	Chair	Information and Computer Science
Bob	Borchers	Maui High Performance Computing Center	HPC	HPC
Roscoe	Giles	Boston University	HPC	Center for Computational Science
Thuc	Hoang	DoE NNSA	HPC	HPC
Valerie	Taylor	Texas A&M University	HPC	HPC
Geoff	Bowker	Santa Clara University	LWD& VO	Center for Science, Technology and Society
Abhi	Deshmukh	University of Massachusetts - Amherst	LWD& VO	Virtual Organizations
Ann	Gates	University of Texas at El Paso	LWD& VO	Software Engineering
Linda	Hayden	Elizabeth City State University, NC	LWD& VO	Center of Excellence in Remote Sensing Education and Research
Alan	Blatecky	UNC	Networking, Middleware & Data	Middleware and Networking
Ron	Hutchins	Georgia Tech	Networking, Middleware & Data	educational collaboration technologies; high speed large-scale network design and management
Mary Ann	Scott	Retired	Networking, Middleware & Data	Networking

OCI COV Members

Email	Phone Number	Submitted to OCI in last 5 years	ACCI	Male	Female	Minority	MSI	EPSCoR	East	West	Mid-west	South
jlking@umich.edu	(734) 764-2571	No	X	X							X	
bob.borchers@mhpcc.hp.c.mil	(703)627-3749	No		X				X		X		
roscoe@bu.edu	(617)353-6082	Yes		X		X			X			
Thuc.Hoang@nnsa.doe.gov	202-586-7050	No			X				X			
taylor@cs.tamu.edu	979/845-5820	Yes			X	X						X
gbowker@scu.edu	(408)551-6058	Yes - Pending		X						X		
deshmukh@ecs.umass.edu or deshmukh@tamu.edu	cell: (413) 265 3500	No		X					X			
agates@utep.edu	915-747-6952	Yes	X		X	X	X					X
haydenl@mindspring.com	(252) 335-3696	Yes			X	X	X		X			
blatecky@unc.edu	919-445-9643	Yes - Pending		X					X			
ron.hutchins@oit.gatech.edu	(404)894-6729	No		X								X
ma.scott2@verizon.net	301-515-8984 or cell: 240-604-6385	No			X				X			

OCI COV Members

Website
http://www.si.umich.edu/people/faculty-detail.htm?sid=220
http://www.mhpcc.hpc.mil/
http://ccs.bu.edu/
http://www.cs.tamu.edu/people/faculty/taylor
http://www.scu.edu/sts/about/leadership.cfm
http://www.ecs.umass.edu/mie/faculty/Deshmukh.htm
http://faculty.utep.edu/Default.aspx?alias=faculty.utep.edu/agates
http://nia.ecsu.edu/nrts/lhayden/haydenresume.html
http://www.renci.org/about/leadership.php

National Science Foundation
Office of Cyberinfrastructure
4201 Wilson Boulevard, Room 1145
Arlington, VA 22230



TO: Ed Seidel
Office Director, OCI

FROM: José Muñoz
Deputy Office Director, OCI

DATE: December 11, 2008

SUBJECT: Report on Diversity, Independence, Balance, and Resolution of Conflicts
for the OCI Committee of Visitors

This is my report to you on the diversity, independence, balance, and resolution of conflicts of the Committee of Visitors (COV) for the Office of Cyberinfrastructure (OCI) held from April 1-3, 2008.

The COV, which was assembled to review OCI programs, and whose report was presented to the Advisory Committee for Cyberinfrastructure (ACCI) on May 15, 2008, consisted of twelve (12) members, of whom seven (7) were male and five (5) were female. Three of the members of the committee were African American, and one was Hispanic.

Nine (9) of the COV members were from academia, one (1) was from a federal agency, one (1) from a High Performance Computing Center, and one (1) is retired. The members' expertise reflected the research areas of OCI which include: High Performance Computing, Networking and Middleware, Data, Virtual Organizations, and Learning and Workforce Development. All invited COV members attended the meeting.

The Chair of the COV, John King, is the Professor and Vice Provost for Academic Information in School of Information at the University of Michigan. Two (2) members were from Minority Serving Institutions, and one (1) was from an EPSCoR jurisdiction.

Five (5) of the COV members are individuals who at the time of the meeting had not been applicants to OCI in the past five years and did not at the time of the meeting serve on any NSF Advisory Committee. Most COV members were familiar with OCI from having served on the ACCI or OCI review panels, or are former or current grantees. None had proposals pending with OCI during the COV meeting. A conflict of interest briefing was held on the first day of the COV meeting. All COV members were required to complete the NSF Conflict of Interest form.

All academic members of the COV were barred from seeing proposals from their home institutions, and all noted conflicts were resolved by barring members from seeing specific proposals with which they had conflicts. No real or apparent conflicts arose during the course of the meeting.

Subject: Committee of Visitors (COV) for the Office of Cyberinfrastructure (OCI) to be held at the National Science Foundation (NSF) on April 1-3, 2008

Date: Tuesday, February 19, 2008 1:48 PM

From: Munoz, Jose L. <jmunoz@nsf.gov>

To: Abhi Deshmukh <deshmukh@ecs.umass.edu>, "Aikens, Crystal R." <caikens@nsf.gov>, Alan Blatecky <blatecky@unc.edu>, Ann Gates <agates@utep.edu>, Bob Borchers <bob.borchers@mhpcc.hpc.mil>, Geoff Bowker <gbowker@scu.edu>, "Hayden, Judy A." <jhayden@nsf.gov>, John King <jlking@umich.edu>, Linda Hayden <haydenl@mindspring.com>, Mary Ann Scott <ma.scott2@verizon.net>, "Munoz, Jose L." <jmunoz@nsf.gov>, Ron Hutchins <ron.hutchins@oit.gatech.edu>, Roscoe Giles <roscoe@bu.edu>, "\"Hoang, Thuc\"" <Thuc.Hoang@nnsa.doe.gov>, Valerie Taylor <taylor@cs.tamu.edu>, "Whitson, Carmen A" <cwhitson@nsf.gov>

Conversation: Committee of Visitors (COV) for the Office of Cyberinfrastructure (OCI) to be held at the National Science Foundation (NSF) on April 1-3, 2008

Thank you for agreeing to serve on the Committee of Visitors (COV) for the Office of Cyberinfrastructure (OCI) to be held at the National Science Foundation (NSF) on April 1-3, 2008. This letter appoints you to the Committee and provides additional logistical information.

The 2008 OCI COV is being chaired by:

Dr. John King, University of Michigan, jlking@umich.edu

CHARGE

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. 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 results generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals.

OCI has four thematic areas: High Performance Computing, Data, Virtual Organizations and Learning and Workforce Development. All OCI awards and declines completed in FY05-FY07 will be under consideration.

LOGISTICS

A continental breakfast will be available beginning at 8:00 AM on April 1, 2008 in Room 530 at the National Science Foundation, 4201 Wilson Boulevard, Arlington, Virginia. The meeting will convene each day at 8:00 AM in the same location. Please pick up your badge from the security desk in the Visitor and Reception Center, on the first floor North lobby, prior to reporting to the meeting. Directions to NSF may be found at this website: <http://www.nsf.gov/home/visit/visitjump.htm>.

An email with all of travel information was sent in mid January. If you have any questions about your travel please contact Crystal Aikens at caikens@nsf.gov or 703-292-4562.

REQUIREMENT OF CONFIDENTIALITY

Before serving on the COV, you will be asked to sign the Conflicts-of-Interest and Confidentiality Statement for NSF Panelists (NSF Form 1230P - attached). NSF uses this form for both panelists and COV members even though there are some differences, explained below.

The NSF Form 1230P asks you to certify that you will not divulge any confidential information related to the content of proposals that you and other COV members may read and their review process. This form must be completed and returned prior to the COV meeting. Please email or fax to Crystal Aikens, caikens@nsf.gov, fax: 703-292-9060.

In addition, we ask that you treat all discussions prior to the submission of the official COV Report to the Advisory Committee as confidential. Your identity as a COV member will not be kept confidential. It is fine to put this valuable service to NSF on your CV. And it is also fine to discuss the report once it is public. We prefer that you not divulge the names of COV members until the report is public.

CONFLICTS OF INTEREST

NSF is very diligent in making sure that our COV members do not have a conflict of interest with the proposals they read. The conflicts rules for COV's are different from panel review. You may not read any proposals that you submitted yourself, any proposals for which you were a reviewer, any proposals from your own department, or any collaborative proposal from your own institution if it was the lead proposal (with some rare exceptions.) During discussions, everyone will avoid mentioning the names of reviewers as there may be people present who have conflicts with that proposal. When you determine that you have a conflict of interest regarding a specific proposal, you must immediately let the NSF officer in charge know.

These issues will be discussed in detail at the start of the COV meeting. If you have any questions, please let us know.

ADDITIONAL INFORMATION

Background materials for the meeting, including a detailed agenda and list of members, will be provided via a restricted website established for the COV. The URL and access information will be provided as soon as the website is available. If you have any questions regarding the substance, scope or structure of the COV, please contact Jose Munoz at jmunoz@nsf.gov, or Carmen Whitson at cwhitson@nsf.gov. You may also reach us by calling 703-292-8970.

We look forward to working with you on this important review of our activities. Again, thank you for agreeing to participate.

Jose L. Munoz, Ph.D.
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