

**Advisory Committee Meeting for
International Science and Engineering
June 16-17, 2005
National Science Foundation, Room 1295**

MEETING SUMMARY

Members Present:

Fred Roberts, Chair, Center for Discrete Mathematics & Theoretical Computer Science (DIMACS), Rutgers University, Piscataway, NJ

Jeanne Altmann, Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ

Julio C. de Paula, Department of Chemistry, Haverford College, Haverford, PA

Terry E. Jordan, Department of Earth & Atmospheric Sciences, Cornell University, Ithaca, NY

Melanie J. Loots, Associate Vice Chancellor for Research, University of Illinois, Champaign, IL

Tilahun Yilma, International Laboratory of Molecular Biology (ILMB), School of Veterinary Medicine, University of California-Davis, Davis, CA

Members Absent:

Bernard Amadei, Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder, Boulder, CO

Dorothy Anderson, Forest Resources, University of Minnesota, St. Paul, MN

Kenneth Prewitt, Carnegie Professor of Public Affairs, School of International and Public Affairs, Columbia University, New York, NY 10027

OISE and NSF Senior Staff Present

Kathryn Sullivan, Acting Director of OISE

Larry Weber, Acting Deputy Director of OISE

Kerri-Ann Jones, Senior Advisor, Office of the Director

The spring meeting of the Advisory Committee for International Science and Engineering (ACISE) was held at the NSF building in Arlington, VA on June 16-17, 2005.

June 16, 2005

Welcome and Introductions of the New Members and Staff

Dr. Fred Roberts, ACISE chair, called the meeting to order at 8:30 a.m. and welcomed the attendees. He asked that everyone present introduce himself or herself, and gave an overview of the agenda. Ms. Kathryn Sullivan, Acting Director of OISE, mentioned the role of the ACISE and the changes that will occur because the committee is now a full committee and no longer a subcommittee. The membership will increase to 15 people, meeting will be open to the public, and the meeting's proceedings will be captured in minutes which need to be approved by the committee. Ms. Sullivan discussed personnel issues and the recruitment for the new OISE Director; the FY06 NSF budget priorities of strengthening core research, cyber infrastructure, broadening participation, and organizational excellence; OISE FY06 budgetary investments including Partnerships for International Research and Education (PIRE), international research experiences, multi-lateral organizations, work in developing countries, broadening participation, human and social dynamics, biocomplexity and the environment, and cyber infrastructure. She also spoke of the actions that OISE has taken in response to the tsunami of December 2004.

OISE Program and Budget Update

Ms. Kathryn Sullivan presented slides giving a summary of OISE staffing, including the arrival of new staff members Mike Pritchard, Jennifer Slimowitz, Anne Emig, and Rick Nader; staff members heading overseas Junku Yuh, Bill Chang, and Christine Gallitzine; and departing staff members Kerri-Ann Jones, Alex DeAngelis, Christine French, Julia Moore, and Mande Holford. She detailed the merging together of the Western Europe and Eastern Europe and Eurasia programs to create one Europe and Eurasia program, and she mentioned the new name of the Global Initiatives program, formerly known as Trans-Regional Affairs. She discussed the new roles of Larry Weber (now Acting Deputy Director of OISE), Rose Gombay (now Program Coordinator of Global Initiatives), Frances Li (now Program Coordinator of East Asia and Pacific), Libby Lyons (now Program Coordinator for Africa, Near East, and South Asia), and Alexandra Stepanian (now Program Coordinator for Europe and Eurasia.)

Ms. Sullivan discussed the budget cycle and reiterated NSF's FY 2006 budget priorities. She presented a break down of the NSF FY06 budget request and stated OISE's FY06 priorities of promoting research excellence through international collaboration and providing U.S. students and early-career scientists and engineers with international research and education experiences. Ms Sullivan reiterated the OISE FY06 budgetary investments and reported on recent developments within OISE, including the development of the PIRE program, the response to the tsunami, the newsletter OISE Weekly, NSF's testimony on China, the re-establishment of the International Directors' Roundtable, the Committee of Visitor's (COV's) website, the proposed new National Science Board (NSB) international report, and the nomination of Kathie Olsen of the

Office of Science and Technology Policy (OSTP) to replace Joseph Bordogna as Deputy Director of NSF.

Update on Partnerships for International Research and Education

Dr. Ed Murdy, Senior International Analyst in OISE, gave an update on the PIRE program, a pilot program supported this year by OISE. He presented the program's objectives:

- Support research/education of the highest quality
- Support strong international collaborative research
- Provide international research experiences for U.S. students and faculty
- Engage resources across U.S. institutions that will contribute to strong international partnerships
- Develop new collaborative models for international research and education
- Raise the profile of international collaborative research and education within the U.S. community.

The program has a maximum award size of \$500K per year for five years. In FY05, OISE has dedicated \$5 million to this program, enabling OISE to support up to ten awards. He presented the value added of this approach, citing the key NSB recommendation from the NSB International Report NSB 01-187. Dr. Murdy presented data from the proposals received by the March 10 deadline:

- 188 proposals received, with 14 subsequently withdrawn
- All of the regions of the world represented, with 48 proposals in (primarily) Western Europe, 46 in East Asia and the Pacific, 32 in Africa, Near East, & South Asia, 27 in the Americas, and 21 in Central and Eastern Europe. Since many proposals involve collaboration with more than one country, these numbers are approximations.
- All of the NSF directorates were represented as well: 55 in Engineering, 38 in Geosciences, 29 in Mathematics and Physical Sciences, 23 in Biological Sciences, 14 in Social, Behavioral, and Economic Sciences, 13 in Computer and Information Sciences and Engineering, one in Education and Human Resources, and one in the Office of Polar Programs.

The proposals were ad-hoc reviewed this spring, and they will be reviewed by a panel of experts on June 27-29, 2005. Awards will be made in August or September. This program engages the entire NSF, as nominations for reviewers and panelists were requested from the research directorates, NSF program officers are invited to the panel sessions, and the proposals represent a co-funding opportunity for the disciplinary programs.

Several committee members asked Dr. Murdy questions about the PIRE program. Dr. Roberts asked if OISE staff had looked at the proposals to assess the inclusion of women or minorities, and Dr. Murdy replied that this had not been done yet. Dr. Altmann asked if OISE received the truly different models that were hoped for, and Dr. Murdy replied that the proposals received were truly across the spectrum – some new things, some things that had been seen before. Ms. Sullivan mentioned that each Ph.D. granting institutions was limited to the submission of one PIRE proposal, and that since the

funding rate for this program will be so low (around 7%), OISE needs to determine the right balance of an appropriate success rate, providing the community what it needs, and operating in a time of flat budgets.

Dr. de Paula asked about the breakdown between graduate and undergraduate student participation in the proposals, and Dr. Murdy responded that most proposals include graduate students and postdocs, while some also include undergraduate and K-12 students. Dr. Roberts inquired about the distribution of the budget size, and Dr. Murdy replied that most proposals requested \$2.5 million over five years, but some requested smaller sums of money. Dr. de Paula asked if another call for proposals is planned, given the interest, and Dr. Murdy replied that it might be possible in FY07, perhaps with a preproposal process.

Presentation of OISE 2005 Committee of Visitors Report

Dr. Melanie Loots is the member of the ACISE who also sat on the Committee of Visitors (COV). She began by thanking OISE and mentioned the COV was extremely happy with the operations, management and impact of OISE. Dr. Loots went through the COV recommendations one by one.

Recommendation 1: We recommend that OISE staff ensure that these international reviewers understand NSF's scientific merit and broader impact criteria. Letters to all referees should clearly state the additional criteria for review of international projects proposed for OISE funding.

The COV did not always see the attention paid to the broader impact criteria that it thought should be there.

Recommendation 2: We recommend that OISE work to increase the number of minorities and women supported and capitalize on the opportunities provided by international collaborations with developing countries.

The COV was happy to see that OISE's numbers with regard to women and minorities were good relative to all of NSF, but the numbers are still too low.

Recommendation 3: NSF's Enterprise Information System (EIS) needs improvement, generally and for OISE in particular. For OISE, there is need to track leverage statistics on co-funded projects, international activities embedded in the proposals of other directorates. For NSF generally, there is need to ensure that program officers and staff do a better job of coding information and that FastLane be modified to adequately capture reviewer demographics.

In order to support and grow OISE, there is a need to document amounts of money that are leveraged on co-funding projects.

Recommendation 4: The COV recommends that OISE develop a mission statement and action plan that recognizes the increasingly international character of knowledge

creation and research activities. The action plan should be articulated throughout NSF and to the scientific and engineering community.

Recommendation 5: OISE needs to be proactive in maintaining U.S. international presence and leadership. OISE should identify centers of scientific and engineering excellence abroad and establish or strengthen connections. Creative mechanisms for redirecting scientific talent to the US should be developed.

OISE should act to ameliorate the current negative view that many foreign scientists hold of the United States.

Recommendation 6: During this period of transition, OISE staff must work to educate the rest of NSF about the need to identify and continue to fund these opportunities [small cooperative grants]. As OISE shifts its focus to a smaller number of larger awards, it must develop an action plan to promote its stated mission of “a foundation-wide vision of international research and education” within other NSF directorates. We urge that both OISE and NSF as a whole work together to find means to continue funding of these small awards, preferably via OISE, given its regional connections, expertise and stated mission of funding junior investigators.

Dr. Altmann asked if the COV felt that there was a need for these activities to be funded by NSF, as one might argue that giving little awards is not necessarily the most efficient way to operate. Dr. Jones brought up the fact that the small awards mean different things to different people, and that the COV thought the “start up award” seed money would be important to keep. Ms. Sullivan mentioned that in response to the planning visit and workshop solicitation, OISE has seen a broad spectrum of activities coming in, including planning visits and on-going collaborative activities that are called “planning visits” for the purpose of the proposal. OISE will look at what it has received this year, analyze what it means, and see if there are mechanisms by which to meet the needs of the community without going back to the \$3K award. Dr. Loots emphasized that the COV appreciates the dedication and hard work of OISE staff, but that the correspondence involved in the processing of a \$3K grant is unbelievable.

Recommendation 7: (also Recommendation 2) During this transition in the OISE Program, we recommend that the partnerships with developing countries be preserved and expanded as an integral part of the structure of the program and allocation of funds.

Recommendation 8: Evaluation of the [OISE] program would be facilitated by routine requirement of final reports and follow up with the PI regarding post-award progress. We recommend that annual reports and periodic site visits be required for large grants.

Dr. Roberts mentioned that it would good to see how the rest of the Foundation accomplishes this task.

Recommendation 9: A system of tracking the future success of fellowship recipients [should] be developed. We encourage OISE to seek mechanisms to shorten the dwell

time. OISE should consider allocating and seeking additional resources to preserve and increase the funding rate for this program [IRFP].

Ms. Sullivan mentioned that the Swedish science funding foundation tracked their fellows funded over the last 15 years. It took multiple years and people visiting towns and knocking on doors to accomplish this. This type of endeavor is not feasible for NSF. Susan Parris and Tony Teolis participate in an interagency working group dealing with this matter. Several committee members brought up the examples of NIH and HHMI's tracking systems, and Dr. Roberts pointed out that there is no way of doing tracking that is not time consuming and expensive. Ms Sullivan mentioned that it might be possible to track individuals who have received IRFP's in the NSF PI database, determining when they apply for and receive subsequent awards.

Recommendation 10: The COV encourages NSF leadership to shield the OISE discretionary budget from these demands to the extent possible [obligations to multilateral organizations].

Recommendations 11 – 14: [to improve tracking and monitoring of awards]

OISE should identify the extent to which OISE is leveraging co-funding and the extent that international activities are embedded in the proposals of other directorates.

NSF in general should ensure that program officers and staff do a better job of coding information and that FastLane be modified to adequately capture reviewer demographics.

OISE should continue to maintain a balance between junior/senior PI's, diversity, discipline, and geographic distribution. We recommend that awards be tracked according to discipline, geographic location, and type of award.

OISE efforts to leverage funds from non-NSF sources to support collaboration with developing countries should continue and expand (this should include other governments, private foundations and individuals). The success of such efforts should be tracked and evaluated.

The committee members discussed the age of awardees, and Dr. Roberts mentioned that there is a gap between the CAREER award and the next receipt of funding.

Recommendation 15: (also Recommendation 1) The COV recommends that OISE staff ensure these international reviewers understand NSF's scientific merit and broader impact criteria. Letters to all referees should clearly state the additional criteria for review of international projects proposed for OISE funding.

Dr. de Paula commented that he is not sure that even domestic reviewers understand the broader impacts criteria, and Dr. Altmann responded that it has been improving by leaps and bounds in the past several years.

Recommendation 16: (also Recommendation 2) The COV recommends that OISE work to increase the number of minorities and women supported and capitalize on the opportunities provided by international collaborations with developing countries.

Recommendation 17: The dwell time should be improved [for OISE in general].

Dr. Altmann asked how much of the length of dwell time is compounded by the issue that the budget gets approved later and later every year? Ms. Sullivan answered that it definitely creates difficulty. Program officers will hold proposals with the hope that they can fund it, or they may make a decision to decline things they might later wish to fund. Dr. Yilma remarked that it wastes time for the PI.

Recommendation 18: The office should articulate in more detail the value and scope of these [non-award] activities to the rest of NSF, the scientific and engineering community, and the US government.

Recommendation 19: The COV recommends that these [non-award] activities be quantified and evaluated since they are such a large and important part of the work of OISE.

Recommendation 20: Allocation of adequate funds for travel is important to the proper function of OISE.

Recommendation 21: OISE should make efforts to disseminate information systematically on its evolving role and programs throughout NSF.

Recommendation 22: The COV recommends that OISE Program Officers consider adopting some of the best practices developed by Program Officers with experience in managing large ongoing collaborative projects (such as the MRSEC's).

Recommendation 23: The COV recommends that the OISE director be included in the NSF Assistant Directors' Meeting to facilitate needed communication with the rest of NSF and participation in priority setting and budgetary discussions.

Recommendation 24: It is important that all efforts be made to identify and select a new director in a timely manner.

Many thanks from the committee to the OISE leadership and all of the staff. We continue to be very impressed with the programs and the dedication of the staff and the good work.

Dr. Roberts thanked Dr. Loots for serving on the COV. It is the role of the ACISE to accept or comment on the COV report and OISE's response to the COV report.

****The committee took a short break****

Dr. Roberts asked for overall comments, and options were discussed as whether to go through the report recommendation by recommendation or take another approach. Dr. Altmann said that she was impressed by the work involved and the quality of the report, and that she would favor the AC's commenting on how some goals can be met without adding more person-hours. Dr. Roberts then asked Ms. Sullivan about staffing levels in the office.

Ms. Sullivan replied that staff splits their time 50-50 between programmatic activities and non-award activities. The staff is stretched, and OISE has been recruiting new staff to replace retirees, but they are not fully on board yet. Also, some staff are on detail out of the office, as in general, rotations out of the office are good and important opportunities for the individual and the office. There is a good deal more work as a result of the PIRE program. The work to cofund or add supplements to existing awards is labor intensive. On the non-award side, visitors, the tsunami, and Dr. Bement's increasing number of meetings and invitations have brought on additional responsibilities. The overseas offices are a major expenditure and require a large office administrative workload.

Dr. de Paula asked about other types of employees – rotators, for example – and Dr. Sullivan replied that there are many different types of rotators (visiting scientists, IPAs, fellows, temporary federal employees) and that each has with it different costs. Dr. Altmann mentioned that it might be possible to bring on more staff in creative ways, for example using SRS to collect data or taking advantage of IT programs. Dr. Jordan asked if there was anything in the COV report that calls for the scaling back of some activities, and Dr. Loots responded that all of the recommendations spoke about doing more, not less.

Committee members discussed ways to group or prioritize the recommendations in their letters to Ms. Sullivan. There will be three documents that the ACISE produces: a letter to Ms. Sullivan accepting the COV report that will be forwarded to Dr. Bement and available to the public, a letter to Ms. Sullivan that is not available to the public, and a meeting summary that will be available to the public.

Recommendations 1,3,6,8,9, and 12 were highlighted as steps that would require a considerable amount of staff labor. Dr. Roberts suggested grouping the recommendations into three categories: high priority, middle priority, and low priority. Dr. Jordan recommending putting all of the data-related recommendations together. Ms. Sullivan mentioned that some recommendations were directed to the office's programmatic functions, some to non award activities, some to its role within the foundation, and some to personnel resources. This may be another way for the AC OISE to group the recommendations in order to address them.

Ms. Sullivan mentioned that the data issue is important to OISE, because it enables the office to determine where its investments lie and what it is accomplishing. Dr. Marburger talked about the science of tracking and measuring science in April. It will become a

larger need as we go forward. For OISE to have a strong case to justify or change what it is doing, data is required.

Ms Sullivan stated that she would like the OISE's role addressed in terms of integration within the Foundation and leveraging investments with offices inside and outside of NSF.

At noon, the group agreed to break for lunch.

***Working Lunch: Developing Country Activities
Developing Countries Team***

Dr. Elizabeth Lyons, Program Coordinator, ANESA Program began the report on developing countries activities by introducing her team which include Dr. Harold Stolberg, Ms. Bonnie Thompson and Ms. Cassandra Dudka. Ms. Dudka began the presentation by explaining how the Developing Country Activities (DCA) team defines a developing country. The DCA team has developed a definition of developing countries that allows for expansion and refinement in the future. Identifying developing countries that have the potential for leading to progressive scientific research opportunities for OISE and NSF require multiple criteria and flexibility. The DCA team has identified a broad range of countries, some of which have NSF counterpart science funding agencies. Ms. Dudka also noted that all OISE regions have developing countries.

NSF's role in working with developing countries is formed in part from the National Science Board's 2001 Report. The report recommended that NSF should encourage and facilitate Science and Engineering research and educational collaboration and partnerships with developing countries. As a result research directorates make the most of the research awards in developing countries.

NSF also works in developing countries via exchange of personnel and Embassy Fellows. The Embassy Fellows Program (EFP) is sponsored by OISE and it is credited for its success in allowing NSF research personnel the opportunity to visit and conduct research in locations that might otherwise not be accessible. Ms. Sullivan noted that although the EFP is a Department of State driven program in actuality the host country sometimes approaches a U.S. embassy overseas to get someone from NSF for the EFP.

OISE's fundamental operating principles for cooperation with developing countries consists of intellectual collaboration, educational opportunities and best science practices. OISE funds catalytic activities for research and many student activities in developing countries. In particular, several of the Partnerships for International Research and Education (PIRE) program proposals involve developing countries.

The 2005 Committee of Visitors recommendations to the DCA team encouraged capitalization of opportunities with developing countries and preservation and expansion of partnerships with developing countries. Ms. Dudka explained that collaborative and educational activities with developing countries are normally based on everyday problems and in certain cases the United States Agency for International Development (USAID) also provides funding for these types of programs.

Working with developing countries today presents OISE with unique problems that prevent fast adoption of the COV recommendations. On the NSF side there are budget limitations and a lack of developing country dedicated funds. Developing countries themselves have uneven resources and uneven infrastructure such as limited cyber infrastructure, which hinders opportunities for new and expanded networks.

Dr. Lyons approached these difficulties by stating that the word catalytic represents OISE's efforts to find foreign researchers and send US students to international locations. She then mentioned a range of activities that involve developing countries. Dr. Stolberg joined by stating that one of the proofs of OISE's efforts is that the Pan-American Advanced Studies Institutes Program (PASI) program is provided in cooperation with BIO and MPS.

Dr. Stolberg presented information explaining the role OISE has played in the materials network. At the beginning of reaching out developing countries U.S. scientists and engineers use planning visits and workshops to establish collaborative relationships. PASI's are short courses of two to four weeks duration at the advanced graduate and postgraduate level. PASI's build on planning visits and workshops by disseminating advanced scientific knowledge and stimulating training and cooperation among researchers of the Americas in the basic sciences and engineering fields. Currently, only institutes in any physical, mathematical, biological science discipline and/or engineering fields may be supported. Whenever feasible, an interdisciplinary approach is recommended.

The Africa, Near East, and South Asia (ANESA) region includes a large number of countries across three continents. Activities focus on human resource development and capacity building in research and education. Participation of junior investigators from both the United States and the host country is strongly encouraged. Topics that benefit from the region's unique biological, environmental, geological, anthropological, and cultural resources are of special interest. Proposals may combine research and education into one project, such as the REU (Research Experiences for Undergraduates) Site on Lake Tanganyika in Tanzania, coordinated through the International Decade for the East African Lakes (IDEAL). Other areas of regional interest include materials research, global climate change, natural resources management, and the International Long-Term Ecological Research (ILTER) Program.

Also at present OISE attempts to reach out to developing countries through parallel requests for proposals and co-funded activities in the Americas and Eastern Europe. In the future the DCA team will initiate RFPs with co-funded activities in Africa and East Asia and Pacific program. Furthermore, Dr. Lyons discussed the goal of establishing co-funding guidelines across the foundation. For example, proof of collaboration would be required in order for another directorate to receive OISE supplemental funds.

To expand developing country research Dr. Lyons explained the need to change what international proposals look like. OISE would foster joint programs and expand the PASI

to Africa. Additionally, OSIE will have to identify new NSF funding opportunities. Dr. Lyons noted that one of her roles is to increase number of proposals from the countries in the ANESA region. Developing country collaboration could also be expanded by broadening participation via outreach efforts. For example, North Carolina under represented institutes will be visiting NSF during the week of June 20 to learn about NSF funding opportunities.

Expansion could also be furthered by taking advantage of EHR programs and other programs geared toward serving underrepresented institutes. The NSF website also needs better information because Fulbright information is not enough to serve the community. One of the goals of the DCA team goals is to increase the community's knowledge through better distributed information.

Following the presentation, the committee had some time to present questions to the DCA team regarding the ways or vision for overcoming barriers to better collaboration with developing countries. One of the programs CISE offers makes awards to Americas based researchers for linking collaborators and data resources. However, there currently is no instrument for making links to African countries. In the future OISE may have established links between collaborators and data resources.

Dr. Stolberg explained that one of the things the DCA team is witnessing is money being put into to new resources. There is no permanency in many cases but in smaller countries a stronger effort for getting people to be trained is noticed. However, funds are limited. Improved connectivity is hoped for in the future. Dr. Stolberg concluded by noting that sometimes small awards are key to facilitating connectivity.

Dr. Roberts closed this session and noted that there were recommendations the committee may have for the DCA team and for them to return after 3:30 P.M.

Discussion with Dr. John Brighton, Assistant Director for Engineering (ENG)

Dr. Brighton began his presentation with a report on ENG international connections. ENG is a participant of the American Society for Engineering Education and actively promotes relationships and exchanges with China and Taiwan. ENG is also involved with the Network for Earthquake Engineering Simulation (NEES) collaboration with the Japanese National Research Institute for Earth Science and Disaster Prevention (NIED) E-Defense Shake Table.

NEES has become operational; there is a call for proposals in sensors and the cyber infrastructure theme has been established. The Small Business Innovation Research (SBIR) program has been reorganized and will operate as a separate office within ENG. There are now 15 NEES project sites in the U.S. and partnerships are underway with the Japan E-Defense shake table facility and with the Directorate for Computer Information in Science and Engineering (CISE). CISE is directing the cyber infrastructure theme within the Foundation and ENG is working with them to determine engineering needs in that area.

Dr. Brighton explained to the committee the Forces Driving New Structure of the ENG directorate. For past 15 years, ENG has had essentially the same organizational structure. Changing conditions have emerged such as: new research areas (Nano, bioeng., etc), national priorities (homeland defense), global competition in innovation. To remain at the frontier, ENG must evolve to address these changes

The external rationale for these changes include:

- Engineering education and research becoming more interdisciplinary, team-oriented, and collaborative
- Universities establishing centers, clusters, and cross-department divisions
- Industry adopting more interdisciplinary research paradigm

The internal rationale for these changes include:

- Strategic Thinking Group (STG) Report identified opportunities inline with new structure
- ENG has relatively large number of divisions, with relatively small budgets
- Divisions must have sufficient funds (at least \$100 million) to have major impact

Dr. Brighton then presented the proposed new structure of ENG. The new structure will enable ENG to:

- Position ENG at the frontiers of engineering, optimize interdisciplinary collaboration, integrate across priority areas, integrate research and education
- Support the continuum from discovery through to early engineering innovation
- Enhance flexibility for evolutionary change by combining some units
- Provide opportunities to explore new areas
- Strategically allocate human and financial resources

In order to implement the new structure Dr. Brighton discussed four scenarios:

- Scenario 1: Operational Effectiveness
- Scenario 2: Priority Led Matrix Structure
- Scenario 3: Cross-disciplinary Excellence on the Continuum from Discovery to Innovation
- Scenario 4: Aligning with Intellectually Stimulating National Priorities

As a result of further consultation a hybrid of scenarios 1 & 2 has been selected. The new structure will better position ENG to be more effective both inside NSF and externally. The new structure better aligns with STG Overarching Goals. The implications for engineering community include; new divisions with larger budgets will help improve success rate for ENG, Engineering Education and Centers will be more deeply ingrained throughout all divisions, multidisciplinary focus will more closely match trends in research and education and ENG will have greater flexibility to explore the frontiers of engineering research, education, and innovation.

Following Dr. Brighton's presentation, the committee presented some questions regarding the degree to which ENG and OISE interact with each other. Dr. Brighton

explained that interaction takes place through joint participation in meetings and there are plans for a meeting of the respective directors to determine a framework for further interaction. Co-funding activates are also a recurring function of interaction but no hard figures were available during the meeting.

The committee was interested to learn about priority areas where ENG is involved internationally and Dr. Brighton explained that there is rich interaction with GEO in the form of earthquake engineering and funding to research sites for construction of earthquake proof buildings. Engineering is especially interested in education. Collaboration between universities in the US and abroad do exist in part from funding of ENG. Dr. Brighton also noted that one of the better ways to work with researchers from other countries was to have U.S. researchers establish relationships on their own.

Dr. Jordan brought up the subject of ethics and how and why people have to trust what is engineered. She inquired if Dr. Brighton saw any particular challenge to the international aspect of the ethics issue. In response he noted that there were issues as an educator but not as a scientist. The ethics concerns come after collaboration. In particular he noted a higher rate of cheating occurs in foreign institutes versus the U.S. counterparts.

Dr. Brighton was then asked about his knowledge of research examples in ENG between the U.S. and developing countries. In response, Dr. Brighton noted that when the objective is to lift up a country, there are examples of engineering faculty interacting with developing countries.

Ms. Sullivan asked about what challenges exist to make policy changes happen. Dr. Brighton noted that there were numerous challenges, but the first is to get people together to learn about their priorities and figure out where groups think they are. The long view was putting together a set of principles to determine what guides decision making in foreign countries. This brought him back to reiterate ENG's engagement in studies listed in the presentation to determine the decision making process in foreign countries. In conclusion, he noted the importance of each party having a leadership team to interact with one another.

Presentation by Kathie L. Olsen, Associate Director for Science, Office of Science and Technology Policy (OSTP)

Ms. Sullivan thanked Dr. Olsen for attending the meeting, as it is the practice at AC meetings to invite speakers from outside of NSF. Ms. Sullivan mentioned that Dr. Olsen has been nominated to serve as Deputy Director of NSF.

Dr. Olsen asked the AC members to introduce themselves. She said that she would discuss why the White House views OISE as very important, and she will provide information about the budget and budget processes. She will discuss challenges that are unique to NSF, such as programs that are mandated from the White House but that NSF is required to support. Advisory committees incredibly important, and they should be as

critical as possible to make us better. Dr. Olsen gave a presentation with slides entitled “S&T Policy and the Internationalization of R&D.”

The U.S. economy has transformed from one based on agriculture, to one based on manufacturing, and now to one based on knowledge. The United States must think about the whole world in terms of the decisions it makes. The United States needs to have an educated workforce and a society knowledgeable about science, technology, engineering, and mathematics. Students should be encouraged to go abroad to do research.

- The extent of international collaboration on U.S. S&E articles increased in every NSF-sponsored field from 1998 to 2001
- Foreign patent applications in the U.S. have increased from 1989-2001
- Strong S&T job growth, increased competition for S&T talent in a global marketplace, globally shared challenges requiring international R&D efforts, mobility, and understanding and recognizing culture and diversity are challenges we all face
- We also have enhanced opportunities brought on by the internet, air transportation, growth of interdisciplinary science, growth of international capabilities, and federal and private programs enabling international exchange
- We must consider the international perspective to ensure strong R&D activities, attract and retain domestic and foreign scientists and engineers, and improve the U.S. innovation system

Dr. Olsen spoke about the role of OSTP, including advising the President and Offices of the President on matters of science and technology and coordinating interagency activities. Dr. Olsen spoke about the 2005 federal budget, with two priorities of “making our people safe” and “strengthening the economy.” In 2005, there was \$132 billion invested in R&D, up 44% from 2001. R&D as a share of discretionary spending is 13.6% of the President’s FY06 request, which is its highest share since 1968. In a historical view, the largest increase in R&D budgets in the 1960’s was in the space area, in the 1970’s in the energy field, in the 1980’s in defense, and in the 1990’s has been in health. OSTP oversees the President’s Council of Advisors for Science and Technology (PCAST) and the National Science and Technology Council (NSTC) to form a multi-pronged approach. Dr. Olsen explained the role of OMB and OSTP in the budget process, and described the new appropriations subcommittees in the Senate.

There are many globally shared challenges that require timely, innovative approaches:

- Space exploration (Cassini and Huygens)
- Human Health and Disease Prevention (Human Genome Project)
- Natural Hazards and Disaster Warnings (the December 2004 tsunami)
- Environment and Energy (global observations, climate, water, hydrogen, sustainable energy)

Dr. Olsen highlighted the Global Earth Observation System of Systems (GEOSS), a U.S. initiated plan with 50 nations collaborating.

Challenges and opportunities that lie ahead include

- Education and Workforce

- Encourage students to enter fields of science and engineering
- Increase science public literacy
- Student and scientist exchange programs
- Student visa issues.

NSF leadership in international activities include its role in

- International organizations like UNESCO, OECD, IIASA, GBIF (Global Biodiversity Information Facility)
- Country collaborations (U.S.-Mexico, U.S. Japan)
- Research collaborations (Human Frontier Science Program)
- Student exchange programs (East Asia and Pacific Summer Institutes).

Dr. Olsen closed her presentation with a list of why the internationalization of R&D is important:

- Perform to the highest standards of global excellence
- Maintain access to the frontiers of science
- Maintain access to leading scientific talent
- Augment human capital through visits & exchanges
- Leverage foreign capabilities
- Enhance science diplomacy
- Gain global support for global issues
- Discharge obligations negotiated in connection with treaties
- Increase prestige and influence with other nations
- Increase national security and economic prosperity through technology-based equity

Dr. Olsen accepted questions from the audience. Dr. Yilma asked why PI's often receive notices from NSF saying the approval of their grant has been delayed because the budget has not been passed. Dr. Olsen explained that when Congress does not pass the budget, NSF cannot fund new grants.

Dr. Jordan noted that the White House is supportive of international activities, but that OISE represents a tiny part of NSF, and the national need is very big. She is frightened that perhaps the White House thinks it is meeting the national need on the back of OISE. Dr. Olsen agreed that one needs to look at the broader role of international activities at NSF, not just OISE. She realizes that OISE has to handle the multi-lateral organizations. Ms. Sullivan commented that dues to multilateral organizations take up approximately 1/3 of OISE's budget.

The ITER project is something that is very important and involves several countries.

Dr. de Paula asked Dr. Olsen for her view of undergraduate research. Dr. Olsen mentioned the importance of starting young in both research and international experiences.

Dr. Jordan asked Dr. Olsen about student visas and deemed export policies impeding the progress of science. Dr. Olsen responded that OSTP does not deal with State Department warnings, but that export control is something of critical importance to OSTP. The Department of Commerce has been working closely with OSTP on this issue, and the presidential executive order has reinforced the exemption of fundamental research.

Ms. Sullivan brought up that these restrictions add another layer to the perception that the U.S. is unfriendly to foreign scientists and engineers. Dr. Olsen responded that this is true, and that other countries are using it to their advantage. Visa rules did not change after 9/11, the State Department just started enforcing them. OSTP needs to work with universities on this issue; we need a campaign to say “we are open, we are here, come.”

Dr. Olsen thanked the group and asked them to follow up with any questions.

Committee discussion

Dr. Roberts convened this session by taking a poll and recommending that dinner be delayed until 6:30 p.m.

Developing Countries

Discussion moved to finishing up with developing countries and Dr. de Paula began by inquiring what beyond REU's existed in the DCA team's portfolio. Dr. Lyons noted that grants can be supplemented to include undergrads in the experiences.

Ms. Sullivan noted that part of OISE's mission is to highlight REU's, PASI and the EAPSI. One issue with the Summer Institutes is costs for in-country expenses. Other countries have difficulty providing funds for the expenses of room and board as well as stipends intended for travel, research expenses and other costs. Another SI challenge is the non-ending aspect inherent to the SI's. OISE is reviewing options and it is agreed that the earlier students begin international collaboration the better for international research. There is flexibility for expansion in developing countries. Dr. Altmann noted that the Summer Institutes are a burden as far as school year timing is concerned. However, Ms. Sullivan reminded the committee that study abroad in the summer is advantageous as it does not interfere with U.S. students' school year.

The committee began discussing other comments regarding developing countries for the letter to Ms. Sullivan. Dr. Jordan inquired what percentage of OISE's budget was committed to developing countries. Ms. Sullivan replied that precise numbers were not immediately available, but it is near 23% for WE, EAP and CEE are around 15-20%, and ANESA and Americas are lower than that. Dr. Weber noted that the budget breakdown becomes more complicated when all programs are considered because PI's go to developed and undeveloped countries. With all of the transition this year it was difficult to do an analysis.

Dr. Lyons brought to the committee's attention that another point was to not focus only on OISE money but on other directorate funds as well. NSF as a whole is working

internationally but whether or not it is more than OISE is not known. Funding across the foundation goes to Africa but for different projects. The challenge is organizing concrete data while doing regular work. It is difficult to do more than the current workload and calling out specific items related to developing countries.

In response to this challenge, Dr. de Paula recommending prioritizing targeted developing countries. In order to prioritize, the committee needs to understand the objective of strategic planning in regards to developing countries work of the office versus the Foundation as a whole. There is a mandate for determining how to go forward. This committee helps to maximize OISE's management of its budget. The committee should also help to maximize this effort as part of the Foundation's mission. With regard to developing countries one needs to look at the committee's comments with eye to OISE and NSF.

In conclusion, the committee recommended cyber infrastructure as a way to move forward in collaboration with developing countries. OISE does not have the funds but it does possess the expertise to possibly leverage other funds from other directorates and agencies. Dr. Lyons concluded this discussion by noting that one way to begin is to digitize libraries for developing country usage.

Mission Statement

To what extent is OISE allowed to plan strategically in isolation?

Ms. Sullivan addressed this concern by noting that OISE can speak strategically to its own mission. There are two themes; 1) Promote research through internal collaboration 2) Develop the next generation of scientists and engineers. These themes are not know throughout the Foundation and no directorate has its own mission statement.

Dr. Loots noted the COV's view that a mission statement reflects the COV's review of management issues and the need for a plan. She recommended endorsement of the principle that a mission statement would help OISE move forward.

The committee recommended that before a new director comes to OISE there needs to more interpretation of data to determine the mission statement. However, a tentative mission statement does currently exist and OISE was instructed take that and review it office wide. Then the new director will have something to review when the/she arrives and it could be revised as necessary. Dr. Roberts recommended that Dr. Loots develop the mission statement.

Presentations – Dr. Brighton, Engineering

Dr. de Paula was pleased to learn of the degree of support ENG provides to OISE and vice versa. Cooperation is entrenched and growing. Ms. Sullivan noted that Jeanne Hudson is the OISE liaison to ENG and that she participates in joint meetings. This has helped to broaden both parties of each others endeavors. Programmatically ENG is very active for international collaboration. They are actively trying formalize collaboration

with Japan by engaging more with Japanese counterparts. It was also noted that ENG has had good representation in the Embassy Fellows Program.

Presentation – Dr. Kathie Olsen, OSTP

The committee was very appreciative for the time and consideration extended to them by Dr. Olsen. A main concern raised was Dr. Olsen's statement that the Federal government's research and development budget is a small portion of the discretionary budget. As such the committee felt that more emphasis should be placed on protecting science programs. There was a lot of interpretation of Dr. Olsen's presentation and budget explanation. The committee learned about the budget and what a small percentage is discretionary. Given what Dr. Olsen presented the committee understood the importance of protecting OISE's budget.

Questions for Dr. Bement

In preparation for the next day's meeting with the Director, the committee began to list questions they felt necessary for his response. It was initially agreed that Dr. Bement should be asked for his perspective on NSF priorities then the committee could contrast that with OSTP's. The committee also agreed that the Director should be asked how the United States determines future levels of funding.

In regards to OISE staff and their responsibilities, the committee decided to ask Dr. Bement when a new office director could be expected. This led to a discussion about the critical role of OISE staff in carrying NSF's mission. It was noted that without a stronger presence in the southern hemisphere NSF could not carry influence to a greater degree than currently possible. Dr. Roberts noted that more travel funds are required to support larger awards, overseas presence, and the need for greater oversight. A general discussion followed this statement about travel and how it is decided by the budget and office rules.

The committee closed for the day at 6:15 P.M.

June 17, 2005

Committee Discussion

Dr. Roberts opened day two of the AC meeting by thanking Pat Tsuchitani for all of her preparations for the committee and beginning a discussion of the day's agenda. Dr. Roberts stated that the AC had three deliverables to complete following the conclusion of the meeting; a letter accepting the COV report and response, a letter to ACISEting Director Kathryn Sullivan, and a response to the meeting summary to be prepared by OISE staff. Dr. Roberts brought up the purpose of the AC and how they should shift away from just getting educated on OISE's activities and reacting to them and move towards finding gaps in programs and identifying places where programs are not acting.

The committee discussed what statistics would help locate the gaps in OISE programs and mentioned regional and disciplinary distribution data.

Discussion with Dr. Arden L. Bement, Jr., Director, National Science Foundation

Dr. Bement began his discussion by stating that his goal is to make international work more strategic and more vision oriented, within and outside of the foundation. He stated that in the past ten years the percentage of international co-authorship of papers has grown from 15% to 50% and he emphasized the importance of international collaboration. Dr. Bement mentioned that NSF has come to be regarded as the gold standard and is being emulated more and more in countries around the world. The confluence of these things convinced Dr. Bement to bring OISE into the Office of the Director (OD). This will allow for more strategic thinking and more visibility for OISE.

Dr. Bement then provided an overview of several prominent international issues affecting NSF, including the International Polar Year (IPY), UNESCO, deemed exports, and the COV's recommendations for OISE. He stated that the IPY serves as an important opportunity to raise the global scientific community's level of knowledge on topics such as global climate change and ice sheet stability. Dr. Bement, who serves as the Vice Chair of the Committee on Natural Sciences and Engineering for UNESCO, discussed the priorities of his work with UNESCO as improving management and accountability. He expressed concern over the topic of deemed exports and said that NSF had encouraged the National Science Board to take a stand and submit a position in the open comment period at the Department of Commerce. He stated that his two major concerns related to deemed exports were the license requirement for foreign students using equipment and the need to consider country of birth rather than country of citizenship or residency. Dr. Bement said he was pleased with the COV's recommendations for OISE that he was also pleased with OISE's response to the recommendations. He then opened up the discussion to the group for questions.

Dr. Yilma brought up the issue of stricter requirements for visas and how they will be a danger to American science. Dr. Bement responded by saying that the visa issue has improved considerably and that just recently there was an extension on how long students can stay on their visas. Dr. Bement then expressed concern that the U.S. has to make coming here to do research more acceptable to foreign scientists. The value of coming to the U.S. for education in science and engineering fields has deteriorated with the recent large investments in research institutions in China and Australia. The U.S. does have some things going in its favor, including a more favorable ratio of public versus private investment that places less of a burden on the public sector as compared to other countries.

Dr. Loots asked Dr. Bement what he thought Congress will do about the topic of deemed exports. Dr. Bement responded that we have to wait to see what the Inspector General of the Department of Commerce will do and that there is a great deal of room for flexibility with how the issue could be handled.

Dr. Altmann brought up the topic of workforce and science personnel issues and asked Dr. Bement if NSF had found any innovative ways to deal with the question of underrepresented groups in science. Dr. Bement responded by stating that there are three things NSF is doing to help in this area. The first is the ADVANCE program, which has been successful in bringing more women and underrepresented minorities in. The second is that top NSF management is engaging each of the directorates to develop retention strategies to plug the leaks of people falling out of the science pipelines. The third item mentioned by Dr. Bement was pathways. NSF has had fragmented programs such as AGEP, LSAMP, and CREST, each of which has had a purpose and provided a certain benefit. NSF is currently pursuing ways to glue these fragmented programs together to help sustain pathways.

Dr. de Paula continued the discussion of the thought pipeline by citing some studies have indicated that research opportunities for 12th graders would be beneficial. Dr. Bement replied that some of NSF's programs, such as AGEP and LSAMP, have already extended to the K-12 scheme. Dr. de Paula brought up the potential workload burden that would be placed on professors and faculty by extending programs to K-12th grade. Dr. Bement responded that this is a faculty issue, a department issue, and a university issue. In reporting results, there has to be real accountability to show what the outcomes are. The workload on faculty is incredible, but on the other hand, this is a real division of commitment for broader impacts that has to be taken seriously. COVs have paid a lot of attention to this and have given us a lot of feedback. The accountability part is still not robust.

Dr. Roberts then expressed his concerns over how the AC should handle the COV recommendations. The AC believed most of the recommendations made by the COV were positive. That raised the question of how to prioritize the recommendations given that the staff and travel money seems to be down. Dr. Bement answered that since OISE does not have the resources to do it all, the AC has to focus on the important and achievable recommendations without losing track of the rest. He stated that if the AC can help OISE understand what recommendations they should tackle, that would be very good feedback.

Committee Discussion

Dr. Roberts opened the final round of committee discussion by reiterating the topics that needed to be covered. These included small grants, a discussion on Dr. Bement's remarks, prioritization of the COV recommendations, and the importance of K-12 and broadening participation in international.

Dr. Altmann expressed concern that there is a real issue with getting the rest of the NSF to buy into international activities. It seems that the research directorates pass international work that they could handle onto OISE. She stated that it would be a good idea for the director or someone in top management to pass on to each directorate that international activities should be taken on more fully. Dr. Roberts agreed that the

message of the importance of international activities should be sent out from as high a level as possible. Dr. Jordan added that it seemed the group agreed with the philosophy of recommendation #6, but not the entire recommendation.

The AC then moved onto COV recommendation #7 and the topic of how to grow NSF's impact in the southern hemisphere and developing countries. Dr. Yilma stated that NSF could do some leveraging with USAID, NAS, or the Gates Foundation and mentioned that the D.C. contact for the Millennium Foundation, Hans Herren, might be a good collaborator in the future.

The AC continued to discuss the recommendations of the COV and how they could be prioritized. The group debated on how to best rank recommendations, whether by identifying those that were highest return and lowest risk or by creating a table that would also take into account the resources required to follow through with each recommendation. The topic of how to evaluate risk was raised and it was noted that there are risks for following through and risks for ignoring different recommendations.

The group agreed that drafts of the three deliverables would be sent out to each AC member for comments to be returned to Dr. Roberts. Dr. Roberts then closed the meeting by thanking the OISE staff and the AC committee members for all of their work.