

**Office of International Science and Engineering (OISE)  
Advisory Committee Meeting Summary  
December 4, 2006  
National Science Foundation**

**Morning Session:**

- Committee Chair, Fred Roberts, called meeting to order. Members and Staff are introduced. New Members are welcomed. Agenda is approved, as are the minutes of the previous meeting.
- Deputy Office Director Kathryn Sullivan gave the Committee an update of the adoption by different parts of the NSF of varying modalities of international cooperation management models. This followed a presentation and discussion of different models of international cooperation at the previous meeting.

Office Director's Report

Thomas Weber, OISE Director, gave the Committee an update on NSF activities related to the Office, these included:

- Introduction of new staff that joined the Office since the previous Committee meeting;
- Reported on the NSF completion of its new Strategic Plan, and the National Science Board 2020 Vision for the NSF;
- Commented on the potential effect that the American Competitiveness Initiative in Congress would have on the growth of the NSF budget, if adopted;
- This would allow for a concomitant growth in the budget of the Office;
- Commented on the strong support that the Office has by the Director and Deputy Director of NSF, and the growth of international cooperative support by all directorates;
- Commented on the integration of an international perspective in the current NSF Strategic Plan, especially directed at enhancing the international involvement of the next generation of U.S. scientists and engineers;
- Reflected on the fact that OISE budget had almost doubled in the last 10 years, however, the success ratio of proposals to OISE has fallen to one third, from one half;

Overview of Partnerships for International Research and Education (PIRE)

Edward Murdy gave an update on the 2006 PIRE program competition. He gave a description of the program and the modifications that were made over the 2005 pilot of the same program. He mentioned that 516 pre-proposals had been received from 199 institutions in all 50 states, including Puerto Rico and the District of Columbia. These are all Ph.D.-granting institutions. The panels assembled will then recommend that about

10% of the pre-proposals be encouraged to submit full proposals that would then lead to the granting of about 15 awards.

Elizabeth Lyons briefed the Committee on the NSF follow-up activities on the PIRE-I (2005) grantees. She explained that since these projects are a new modality for OISE to manage, they require special care and follow-up. They are complex, multi-institutional international projects from which we are learning, to improve their performance, and also for NSF to improve its offerings and its facilitation to allow grantees to accomplish their goals. We are developing evaluation instruments, especially to assess the impact of these experiences on the internationalization of the students.

The Committee members contributed comments and gave advice to OISE staff to improve on both, the management of PIRE-I awards, and the management of the present competition.

#### Briefing on the Office of Legislative and Public Affairs (OLPA)

Jeff Nesbit, Director of OLPA briefed the Committee on the challenges that NSF faces in presenting science and technology in the current new media and described some of the current efforts being made by his office:

- The goal is to reach 100 million people with NSF messages
- Increasing use of the Internet by the public offers new challenges
- There is still a problem with NSF name recognition
- NSF in partnership with media giants is trying to embed science news and reporting. For instance current reporting on Antarctica with the start of the International Polar Year shows some success.
- Attempting to overcome the fact that NSF does not appear on page 1 in Google searches by posting a Science Daily.
- NSF has been supporting PBS, which has done 27 News Hour segments on science and engineering.
- A current partnership with MSNBC, and Good Morning America from the South Pole were offered as recent successes
- NSF will revive its own science communication media in new format: radio, Podcasts, Science in Motion videos for schools, other visualization media, lecture series, magazines, etc.

#### Briefing on the International Polar Year

Karl Erb, Director of the Office of Polar Programs, and Marie Bundy gave an update of the 2007-2008 International Polar Year activities and the international collaborations between NSF and its Arctic and Antarctic Programs partners around the world. They responded to a series of questions from the Committee on the science and logistics of the IPY.

There are 47 countries participating in the IPY research and education programs. This is a unique opportunity to study climate change, human and biotic systems, education and

outreach, and related cooperative science activities in the two Polar Regions. The NSF has the lead for the U.S. efforts. The NSF expects to spend about \$150 million in these two years in multiple logistics, research, and education projects, in collaboration with other nations.

### Broadening Participation

Thomas Windham, Senior Advisor for Scientific and Engineering Workforce in the Office of the Director, and Jody Chase, Program Director for Tribal Colleges and Universities (TCUP), gave a briefing of NSF activities to broaden the participation of underrepresented groups in science and engineering. They described current NSF efforts, especially the work with Tribal Colleges and Universities:

- In broadening the participation of underrepresented groups in NSF programs and activities NSF is mindful of the definition of categories of potential clients. Working with minority serving institutions and smaller institutions that do not meet the strict definitions of minority serving institutions.
- NSF making strong efforts at strengthening the education and career prospects of minority scientists and engineers, and the competitiveness of minority serving institutions.
- NSF is attentive to the subtle differences between tribal colleges in Alaska and Hawaii, and the lower 48 states' tribal institutions.
- The NSF TCUP has expended about \$10 million per year, now in its 7<sup>th</sup> year with 38 implementation awards with faculty and student support to keep them in science.
- In reply to Committee questions about the international cooperation of tribal colleges and universities, several examples were given: Many of the institutions belong to a World Indigenous Consortium of Higher Education dealing with upper level administration issues. Hawaii collaborates in the Pacific Islands region in Oceania. Alaska partners in the circum-Arctic region with Russia and Nordic European countries. Some of the Lower 48 Tribal Colleges have collaborations in Central and South America.
- It was clarified that about 800 of 6,000 institutions of higher learning in the U.S. are classified as minority-serving institutions.
- In STEM, Asian-Americans are not considered an underrepresented minority.
- Roughly \$396 million of \$3,573 million went to minority serving institutions in 2005; about 10% of the budget.

### **Afternoon Session:**

#### NSF Cyberinfrastructure Initiative

Daniel Atkins, Director of the Office of Cyberinfrastructure, gave a briefing on this newly established Office under the Director of NSF and its current priorities.

- Concentrate on high performance computing research and education;
- Develop opportunities for the NSF clientele to do Cyberinfrastructure enhanced and enabled research and education, and to advance the science and engineering of a common Cyberinfrastructure;
- Such Cyberinfrastructure would enable rapid worldwide communications in all sciences and humanities. It would facilitate collaboration, learning and research across borders and long distances.
- The vision is that this initiative would facilitate high performance computing; novel data visualization; the organization of virtual research and education organizations; and revolutionary ways of learning and workforce development, allowing displacements in space and time.
- Examples were given where the potential and power of these high speed high capacity networks are already in place: A grid of earthquake engineering and research; a research network in the biomedical fields; weather research network; nanotechnology and science education. All of these are pushing the limits and possibilities of an advanced Cyberinfrastructure.
- It was pointed out that there are several regional and worldwide networks in some of which development work is taking place on more capable software to enhance their potential use.

#### Conversation with NSF Director Arden Bement

In response to a number of questions from Committee Members, the Director gave his thoughts:

- He thanked the Committee for its service to NSF.
- Highlighted the importance of OISE to bring more international attention and participation by all NSF directorates and programs.
- Remarked on the importance that international activities have for the NSF and for his office in particular. There is no week that goes by without having visitors from abroad pursuing different facets of collaboration with the U.S. and NSF.
- The U.S. involvement with other countries today is more important than ever because of the growth in investment in research and development around the world, where most nations strive to invest over 3% of GDP in science and technology like the Nordic countries (even the U.S. is not close to this level). Advances in science are being made increasingly abroad, that is why we need to be connected and collaborate internationally.
- It is important to be linked to other countries where they are using different approaches to education, science and innovation, where the proportion of research and development investment is different from the U.S. (one third public and two thirds private).
- We are very concerned about having the human resources to keep up with our needs for innovation and wealth creation in a world that depends heavily on scientific and technical talent for this. We are not the only ones

experiencing the reluctance of our young people from learning science and entering technical careers. Even China with its ambitious education goals foresees a shortage of engineers, and is embracing Cyberinfrastructure-mediated education to overcome the shortage of teachers, in order to educate all through high school, and half through college by 2020.

- Our challenge is to educate all our young as many of the foreign students we have come to rely on, increasingly return to their own countries, such as China and India.
- It is not appropriate for the NSF to become involved in technical assistance to developing countries; this is a proper role for other technical and mission agencies. Our strength is in enhancing our and our partners' contributions to advancing science and engineering research through collaboration.
- We have seen improvements in the issuance of visas to scientists and students from abroad.
- We should not be too preoccupied with comparisons made about the level of science and mathematics knowledge of our students compared to other countries. These measure memorization and conceptual learning, however they fail to measure ability to apply that knowledge to the solution of concrete technical and engineering problems. We have many instances where middle school students work and compete in teams to solve concrete technical problems as a way to internalize and apply the concepts that are taught before such exercises, and they do very well.

#### Impact of Proposal and Award Broadening Participation Management Mechanisms (IPAAM)

Joanne Tornow, who chairs the IPAAM Working Group gave the Committee a presentation on the current work of this group, and answered questions and comments from the Committee:

- The group studied trends in proposal submissions to, and awards made by NSF based on the research awards which are 75% of the total.
- The studies are driven by the increased workload on NSF because of a larger number of proposals being received and the success ratio of these proposals falling.
- Success ratio fell from 30% in 2000, to 21% in 2006.
- There was a 47% increase in proposals, which peaked in 2004.
- Award size increased 44%, and a 31% increase in the median award size.
- Each year there is one billion dollars worth of proposals judged in the excellent range that do not get funded.
- There is a 29% increase in first time submitters, and 38% overall submissions.

The Committee gave reactions on their perceptions and what the drivers are in their institutions and made suggestions for the working group to consider.

#### Committee Discussion

Based on what was heard and discussed during the day, the Committee agreed with the Office Director that it would be useful for the Committee to meet twice a year, for one full day each, where the agenda would include presentations from Assistant Directors on their international programs; other agencies on their international programs; a couple of topics of concern to the future of OISE, including strategy and budget; and the international interests of the other parts of NSF.