

**National Science Foundation
Advisory Committee for Social, Behavioral and Economic Sciences (SBE AC)
Thursday, June 7, 2007**

**National Science Foundation
Stafford I, Room 920
Arlington, VA**

MEETING SUMMARY

Members Present

Dr. Robert Groves, Chair, SRC Research Center, University of Michigan, Ann Arbor, MI
Dr. Michael Goodchild, Department of Geography, University of California, Santa Barbara, CA

Members Participation via WebEX:

Dr. Cecelia Conrad, Department of Economics, Pomona College, Claremont, CA
Professor Shari Diamond, Departments of Law and Psychology, Northwestern University, Chicago, IL
Dr. Fred Gault, Science Innovation and Electronic Information Division, Tunney's Pasture, Ottawa, Ontario
Dr. Ira Harkavy, Center for Community Partnerships, University of Pennsylvania, Philadelphia, PA
Dr. David Poeppel, Departments of Linguistics and Biology, University of Maryland, College Park, MD
Dr. Paula Stephan, Department of Economics, Georgia State University, Atlanta, GA

Ex Officio Members Participation via WebEX:

Dr. David Abrams, Office of Behavioral and Social Sciences Research, National Institutes of Health, Bethesda, MD
Dr. Samuel Myers, Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, Minneapolis, MN

Members Absent:

Dr. Cynthia Beall, Department of Anthropology, Case Western Reserve University, Cleveland, OH
Dr. Lila R. Gleitman, Institute for Research in Cognitive Science, University of Pennsylvania, Philadelphia, PA
Dr. Guillermina Jasso, Department of Sociology, New York University, New York, NY
Dr. John King (CISE AC Liaison) University of Michigan, Ann Arbor, MI
Dr. Ruth Delois Peterson, Department of Sociology, Ohio State University, Columbus, OH
Dr. Claude M. Steele, Director of the Center for Advanced Study in the Behavioral Sciences and Lucie Stern Professor of Psychology, Stanford University, Stanford, CA

SBE Senior Staff Present:

Dr. David Lightfoot, Assistant Director, SBE
Dr. Mark Weiss, Acting Deputy Assistant Director, SBE
Dr. Edward Hackett, Division Director, Social and Economic Sciences (SES)
Dr. Sandra Schneider, Division Director, Behavioral and Cognitive Sciences (BCS)
Dr. Lynda Carlson, Division Director, Science Resources Statistics (SRS)

The spring meeting of the Advisory Committee for Social, Behavioral and Economic Sciences (SBE AC) was held June 7, 2007, at the National Science Foundation (NSF) in Arlington, VA.

Dr. Robert Groves, Chair, SBE AC, called the meeting to order at 1:04 p.m.

Review of Minutes and Directorate Update

Dr. Groves welcomed the group and explained technical aspects of the teleconferencing software. Dr. Groves suggested that if there were only minor concerns with the minutes circulated from the previous AC meeting, there was no need to discuss further and that committee members should send changes to Tyrone Jordan, Budget Officer.

Dr. Lightfoot gave an update on activities within SBE. While NSF had expected to operate under a Continuing Resolution (CR) for most or if not all of FY07, Congress passed legislation (H.R. 5672) in February 2007. As requested, Congress enacted SBE's FY 2007 Request Level budget of \$213.76 million (a 6.9% increase) and passage of this legislation allowed a release of several solicitations, including those for Science of Science and Innovation Policy (SciSIP), International Polar Year (IPY), Ecology of Infectious Diseases (EID), and Explosives and Related Threats (EXP). Dr. Lightfoot stated that the FY 2007 budget was formulated in the context of the American Competitiveness Initiatives (ACI) with NSF, Department of Energy's Office of Science, and the National Institute for Standards and Technology identified as key players in this initiative. Details on the NSF FY 2007 budget were provided.

- The FY 2007 budget allocates \$10 million for **Science of Science and Innovation Policy**. SBE has sponsored workshops and lectures, notably one given recently by Dr. Rogers Hollingsworth on innovative science as part of the ramp up activities.
- The fourth **International Polar Year** (which runs from March 2007 to March 2009) marks the first time that research outside the geophysical sciences will be funded. The life and human sciences are included as key parts of IPY. IPY is quite visible, with attention from the mass media on polar regions, particularly with respect to climate change issues.
- **Ecology of Infectious Diseases**, involving NSF's Directorates for Social, Behavioral and Economic Sciences; Biological Sciences; and Geosciences along with the John E. Fogarty International Center, National Institutes of Health will fund work on social and behavioral components of infectious disease spread.
- Finally, work on sensors, which is an NSF-wide effort lead by NSF's Directorate for Engineering, will include research by SBE scientists via the solicitation for **Explosives and Related Threats: Frontiers in Prediction and Detection (EXP)**. In FY 2007, NSF will invest in leading edge, frontier research on sensors and other areas, including social and behavioral sciences that are potentially relevant to the prediction and detection of explosives and related threats.
- In FY 2007, while research programs within the Research and Related Activities Appropriation (BIO, CISE, ENG, GEO, MPS, SBE, OCI, OISE, OPP, IA) fared well, funds for NSF's Human Capital Funding account did not. The Human Capital budget includes expenses for the merit review process, advisory committee meetings, committees of visitors' expenses, and other administrative-related costs. Dr. Lightfoot parenthetically remarked that in the FY 2008 Budget, the "Salaries and Expenses" account has been renamed to "Agency Operations and Award Management."

In terms of the FY 2008 budget, SBE fares less well than some of the other research directorates, with only a four percent increase (or \$8.24 million) over the FY 2007 Request of \$213.76 million. The overall increase for NSF is almost seven percent (or \$408.79 million.) Regarding the Congress, Dr. Lightfoot noted that all discussions have been congenial to NSF and that Representative Baird wants to hold hearings on Grand Challenges in the SBE Sciences prospectus.

A key part of the FY 2008 NSF budget request is **Cyber-enabled Discovery and Innovation (CDI)**, which has five areas of themes: knowledge extraction, interacting elements, complex interactions, computational experimentation, virtual environments, and educating researchers and students in computational discovery. The SBE budget includes \$1.69 million for CDI and is likely to take a larger role under the rubric of complexity and systems. Regarding long-term funding for CDI, NSF's five year plan calls for a first-year total of \$51.98 million (FY 2008), growing to at least \$150 million by the third year (2010). Growth of about \$50.00 million per year for a full 5 years is suggested.

Dr. Lightfoot also mentioned the following activities that have occurred within this fiscal year:

- In January 2007, NSF's first inter-directorate standing program, **Dynamics of Coupled Natural and Human Systems** (CNH), was launched. CNH was originally part of the Biocomplexity in the Environment priority area. SBE and the Directorates for Biological Sciences and Geosciences are all participating in CNH, for an annual total of \$9 million, with an expectation that the Directorate for Engineering will be involved at a later date.
- Dr. Lightfoot noted that the *Prospectus for Grand Challenges for the SBE Sciences*, a document inspired by the NSTC Subcommittee on SBE Sciences, is currently in the clearance process.
- Dr. Lightfoot mentioned three staff changes: Dr. Wanda Ward, formerly Deputy Assistant Director in SBE, has been appointed as Acting Deputy Assistant Director in Education and Human Resources (EHR); Mark Weiss is now the Acting Deputy Assistant Director for SBE; and Rita Teutonico is now permanent in SBE, serving as Advisor for Integrative Activities.
- There is one program change, effective April 15, 2007, the ADVANCE program moved from SBE to the Directorate for Education and Human Resources.
- The Panel Study of Income Dynamics was renewed after review by the National Science Board, which generated much favorable discussion. SBE plans to re-compete the General Social Survey, with changes in scope likely.

Discussion:

- Dr. David Abrams pointed out that discussions with the National Institutes of Health's (NIH) National Institute of General Medical (NIGMS) Sciences on the Ecology of Infectious Diseases initiative might be fruitful since NIGMS has a current program called "Models of Infectious Disease Agent Study" and is currently considering larger investment in behavioral sciences. Dr. Lightfoot agreed this would be worth pursuing.
- Dr. Paula Stephan, who is on the Advisory Committee for NIGMS, seconded this suggestion.
- Dr. Shari Diamond expressed concern about the degree of inclusion of SBE sciences in ACI. Dr. Lightfoot gave some background on this, saying that ACI grew out of the *Rising Above the Gathering Storm* report. The initial focus for ACI, then, was on the physical sciences. NSF's broad interpretation is that the ACI should include all of the sciences; however, there are ongoing discussions as to how this plays out in terms of budget. Debates continue not only at NSF but at other key agencies including OMB and OSTP. David Lightfoot has argued that SciSIP is a core component of any consideration of competitiveness.
- Dr. Robert Groves asked if it was correct to surmise that differences in directorate budget increases (where some are getting about four percent increases and others as much as eight percent) are connected to ACI. Dr. Groves suggested since this AC meeting does not include time with Dr. Bement, the SBE AC should discuss ways to communicate concerns to him at the conclusion of the meeting. Dr. Diamond seconded this.

Science of Science and Innovation Policy Update

Dr. Kaye Husbands Fealing, SBE/OAD Science Advisor, provided an update on the SciSIP initiative. She noted there have been many developments since the last AC meeting, given Congressional action on the NSF budget that allowed spending at the FY 2007 Current Plan Level of \$9.4 million. A draft of the SciSIP solicitation had been developed by December, but has since been refined and released.

Dr. Husbands Fealing stated that SciSIP offers new vantage points to look at a rigorous evidence-based platform for policy-makers, but that the focus is on basic research. Presentations by Dr. Jack Marburger, Science Advisor to the President, provided the impetus for SciSIP. He identified four priority areas: comprehensive data collection, data taxonomy, and stewardship; new metrics, models, tools, and frameworks; interagency collaboration on a new framework; and international partnerships that promote science and technology advancements.

Each of these four areas is addressed by SciSIP. SBE's Division of Science Resources Statistics is currently reevaluating surveys; the current solicitation calls for proposals on models and tools; an Interagency Task Group is continuing to meet and develop other initiatives; and on the international front, several countries are interested in NSF's pioneering efforts. Dr. Husbands Fealing has spoken with representatives from several countries on this topic.

The goals of SciSIP are to develop usable knowledge and theories; improve and expand science metrics, datasets and analytical tools; and coordinate efforts among federal agencies; and cultivate a community of practice focusing on the science of science.

Investigator-initiated research is expected to span many categories. PIs might develop theoretical and conceptual models of scientific discovery and technological innovation; statistical and econometric tools for estimating returns to science and engineering investments; qualitative tools; or scientometric and bibliometric tools. There are many levels of analysis, from the cognitive, organizational, and cultural to regional, national and transnational. Interdisciplinary and international collaborations are strongly encouraged in the solicitation.

The first solicitation narrowed the call to models and tools in order to limit the number of proposals received. About 60 proposals (representing 53 projects) were received, with a broad distribution of methodologies. Ten EPSCoR states are represented and studies include broad international representation of datasets and/or research collaborators. NSF expects to make about 20 awards, with a total budget of \$7 million.

In terms of data enhancement strategies, SRS is initiating several activities. Key among these are redesigns of R&D surveys, improvements to data capture of science and engineering workforce metrics, incorporation of survey modules on innovation, and collaboration with other Federal agencies on R&D and innovation metrics.

The next steps for SciSIP are to develop a second solicitation for release in November or December with two new foci – data and science and society. Dr. Husbands Fealing plans to form a SciSIP Advisory Group, with representatives from several NSF directorates and offices.

Near term milestones include the development of new surveys, datasets, indicators, and benchmarks; new methods, models and tools to inform the data-collection process; and new global linkages using cyber-tools. The medium term milestone is to develop domain-specific models emerging from collaborations between social-behavioral scientists and chemists, geologists, health-sciences, etc. Finally, the long term milestone is to foster a community of practice.

The purpose of the Interagency Task Group (ITG) is to advance the evidence-based platform for science policy and advance the formation of a community of practice. Specific action items for the ITG are to synthesize the literature on SciSIP; create a fact-finding questionnaire of best practices among Federal agencies related to science policy decision-making; develop a roadmap exercise leading to creation of a community of practice on science of science policy; and finally form a comprehensive definition and understanding of what constitutes the science of science policy.

Discussion:

- Dr. Lightfoot commended Dr. Husbands Fealing for a well-crafted solicitation, particularly her efforts to keep the number of submissions down (and therefore ensure a healthy funding rate).
- Dr. Goodchild asked if there are gaps in knowledge not covered by the proposals received. Dr. Husbands Fealing said that the proposals cover a large area and seem to explore all of the dimensions explored in the solicitation.
- Dr. Gault asked what is being done to build communities of practice in universities. Dr. Husbands Fealing said little has been done to date, but that SciSIP will work toward encouraging collaborations among researchers from different universities and will develop workshops and conferences to allow networking opportunities. She stressed the importance of bringing together researchers from the academy and from public and private sectors, and noted the importance of disseminating findings (and any tools) as broadly as possible to reach multiple stakeholders.
- Dr. Harkavy asked about translating results of a community of practice into a public good. Dr. Husbands Fealing responded that the better the quality of research in the SBE sciences, the more likely the benefits to the broader public. Dr. Husbands Fealing also stated that a summative workshop will be developed during the coming months. Such a workshop will facilitate the take-up of scientific foundations for science policy by those who implement science policies at the federal and state levels.
- Dr. Poeppel mentioned that a lot of data are already available and wondered about SciSIP doing retroactive studies. Dr. Husbands Fealing said that the second solicitation will focus on research topics to include the history of science and ethics of science. It is important that SciSIP avoid redundancies in research activities. Engaging historians of science in SciSIP's research agenda is one way to firm up the scientific foundation for science and innovation policy.

Human and Social Dynamics Priority Area Update

Dr. Rita Teutonico, SBE/OAD Advisor for Integrative Activities, gave an update on HSD activities. She stated that HSD is an NSF-wide priority area focusing on interdisciplinary research, the main goals of which are to encourage researchers to think big, tackle big questions, and to develop new interdisciplinary communities.

FY 2007 marked the fourth competition for HSD. A total of 220 projects were submitted by the deadline dates. Eight HSD panels were held during May: two in the Agents of Change emphasis area (Environmental Dynamics and Social, Political, and Economic Dynamics), two in the Dynamics of Human Behavior emphasis area (Cognition, Language, and Modeling and Societal, Organizational, and Cultural Dynamics), two in the Decision Making, Risk, and Uncertainty emphasis area (Disasters and Decision Making and Decision Making, Risk Perception, and Coordination), and one each for the Exploratory Research and HSD Research Community Development and Type 2 (larger-scale) areas.

The HSD success rate has been roughly 20% over the past three years, with a total of 286 awards made. The projects have led to real integration among different disciplines and the formation of new partnerships. Some of the scientific themes emerging from HSD are globalization, population dynamics, democratization, environmental change, security issues, and disaster preparation and response.

HSD is due to end after FY09; logical next steps are to continue to foster interdisciplinary, international research on dynamic systems, with possibly a special emphasis on themes related to complexity and sustainability. HSD staff will continue to identify emerging themes, fields, and communities in need of nurturing.

Discussion:

- Dr. Goodchild asked how NSF is identifying possible next steps after HSD. Dr. Teutonico answered that staff are meeting with researchers at conferences, workshops, and PI meetings to discuss this and get feedback.
- Dr. Conrad raised the possibility of HSD (or its successor) becoming a standing inter-directorate program along the lines of Dynamics of Coupled Natural and Human Systems. She also asked what the relationship is between HSD and CNH. Dr. Teutonico answered that there is a good synergy between the two programs and that some PIs have been funded by both programs.
- Dr. Diamond asked if NSF has thought about a formal way of getting information on what areas of research are getting done that would not in absence of a funding mechanism like HSD. Dr. Teutonico answered that some PIs have asked whether we might consider funding exactly *this* via an HSD award and that it might be a good study for SciSIP.
- Dr. Myers asked about percentages of minority involvement in HSD. Dr. Teutonico did not have any figures at the moment, but would provide these data after the meeting.

International Polar Year Update

Dr. Mark Weiss provided an update on International Polar Year (IPY) activities. He noted that the vision for this IPY was laid out in documents from several organizations, including the National Academies of Sciences and the International Council for Science. IPY is conceived as an intense, time-limited campaign that will leave a legacy of data, research, and educational activities revolving around polar regions. To be funded by NSF, IPY projects should be interdisciplinary and international in scope.

There have been prior International Polar Years (and one International Geophysical Year); however this is the first IPY to feature social and human aspects. This is important as there are currently four million people living in Arctic regions. Sound research on areas ranging from natural resource management to food systems to health risks all demand an understanding of the underlying SBE sciences.

SBE is investing in IPY via two mechanisms: (1) funding through core programs for investigator-initiated research on issues of interest to IPY (total of \$3 million), and (2) a central solicitation with two funding rounds. The first round (held in May) received \$2 million in funding from SBE and approximately the same amount from the Office of Polar Programs (OPP); the second round (with a deadline of September 14, 2007) will involve approximately \$2 million from SBE and, \$1-2 million from OPP.

IPY has three primary emphasis areas; the one of most interest to SBE is the Humans in Polar Regions emphasis area. This emphasis area will fund research on adaptations of humans in polar communities, drivers of social and economic change, and indigenous land use and policy. A total of 26 proposals were received for the first round; funding decisions will be made by June 26. There will be a second deadline to allow greater participation by SBE scientists.

Discussion:

Dr. Goodchild asked whether tourism could be a possible topic for IPY funding. Dr. Weiss replied that research proposals exploring issues related to tourism would indeed be considered.

Division of Social and Economic Sciences (SES) Committee of Visitors

Dr. David Lightfoot introduced the discussion on the SES Committee of Visitors (COV) meeting by saying that all NSF programs are reviewed by a COV every three years and noted that this COV was especially successful. The COV for SES had three clusters, each of which has a member who also serves on the SBE AC. The chair of the COV was John King, who is also a member of the SBE AC. Because he could not be present, Dr. Diamond summarized the report findings.

She stated that COVs are charged with looking at the efficiency and integrity of the review and funding process and the quality of research results. They have a special mandate to look at the process as a whole. This COV looked at a total of eight programs. COV members were impressed by the quality of research results they saw and, in terms of operations, were generally impressed with performance given the available resources.

Dr. Diamond outlined areas of concern identified by the COV:

1. Staff size may be too small to manage significant administrative workload.
2. The numbers of rotating versus permanent program officers should be more balanced.
3. COV members had difficulty determining the balance between cross-cutting research funded in special competitions (e.g., HSD) and disciplinary work funded by programs.
4. Reviewers and panelists still seem to struggle with the broader impacts criterion.
5. Need for more postdoctoral support.
6. Need for greater participation in ACI.
7. Need to continue developing models for transformative research.

The bottom line, she said, was that things are healthy, but that there may be some missed opportunities due to limited resources.

Dr. Edward Hackett, SBE/SES Division Director thanked the COV members and SES program officers and staff for their efforts. He responded to each of the recommendations outlined by Dr. Diamond.

1. In terms of staffing, SES is currently at the level permitted by Congress; when more positions are allocated to NSF, SES will attempt to get some of these to reduce workloads on current staff.
2. The current balance between numbers of rotators and permanent program officers is good, with eight in both categories.
3. In terms of the COV getting information on the mechanics of disciplinary and cross-disciplinary research, this is difficult under current guidelines, whereby COVs are organized by program, and not discipline.
4. The COV seemed to use a narrower definition of broader impacts (focusing on broader scientific impacts) than typically used by NSF, where this might be one part, but also looks beyond the science, for benefits to society. An example might be making data available from some of the large, longitudinal surveys (e.g., PSID, GSS) for primary education settings.
5. SES agrees with need for more postdoctoral support. Dr. Hackett said that one mechanism for achieving this is IGERT and that some programs have small grants for training and research at graduate and postdoc levels in some programs.
6. Dr. Hackett says there is a conspicuous absence of SES sciences in ACI, but notes that there are limits as to what NSF can say about this, so asks that AC members relay information to the research community.
7. SES agrees with the need to better understand transformative research and is working toward this goal.

Discussion:

- Dr. Myers asked whether broadening participation is a necessary component of the broader impacts criterion. Dr. Hackett answered that this is one of several components and that PIs can choose to address any of these. Dr. Myers followed up by asking to what extent broadening participation emerges as a significant part of broader impacts. Dr. Hackett said it is indeed a significant part.
- Dr. Diamond observed that there is a broad range of interpretations in what constitute ideal broader impacts and how broader impacts (and broader participation) are operationalized in proposal review. Dr. Hackett agreed and noted this problem holds for the whole Foundation. He noted that IGERT has the most rigorous standards on issues related to broadening participation and could serve as a useful model for other programs.
- Dr. Harkavy said that the University of Pennsylvania has put together a group of NSF and NIH scientists to look at issues of broadening participation. He noted that now might be an especially good time to discuss these and that SBE might want to take a leadership position. Broadening participation issues also seem to fit the SciSIP initiative, especially research on how broader impacts and broader participation can help foster better social science and science in general.
- Dr. Hackett said these were good points and that SES would look at these issues. There was discussion among COV members about previous studies (mostly in history of science) on how involving underrepresented groups has not only benefited society, but also strengthened science.
- Dr. Groves asked Dr. Diamond for a definition of computation. She described it, in this context, as the introduction and understanding of cyber capabilities for measurement. Dr. Hackett said he sees it as a third way for science, where simulation and modeling can now be used to visualize and test theories because of massive computing power. Dr. Groves noted that the SBE sciences are poised to examine the feedback loop between the computational and measurement aspects of science.
- Dr. Conrad said that the COV expressed an interest in viewing a sample of jackets from programs outside SBE to assist in their evaluation. She turned the topic to postdoctoral researchers, saying that postdoctoral funding can often lead to immense pay-offs with relatively small investments. Dr. Stephan expressed a concern that the SBE sciences not emulate a tendency (of the physical and life sciences) to put postdocs on trajectories that keep them in the academy even though there are not enough tenure-track jobs. Dr. Poeppel said it would be helpful, and potentially transformative, if NSF can give guidance on how new disciplines can structure postdoctoral positions.
- Dr. Groves said a small theme across several COVs was a division between qualitative and quantitative methods and asked whether this is becoming a bigger issue. Dr. Hackett said he was not sure of the magnitude, but said that qualitative methods are coming of age and that SBE will support their development. Both cyberinfrastructure and improved computation will make large bodies of data manageable and will make qualitative studies increasingly rigorous.
- Dr. Groves noted that some of the observations have appeared on previous COV reports and asked on which of these can NSF reasonably take action? Dr. Hackett said that NSF can continue outreach efforts to help the community better understand broader impacts, disseminate information about NSF surveys, and develop ways to make better use of computational methods for qualitative data. In addition, the Methodology, Measurement and Statistics program is collaborating with the Directorate for Mathematical and Physical Sciences to revitalize initiatives in mathematical social sciences. He further said that NSF will continue to think more about postdocs and will continue to encourage people to think about the role the SBE sciences can play in ACI.

Initiatives for the FY 2009 OMB Budget Submission

The budget writing process begins in May, runs effectively through August, and is sent out of NSF the first week in September. In preparation, SBE held a retreat in February with program officers, science assistants and senior administrative staff members to discuss potential budget initiatives. Dr. David Lightfoot gave a PowerPoint presentation outlining the major areas under consideration for the FY2009 budget request. Ideas on the table include:

- **Complexity and systems thinking to advance human sciences:** emerging out of HSD and reflected in HSD. A complexity working group has been formed, involving program officers from BIO, ENG, and other Directorates, including SBE; one of the goals is a kind of interdisciplinarity in developing relationships and interoperable models. The work focuses on catastrophic changes in various domains, tipping points leading to major structural change.

- **Disruptive events:** prevention/ prediction, preparation/ mitigation, response/ recovery.
- Develop new kinds of **surveys and data collection**, including: re-doing the survey of Industrial R&D; conducting a survey looking at post docs, as well as a survey looking at workforce issues wherein field of degree will be inserted into the survey.
- **Cyberlearning** (“cyber-enabled learning”): involves EHR, SBE and OCI. There are three dimensions to SBE: 1) Overcoming deep divide between work in the cognitive/ learning sciences and educational theories and practices, 2) Issues of *privacy and confidentiality*: data management, analysis, storage, etc. and 3) The *Science of Broadening Participation*: new technologies and modalities of education would be useful in addressing the vast number of groups of people who are not currently drawn into the STEM disciplines.
- **Neurotechnology:** moving forward in the area of neuroscience, a technology dependent field. New brain imaging techniques need to be developed to capture the full range of the brain functioning domains. Technology development will be guided by those people who work on brain functions, covering the full range of NSF sciences. One example is biomimetics – look at biology (i.e. brain, from the SBE sciences perspective) and see what kinds of “machines” can be built that simulate what we have in nature.
- **Infrastructure Initiative for the Environment:** Increase the work of SBE sciences in observatories, such as LTERs, NEON, WATERs, etc., but also establish new SBE observatories of various domains. An additional goal is to incorporate more spatial data into the various gold standard surveys because understanding where things happens helps in understand why and how they happen.

Discussion:

Dr. Groves asked Dr. Lightfoot about what type of response he would like from the AC. Lightfoot responded that this presentation was for the AC’s information only. No discussion ensued.

NSTC Prospectus of Grand Challenges for the Social, Behavioral and Economic (SBE) Sciences

Dr. Lightfoot provided an update on the progress of the NSTC Subcommittee for the SBE Sciences, comprised of representatives from 17 different agencies, including NSF, NIH, CIA, etc., all with very different interests in the SBE sciences. The subcommittee has been working on a “prospectus of Grand Challenges for the SBE sciences” for the past 18 months. The document is now complete and the subcommittee has sent it to OSTP for review. Changes may still be called for before it moves to the Committee on Science for final approval. It is not a public document as of yet.

The document will address four grand challenges:

1. Understanding **origins**: who we are, how we got here, shedding light on why certain populations are disparately impacted by diseases; informed by genomics.
2. Understanding the functioning of **mind and brain**: Understanding how individual behaviors arise; neural basis of cognition, language and behavior.
3. **Complexity of human societies**: development of new tools to grapple with the complexities of modern life; developing networks to prepare for and respond to healthcare needs, disruptive events, terrorism, natural disaster.
4. **Policy**: how can we take charge of our future? Using a human factors approach, informed by enhanced surveys for evidence-based policies. Policy has its own set of sub challenges in domains such as:
 - Cooperation and conflict: understanding how cooperation arises or how we can manage violence, conflict and terrorism;
 - Resilience: understanding how to mitigate and recover from extreme events;
 - Education: fostering a learning society;
 - Health: fostering a healthy society; and
 - Competitiveness: fostering an ecosystem of innovation.

Three recommendations are made in addressing these Grand Challenges:

1. **Data gathering, curation and analysis:** SBE sciences are being transformed by vast amounts of new data. Recommendations include:
 - Continue to develop new tools and techniques for research (i.e. genetic mapping and fMRI);
 - Expand investments in long-term “baseline” studies;

- Ramp up efforts to collect short-lived data in the wake of extreme events; and
 - Ensure data collections are accessible, interoperable, but with iron-clad guarantees of privacy and security.
2. **Systems:** SBE sciences are increasingly embracing systems thinking, comparable to systems biology, much of this has to do with the new kinds of interoperable interdisciplinary models.
 3. **Policy:** Implement evidence-led policies in ways that are also evidence generating, in which every new policy or program is itself an object of study.

In summary, the SBE sciences play a unique role in understanding the human element and should be integrated into policy and decision-making at every level of every sector, public and private.

This material was presented to the Committee on Science on June 6, 2007. The expectation is that this will help in the writing of budgets now and will influence the way the SBE sciences are considered in the creation of future budgets.

Discussion:

- Dr. Mark Weiss noted that Dr. Lightfoot's presentation to OSTP and COS yesterday was very well received. Dr. Marburger commented that this report is very important and will provide necessary information in advocating for the SBE sciences. Dr. Weiss commented that we could not have asked for a better reception.
- Dr. Lightfoot noted that the next meeting of the Committee on Science is December 4, 2007. It is hoped that the COS will approve the document at that time and it will be published. When the document is publicly available, a major event should be planned. There are many hopes tied to this:
 - Providing necessary validity to the SBE sciences and their role in a national context that would enhance our ability to deal with the periodic challenges that emerge, (i.e. Congressional interest in de-funding some SBE awardees) and
 - Providing influence on the budget formation process across the federal agencies.
- Dr. Weiss noted that one of the key points of the recommendations is that human sciences are integral to virtually every major problem facing humanity and the nation, (i.e. climate change, terrorism, criminal issues, etc). For too long, technology has been looked to for solutions in the absence of the human element, which is integral. This is a bold-faced document advocating for a seat at the table.
- Dr. Lightfoot commented that this has implications that extend beyond this.
- Dr. David Abrams commented that the Univ. of Michigan recently cosponsored a workshop on complex systems and agent-based modeling, which is now available via webcast. The workshop addressed many of the issues outlined in Dr. Lightfoot's presentation. Dr. Abrams feels that we are in the middle of what he hopes to be a transformative scientific revolution (Kuhnian), similar to what has occurred in biology in the last 30 years.
- Powerful tools for data mining, curation and analysis will change how we look at social network structures. Dr. Abrams pointed to work at Cornell on memes as being an example of this type of transformative work. The Cornell project was funded by NGCT.
- Dr. Lightfoot commented that Kuhnian revolutions come with deepening theories. The major attraction of building up work in complexity and systems thinking is that it increases the driving role of theory.
- Dr. Abrams noted that the theory-building will be new theoretical synthesis that will deepen but also integrate disparate disciplines to make a more integrative theory.
- Dr. Poeppel commented that the ACI seems to be largely driven by the physical sciences. He suggests that we should aim much higher with the 'grand challenges' to advocate for a separate ACI for the human sciences. Now that we're doing the physical sciences, why not push for the next ACI to be the decade for the human sciences?

Briefing on IPAMM (Working Group on Impact of Proposal Award and Management Mechanisms)

Dr. Jacqueline Meszaros presented an update on the IPAMM study, noting that there is now a website available: <http://www.nsf.gov/od/ipamm/ipamm.jsp>. She presented some preliminary data, although the data are not yet public as analyses are still underway.

The NSB has been concerned about declining success rates. Some preliminary findings include:

- The overall NSF budget grew about 42% from 2000-2006. At the same time, there was a 38% increase in award sizes and proposal load increased 47%, resulting in funding rate declines from, on average, 30% to 21%. The decreased funding rate translates into increased effort rate of PIs. Successful PIs were submitting, on average, 1.7 proposals per award in FY 2000; now PIs submit on average 2.2 per award. Success rates have dropped within particular programs and PIs have migrated to other programs. Nearly 70% of PIs submit to multiple programs. Throughout this period, awards to new PIs have remained relatively stable, at 27%.
- There has been some worry about how declining funding rates impact young PIs, transformative research, and the burden of review. IPAMM has been involved in looking at these questions and also at what the drivers of increased proposal submissions are. The increase in proposal submissions is likely due to both internal and external drivers. Within NSF, noted drivers include the effects of budget increases, the increased use of solicitations, and enhanced proposal processing efficiencies, i.e. the FastLane system, and reduced dwell time. The numbers of solicitations increased from 53 in FY2000 to 77 in FY2005, while proposals received in response to solicitations also increased from 12 to 20% of all proposals. Externally, institutional pressures, growth of the scientific community, and changes in other funding agencies may also be contributing.

The IPAMM group has been soliciting advice from the ACs, as well as, eliciting external feedback via a survey of 43,000 PIs who submitted to the NSF in the last 3 years. The propose survey was fielded in February of this year and the group is now analyzing the results.

Discussion:

- Dr. Paula Stephan notes that this is an interesting report and questions whether the stats are available at the webpage yet.
- Dr. Meszaros said that stats presented today are all preliminary and are not yet available online. They have to go through further analysis and approval.
- Dr. Stephan commented that NIH is confronted with a similar situation. She suggested that it might be interesting to know if the award size increases are primarily coming from increases in funding of students, which has been the case at NIH.
- Dr. Meszaros responded that this has not been looked at yet and noted the suggestion.
- Dr. Lightfoot comments that the SBE 21% success rate is the NSF average. Some directorates have very low rates of about 10%, like BIO & ENG. SBE is at about the average, where other directorates' funding success rate is in the 30% range.
- Dr. Shari Diamond inquired about submissions to more than one program, wondering if these were inter-directorate or inter-program within a directorate.
- Dr. Meszaros responded that they are submitting more proposals to multiple programs, but it is not yet clear how this affects success rate.

Transformative & Interdisciplinary Research

Dr. David Lightfoot presented an overview of current developments on the subject of transformative research. This topic was discussed briefly at the November 2006 meeting. There has been considerable attention given to transformative/innovative work at the NSF. The main question is whether NSF supports enough of it. Emanating from an NSB report, there has been a lot of interesting discussion on the nature of transformative research and how one might recognize it in advance. The NSB report suggested that an NSF-wide initiative should be considered. This would involved doing considerable work on describing what exactly transformative and innovative work is, how to define it and how to identify it. The assumption within the Foundation is that there is transformative work being funded currently within the programs and we would not want to isolate transformative work by having a separate program for it. Further, NSF is proud of its merit review mechanisms and is regarded with envy by many funding agencies around the world. There is no plan to change the merit review criteria, but there is consideration of adding something on transformative research to criterion 1 or 2.

Discussion:

- Dr. Groves asked Dr. Lightfoot if this is a topic that will be around for awhile and therefore would be worth a larger discussion at the next AC meeting.
- Dr. Lightfoot responded that this will continue to be an issue of importance on the tables as NSF grapples with interpretation and understanding of this topic. But, he does not see a particular role for the AC at this time.
- Dr. Groves stated that this could generate an amazing amount of discussion within the AC.

Discussion on Drafting a Letter to the Director:

Prior to setting some agenda items for the fall AC meeting, Dr. Groves suggested that the AC needed to craft a letter as a substitute for not meeting with the Director. He proposed that the letter be in regards to the lack of the role of the SBE sciences within the ACL.

- Dr. Groves also suggested that it talk about the Grand Challenges document and that the AC considers this important to pay attention to.
- Dr. Shari Diamond concurred, stating that the letter should also express appreciation for the ideas contained within the document. Additionally, Dr. David Poeppel stated that this should be viewed as an exciting opportunity for Dr. Bement and Dr. Olsen to embrace it and push for the SBE sciences. He also noted that the idea of post-doc support needs to be mentioned as well.
- Dr. Groves mentioned that the letter should also contain comments on the massive set of COVs, and that the letter should bring in the non-attending members of this AC meeting.
- Dr. Groves further suggested that he will draft a letter and the AC can work on it collectively in cyberspace. No deadline for completion of the letter was mentioned.

Identification of Agenda Items for Next Meeting

Dr. Groves first suggested some agenda item, and then took several suggestions from the floor. The topics for the next meeting are:

- IRB and Human Subjects;
- An update on SciSIP, including progress and information for future calls for proposals;
- Science of Broadening Participation, the AC should engage in a deeper conversation about initiatives underway;
- Potential role of neurosciences, a discussion of the outcomes of many small reports that were generated and workshops, relating to the mind and brain aspect of the Grand Challenges and the budget as well; and
- GSS re-competition? Dr. Ed Hackett mentioned that the solicitation will be out but the proposals will not be in, so there will not be much to discuss at that point, other than perhaps the educational aspects of the major surveys. He suggested leaving it off the agenda for the fall meeting.

The next AC meeting will be a face-to-face meeting at the NSF, November 8-9, 2007.

Dr. David Lightfoot noted that Dr. Grove's term as Chair of the SBE AC comes to an end at the next meeting, so members should be thinking about a new Chair for the AC. Dr. Lightfoot thanked Dr. Groves and the AC. Dr. Groves thanked the AC members for their participation, especially those that participated via the virtual environment. Dr. Lightfoot also thanked Mr. Philip Johnson, SBE Senior IT Specialist, for setting up the virtual meeting and making sure the technology and connectivity ran smoothly throughout. Dr. Lightfoot also commented that this virtual meeting happened due to budget constraints, and he would welcome any comments concerning the virtual environment meeting experience. With no further discussion, the meeting was adjourned at 5:27 p.m.