Division of Social and Economic Sciences
Response to the 2013 COV Report
Executive Summary

The Committee of Visitors for the Division of Social and Economic Sciences (SES) met June 3-5, 2013 at the National Science Foundation. The committee consisted of twenty members. In addition to a chair and two sub-chairs, 17 other committee members were assigned to review the nine programs managed by SES: Decision, Risk and Management Sciences (DRMS); Economics (Econ); Ethics Education in Science and Engineering (EESE); Law and Social Science (LSS); Methodology, Measurement and Statistics (MMS); Political Science (PoliSci); Science of Organizations (SoO); Science, Technology, and Society (STS); and Sociology (Soc). The members of the COV met both in plenary and in program-focused and cross-program sessions. At the conclusion of their deliberations, the COV reported out in closed session to Dr. Myron Gutmann, Assistant Director (AD) of the Directorate for Social, Behavioral, and Economic Sciences (SBE), and Dr. Joanne Tornow, SBE Deputy Assistant Director. The COV then reported on its findings in an open session attended by the Division leadership, program officers, and other members of the Divisional program and administrative staff.

The present COV review differed from those of previous years in that the level of analysis was strategically focused on the Division, with less emphasis than in the past on program-level review. Accordingly, this response focuses primarily on Divisional level comments and feedback.

The COV provided recommendations in the areas of Intellectual Vision, Data Access and Infrastructure, Review Innovation, Doctoral Dissertation Research Improvement Grants, Program Management, and COV Reorganization.

A. INTELLECTUAL VISION AND EXCITING AREAS FOR RESEARCH

The COV was asked by Directorate and Divisional leadership to look forward over the next 10 years to describe a vision for the intellectual future of Division. With that in mind, the COV noted that the frontier of research is theoretically-driven, data-intensive, collaborative, and problem-oriented. A strong foundation of SES science and scientists working at the frontiers of knowledge in interdisciplinary collaborations is indispensable to the Division's success. In its report, the COV enumerated a number of examples of this type of work.

The COV identified six key features defining the future landscape for SES sciences and programs: interactions of human and natural systems; socio-genomics and other biological/social interactions; Big Data; human security; human factors in the development, adoption, and impact of new technologies; and systems science.

1. ***Interactions of human and natural systems.*** Changes in population size, characteristics, and behavior lie at the heart of key environmental challenges, including deforestation, declining biodiversity, and water shortage. Conversely, environmental change has profound implications for human behavior, including mass migration, food scarcity, and increased armed conflict. Analysis of these interactions has profound importance, allowing us to

anticipate and prepare for future change.

2. ***Socio-genomics and other biological/social interactions.*** The completion of the Human Genome Project has opened up the potential for new research agendas for SES. As genomic research proceeded, the complexities of trait inheritance became evident, shifting at least part of the focus to epigenetics (e.g., where methyl groups and histones attach to DNA as a result of environmental factors, changing how genes function). For SES science, the process by which society "gets under the skin" has been called biological embedding. We are now only at the beginning of important collaborations between the molecular and SES sciences.

3. ***Big Data.*** As described in the NSF Strategic Plan, there is a data deluge across all areas of science. An explosion of data from commercial transactions, social networks, satellite imagery, administrative records, and statistical agencies around the world has created exciting new opportunities for analysis and discovery. The massive increase in the scale and heterogeneity of data has also created new challenges: we lack the institutional and technological structures to sustain the flood of new data and to fully capitalize on the new opportunities. The research community needs infrastructure development to ensure data access, sustainability, and interoperability across diverse data formats.

4. ***Human security.*** Increasing social contact and global interdependence can heighten a number of risks to national and individual security. The onset and impacts of sudden and severe economic downturns, the spread and consequences of pandemics, the expansion of organized crime and trafficking, and the diffusion of terrorism and civil conflict exemplify some of the risks. Cross-disciplinary collaborations are needed to discover what institutions, policies and practices help to mitigate the risks, and to assess the factors that make nations and individuals more resilient.

5. ***Human factors in the development, adoption, and impact of new technologies.*** The effects of new technologies on our society often depend less upon their technical attributes than the decisions of the people who might use them. Whether the issue is the spread of more efficient energy-use technologies, the effectiveness of cybersecurity measures, or the selection of healthier diet and lifestyle options, SES insights into the wants of the public, its means for fulfilling them, and the purposive and unintended consequences will be key aspects of the design and promulgation of new technologies that can make life healthier, safer, and more sustainable.

6. ***Systems science.*** With the growing recognition that most phenomena are complex, systems science has come to a more prominent place in SES science. The key tenet of systems science is that large interacting systems, from the biological to the geographic, work together and in opposition to influence how individuals, organizations, institutions and societies operate. Traditional linear models have limited utility when dealing with the dynamics of complex systems and they need to be augmented or replaced by agent-based modeling, systems dynamics modeling, and network analysis.

<u>Recommendation</u>: The COV recommended that SES should provide strong support of the core even as the Division seeks new ways to stimulate research at the intersection of disciplines.

<u>Response</u>: The COV has provided an incisive, insightful assessment of the key issues likely to influence the intellectual future of SES research over the coming years. In response, SES plans to initiate a series of discussions involving Divisional and Directorate leadership and program staff, members of the Advisory Committee, and representatives of relevant external communities to consider how SES might re-define existing programs or introduce new initiatives to focus attention more effectively on these new and emerging topics at the intersection of disciplines without neglecting important, on-going core research programs and emphases.

B. DATA ACCESS AND INFRASTRUCTURE

The COV saw shared infrastructure as one of the most efficient mechanisms for supporting interdisciplinary research and indicated that issues of data access and data infrastructure should be a high priority for the Division. While supportive of the SBE-EHR program "Building Community and Capacity for Data-Intensive Research," the COV concluded that an expanded program to develop shared infrastructure would be a highly effective use of scarce resources for social and economic research.

The COV offered seven specific recommendations relating to data access and infrastructure.

1. The Big Three

<u>Recommendation</u>: The COV expressed concern that the "Big Three" surveys—the General Social Survey, the Panel Study of Income Dynamics, and the American National Election Studies—have been slow to implement the recommendations of SBE's 2011 "Future Investments in Large-Scale Survey Data Access & Dissemination" report, which called for attention to data standards, shared software infrastructure, and interoperability across projects. One way to improve interoperability and communication across surveys would be to move the Big Three surveys into a Long-Term Infrastructure Cluster. The COV recommends that the Division think carefully about a new management structure to ensure appropriate disciplinary input.

<u>Response</u>: We are in agreement about the potential benefits of a new management structure to improve interoperability and communication across surveys. Future plans for each of the three surveys contemplate significant and substantial changes. Over the next few years, the Division will engage the AC and other members of the relevant research communities in a discussion about how best to proceed, giving serious attention to moving the Big Three surveys (and smaller survey and data infrastructure projects, as well) into a Long-Term Infrastructure Cluster.

2. Data Sharing

Recommendation: **The COV applauded the NSF Data Sharing policy, but expressed concern that enforcement is weak. The COV proposed that SES researchers should be required to certify that they have implemented their data-sharing plan before being eligible to submit a new proposal, much as they are required to submit a final report for their projects. This would not preclude an embargo; for example, a researcher could document that the data have been transferred to a data archive under a limited-term embargo agreement. Moreover, researchers with data that cannot be shared for a legitimate reason (such as high sensitivity) would be required to document that reason.**

Response: SES is receptive to this suggestion. Over the course of the next year, we will begin to assess the potential positive and negative implications of such a change for the research communities supported by the Division. Initiatives in this regard may require Foundation-wide coordination, however.

3. *Data Citation*

Recommendation: The COV concluded that proper data citation is vital and suggests that NSF data sharing requirements should be extended to include a Digital Object Identifier. The COV further urged the SBE Directorate to maintain a catalogue of all NSF-funded SBE datasets, including work in progress, with information about the status of data availability and access.

Response: The SES Division and SBE Directorate are receptive to this suggestion and during the next year will consider the benefits and costs of strengthening the data sharing requirement for the SES (and the broader SBE) research communities. Initiatives in this regard may require Foundation-wide coordination.

4. *Digital Curation*

Recommendation: With new data sharing requirements, NSF must be prepared to cover new costs. Accordingly, the COV urged the Division to provide support for data preservation, metadata, data integration, archiving, and dissemination.

Response: We are sympathetic to this suggestion. Over the course of the next year we will initiate an analysis of the benefits and costs of options for providing greater levels of support for digital curation. Again, initiatives in this regard may require Foundation-wide coordination.

5. *Confidentiality*

Recommendation: The COV urged the support of research on statistical disclosure control as well as other methods—including virtual data enclaves—to address this issue. The exploitation of transactional and administrative Big Data will require overcoming confidentiality barriers. Sharing of qualitative data poses equally challenging issues of disclosure control.

Response: We are in agreement about the potential risks associated with use of and sharing of such data. We are therefore open to the suggestion of taking steps to encourage and support research on methods to address confidentiality issues. Over the course of the next year, SES will identify and assess options for promoting such research.

6. *Interoperability*

Recommendation: The COV recommended that the Division collaborate with other divisions and directorates on integrating data from different sources and consider adoption of novel and large-scale data sources.

Response: We are open to this suggestion and will assess current partnerships with other divisions and directorates as well as potential new ones to address issues relating to data interoperability, including integration of data from different sources and adoption of novel and large-scale data sources.

7. *Capacity Building*

Recommendation: The COV urged support of the formation of disciplinary and interdisciplinary research networks to focus on fundamental SES questions, such as threats to the nation's security and economic opportunity for young adults.

Response: This is a particularly interesting, important suggestion. We are open to it and will consider ways of signaling interest in proposals focusing on such issues to SES research communities.

C. REVIEW INNOVATION

The COV provided several recommendations to streamline the review process and to improve the quality of reviews, characterizing the following set of recommendations as "review innovation."

1. *Review Analysis*

Recommendation: COV members questioned the value of routine preparation of review analyses for the many proposals that fall in the "must fund" or "do not fund" categories, except where the Program Officer disagrees with the panel assessment. Consequently, the CV strongly encourages programs to use templates (i.e., "boilerplates") for review analyses.

Response: The Division will carefully consider this recommendation. In light of the heavy workloads that programs face, the COV has recommended against spending too much time or investing too many human resources on cases where the outcome, whether positive or negative, seems overwhelming clear. In such cases, templates for review analyses are reasonable. In all cases whether templates are used or not, it is essential that review analyses provide a clear summary statement of the scientific merits of any proposal recommended for funding even when all reviewers and panelists are unanimous with respects to its merits so as to aid Divisional leadership in its

independent review of the funding recommendation and to support the Division's ability to be accountable to both internal and external communities.

2. *Streamlining cross-disciplinary reviews*

Recommendation: The COV suggested that efficiencies could be gained if limits were imposed on the number of reviews obtained for proposals reviewed by more than one program. The COV noted that in some cases proposals submitted to or co-reviewed by multiple programs received as many as six or eight reviews and a panel summary from each reviewing programs.

Response: The division agrees and plans to undertake efforts aimed at streamlining the review process for proposals reviewed by more than one program. The Divisional leadership will work with program officers and administrative staff to identify the most efficient procedures to accomplish this objective.

3. *Panel Diversity*

Recommendation: COV members felt that additional diversity is needed on review panels in two specific respects. First, the COV collectively agreed that additional diversity with respect to career stage, gender, and race/ethnicity was needed on the Division's panels. Second, certain COV members recommended greater disciplinary diversity in the Economics, Political Science, and Sociology panels. Other COV members, however, disagreed with this recommendation and advocated continuation of single-discipline review panels for standing core disciplinary programs.

Response: First, the Division agrees with the desirability of increased diversity with respect to race/ethnicity, gender and career stage, and Divisional leadership will work with programs to encourage and support achievement of greater diversity in panel representation. Panel membership is typically quite time consuming, however, and many programs recruit panelists to serve for four cycles. For younger researchers, the benefits of participation on panels must be weighed against the heavy demands that panel membership places on them. Second, with regard to disciplinary diversity, the Division believes that program directors are best positioned to evaluate the benefits and drawbacks associated with increasing disciplinary diversity on panels. During the coming year, the Division will encourage program officers in Economics, Political Science, and Sociology to weigh seriously the merits of increasing disciplinary diversity within panels, but will leave the final decision in this regard in their hands.

4. *Number of Annual Review Rounds*

Recommendation: The COV discourages reducing regular program reviews from two rounds to one round annually. The COV endorsed, however, the potential of a contemplated experiment for dissertation proposals which maintains two review dates but with the second cycle confined to revise and resubmit proposals. The Committee concluded that this decision may best be left to the Program Officers.

Response: The Division appreciates the COV's input and believes it will be useful to experiment with alternatives such as limiting the second cycle to revise-and-resubmit proposals. The Division will continue to evaluate options and encourage program officers to consider the merits of potential innovations to manage workload for standard proposals as well as dissertation proposals.

5. *Review Management*

Recommendation: Several COV members suggested that SES should consider adopting review management and rating software developed for peer-reviewed journals, which could offer efficiencies in the selection of reviewers.

Response: The Division will introduce this proposal into discussions about Foundation-wide policies regarding proposal processing and review.

6. *Split scores*

Recommendation: The COV recommended that the E-Jacket System be modified to recognize split scores—such as VG/G—and compute intermediate numerical scores. If this cannot be done, then the COV recommended prohibiting the use of split scores. The COV offered several other recommendations for E-Jacket such as including filters to sort columns for numerical scores by reviewers and for recommendations by program officers. The COV suggested that proposals should be sortable by mean score, score sum, or other numerical measures; this would make sense only if split scores were disallowed or given distinct numerical values.

Response: Changes to EJ are not within SES' purview, and these recommendations will be forwarded for consideration s during the next round of updates for the E-Jacket system. The E-Jacket system for review management is an NSF-wide system, which constrains SES in its ability to make independent modifications to the system.

D. DOCTORAL DISSERTATION RESEARCH IMPROVEMENT GRANTS (DDRIGs)

***Recommendation*: The COV sees DDRIG grants as valuable and cost-effective and recommends that they not be reduced or eliminated. Although the COV sees value in streamlining the review process in light of the increasing volume of proposals, they urge NSF to develop improved outcome metrics to better evaluate and document the effectiveness of DDRIGs.**

Response: Several programs currently process a large and growing volume of DDRIG proposals each cycle. The workload associated with reviewing and managing these proposals is extensive and impacts personnel at each step of the process including administrative staff, program directors and other program staff, panelists, the Division Director and the Deputy Division Director, and Division of Grants Administration

personnel. The Division will continue to evaluate strategies aimed at reducing the workload associated with DDRIGs. This may involve the use of the "revise and resubmit in second round only" approach. Although the Division is sympathetic to the COV's conclusions about the value of DDRIGs, at this time it seems prudent not to foreclose the option of taking more drastic action, including possibly reducing the annual number of DDRIG review cycles. Consistent with the COV recommendation, SES has already begun discussions about how to collect evidence regarding the effectiveness of DDRIGs and we will continue such efforts during the coming year.

E. PROGRAM MANAGEMENT

The COV was generally favorably impressed by the management of SES programs. The COV described SES programs as representative of an outstanding model of scientific peer review, observing that (1) dwell time is generally excellent; (2) advice to PIs is clear and effective; (3) review analyses for borderline cases are excellent; and (4) decision making on budgets is thoughtful and insightful.

The COV expressed concerns about workload, particularly for Sociology, Political Science, and STS. The COV also concluded that the issue of Broader Impacts continues to raise a variety of concerns, although the nature of those concerns varies across programs.

***Recommendation*: With respect to workload, the COV recommended that Sociology be given additional staff. The COV also recommended that LSS should have a permanent program officer to ensure adequate institutional memory.**

Response: The Division is allocated a set number of Full Time Equivalent (FTEs) employees. As such there are constraints with respect to adding new full-time positions to a program. A potential method for addressing the workload issues faced by certain programs is to employ so-called intermittent experts to serve for a term-limited time in the functional equivalent of program directors during periods when the workload is heaviest. We have now used this strategy several times with various programs with favorable results. We see the option of adding intermittent experts to program staff at times of peak workload as a promising, viable strategy for better managing chronic workload issues. In this vein, it may be worth noting that the workload problem results in part from the large and increasing volume of DDRIGs, noted earlier. With respect to the LSS program, SES appreciates the motivation for the COV's recommendation and commits to giving serious consideration to it during the next year.

Recommendation: Some COV members were concerned that broader impacts may not be given enough weight in the review process, stressing especially the importance of broader societal impact.

Response: The Division affirms its commitment to take steps to educate and remind reviewers and panelists of the importance of the broader impacts merit review criterion.

F. COV REORGANIZATION

Recommendation: Some members of the COV felt that the current practice of separate COV reports and review templates for every program is excessive and puts substantial burdens on staff. SBE COV reports are almost an order of magnitude longer than the average of divisions in other directorates, and preparing for the COV entails considerable effort. Therefore the COV recommends an alternative followed by most divisions in other directorates—to produce one consolidated report and template for the entire division. At the same time, there were other COV members, who felt that the great detail of separate reviews yields program-specific feedback that is invaluable to staff.

Response: We are in agreement that the effort involved in preparation of the COV review is substantial. The Division and programs value the feedback provided by the COV and we believe that a consolidated report and template for the Division would yield sufficient and important feedback. Steps were taken during this COV cycle to move toward a more Divisional focus and we plan to continue movement in this direction during upcoming cycles.