



NATIONAL SCIENCE FOUNDATION

**Directorate for Social, Behavioral & Economic Sciences
Office of the Assistant Director
4201 Wilson Boulevard, Suite 905
Arlington, VA 22230**

MEMORANDUM

DATE: July 2, 2008

TO: Dr. James Lightbourne, Senior Advisor for the Integration of Research & Education

FROM: David W. Lightfoot, AD, SBE

SUBJECT: Report of the Committee of Visitors for the Human and Social Dynamics (HSD) Program within the SBE directorate

Please find attached the report of the Committee of Visitors (COV) for the Human and Social Dynamics (HSD) priority area - yesterday's message had only the template, in error.

The COV report was discussed and accepted at the June 5-6, 2008 meeting of the Social, Behavioral, and Economic Sciences Advisory Committee. Attached, please find SBE's formal response to the recommendations of the COV, the COV report, and lists of COV members and SBE Advisory Committee members.

The COV consisted of 16 members selected to span all of the areas represented within HSD-related sciences. It was composed of 7 women and 9 men from a variety of academic institutions and different regions across the country. It also included 3 underrepresented minorities. Four members had received past funding from the HSD program, 12 had not. Half of the members had no experience (as reviewer or applicant) with the HSD program. The sample of proposals was selected to avoid institutional conflicts with the COV members. Individual conflicts were dealt with by blocking the member's access to any proposals for which they had a personal conflict of interest.

Attachments

cc: Arden Bement, Jr., OD
Kathie Olsen, OD
Thomas Cooley, BFA
Anthony Arnolie, OIRM

Christine Boesz, OIG
Lance Haworth, OIA
Susanne Bolton, OIRM

**Human and Social Dynamics
Committee of Visitors, May 2008**

List of Members

Dr. Cecilia Conrad, COV Chair
Department of Economics
Scripps College
cecilia_conrad@scrippscollege.edu

Agents of Change Emphasis Area

Dr. Gary Libecap, Chair
Department of Corporate Environmental
Management
University California - Santa Barbara
glibecap@bren.ucsb.edu

Dr. Lilian Na'ia Alessa
Department of Geography & Environmental
Studies; Biology
University Alaska Anchorage
afla@uaa.alaska.edu

Dr. Lee Epstein
School of Law
Northwestern University
lee-epstein@northwestern.edu

Dr. Arthur 'Skip' Lupia
Department of Political Science
University Michigan
lupia@umich.edu

Dr. David McGinnis
Department of Sponsored Research Office;
Geography
University Montana - Billings
dmcginnis@msubillings.edu

**Dynamics of Human Behavior Emphasis
Area**

Dr. David Poeppel, Chair
Neuroscience & Cognitive Science Program
University Maryland
dpoeppel@umd.edu

Dr. Roger Bolton
Department of Economics
Williams College
roger.e.bolton@williams.edu

Dr. Sharon Derry
Department of Educational Psychology
University Wisconsin Madison
sjderry@education.wisc.edu

Dr. Dennis O'Rourke
Department of Anthropology
University Utah
dennis.orourke@anthro.utah.edu

Dr. Dawn Robinson
Department of Sociology
University Georgia
sodawn@uga.edu

**Decisions, Risk, and Uncertainty Emphasis
Area**

Dr. Ruth Delois Peterson, Chair
Department of Sociology
Ohio State University
peterson.5@sociology.osu.edu

Dr. Kevin McCabe
Department of Economics
George Mason University
kmccabe@gmu.edu

Dr. Patricia Gober
Department of Geography
Arizona State University
patricia.gober@asu.edu

Dr. Michael Lindell
Department of Landscape Architecture &
Urban Planning
Texas A&M University
mlindell@archone.tamu.edu

Dr. Thomas O'Rourke
Department of Civil & Environmental
Engineering
Cornell University
tdo1@cornell.edu

National Science Foundation
Advisory Committee for Social, Behavioral and Economic Sciences

Dr. Michael F. Goodchild (Chair)

Department of Geography
University of California, Santa Barbara
Office: Ellison 5707
Santa Barbara, CA 93106-4060
Phone: (805) 893-8049
Cell: (805) 455-6529
Fax: (805) 893-3146
Email: good@geog.ucsb.edu

Dr. Christine Almy Bachrach (EX OFFICIO)

National Institute of Health/OBSSR
31 Center Drive Bldg 31/Room B1C19
Bethesda, Maryland 20892-7510
Phone: 301-496-9485
Fax: 301-496-0962
bachracc@mail.nih.gov
Assistant: Janaki Nibhanupudy
janakin@mail.nih.gov

Dr. Cecilia Conrad

Dean, Faculty of Scripps
1030 Columbia Ave.,
Claremont, CA 91711
Phone: 909-607-2822
Fax: 909-607-1204
Email: cconrad@scrippscollege.edu
Assistant: Maureen McCluney
Email: mmcclune@scrippscollege.edu

Dr. Susan L. Cutter (AC-ERE Liaison)

Director, Hazards & Vulnerability Research
Institute
Department of Geography
University of South Carolina
Callcott, Room 312
Columbia, SC 29208
Email: scutter@sc.edu
Phone: (803) 777-1590
Fax: (803) 777-4972
Assistant: Charlie Faucette
Email: faucette@mailboxsc.edu

Dr. Fred Gault

Visiting Fellow
International Development Research Centre
PO Box 8500
Ottawa, Canada K1G 3H9
Phone: + 1 613-236-6163 Ext. 2414
Email: fgault@idrc.ca

Dr. Lila R. Gleitman

Emerita, Institute for Research in Cognitive Science
University of Pennsylvania
Mail all Correspondence to:
260 Sycamore Avenue
Merion Station, PA 19066
Phone: (610) 667-7895
Email: gleitman@cattell.psych.upenn.edu

Dr. Ira Harkavy

Associate Vice President & Director
Center for Community Partnerships
University of Pennsylvania
133 South 36th Street, Suite 519
Philadelphia, PA 19104
Phone: (215) 898-5351
Fax: (215) 573-2799
Email: harkavy@pobox.upenn.edu
Assistant: Tamekia Hall
Email: ihappts@pobox.upenn.edu

Dr. Janet A. Harkness

Director, Survey Research and Methodology
Program
University of Nebraska-Lincoln
UNL Gallup Research Center
200 North 11th Street
P.O. Box 880241
Lincoln, NE 68588-0241
Email: jharkness2@unl.edu
Phone: (402) 458-5585
Fax: (402) 458-2031
Assistant: Barbara Rolfes
Email: brolfes3@unl.edu
Phone: (402) 458-2035

Dr. Nina G. Jablonski

Head, Department of Anthropology
Penn State
409 Carpenter Building
University Park, PA 16802
Phone: (814) 865-2509
Fax: (804) 863-1474
Email: ngj2@psu.edu
Assistant: Melissa Strouse
Email: mvs5@psu.edu
Phone: (814) 867-0005

Professor Guillermina Jasso

Department of Sociology
295 Lafayette Street; 4th floor
New York University
New York, NY 10012-9605
Phone: (212) 998-8368
Fax: (212) 995-4140
Email: gj1@nyu.edu

Dr. John L. King (AC-CI Liaison)

University of Michigan
503 Thompson Street
3074 Fleming Adm. Bldg.
Ann Arbor, MI 48109-1340
Phone: (734) 764-2571
Fax: (734) 764-2475
Email: jlking@umich.edu
Assistant: Kati Baurer
Phone: (734) 764-2571
Email: kati@umich.edu

Dr. Jeffrey K. MacKie-Mason (CISE Liaison)

School of Information
University of Michigan
3218 SI North
Ann Arbor, MI 48109
Phone: 734-647-4856
Email: jmm@umich.edu
Assistant: Heidi Skrzypek
Email: hmdona@umich.edu

Dr. Ruth Delois Peterson

Department of Sociology
300 Bricker Hall
190 N. Oval Mall
Ohio State University
Columbus, OH 43210
Phone: (614) 292-6681
Fax: (614) 292-6687
Email: Peterson.5@sociology.osu.edu

Dr. David Poeppel

Neuroscience & Cognitive Science Program
Department of Linguistics
University of Maryland
3416 Marie Mount Hall
College Park, Maryland 20742
Phone: (301) 405-0882
Fax: (301) 314-5052
Email: dpoeppel@umd.edu

Dr. Claude M. Steele

Center for Advanced Study in the
Behavioral Sciences
75 Alta Road
Stanford University
Stanford, CA 94305-2130
Phone: 650-321-2052 ext. 302
Fax: 650-321-1192
Email: claudio@casbs.stanford.edu
Assistant: Susan Hilpisch
Email: director-office@casbs.stanford.edu

Dr. Paula E. Stephan

Professor of Economics
Andrew Young School of Policy Studies
Georgia State University
35 Broad Street, Suite 620
Atlanta, GA 30303
Phone: (404) 651-3988
Fax: (404) 651-3996
Email: pstephan@gsu.edu
*Fax info. to assistant -Mr. Avani Raval
Email: araval@gsu.edu
Phone: (404) 651-0953
Fax: (404) 651-3996

Sir Roderick Floud (EX OFFICIO)

London Metropolitan University
31 Jewry Street
London EC3N 2EY
United Kingdom
Fax: 44 20 7320 1390
Email: roderick.floud@btinternet.com
Assistant:

Dr. Samuel L. Myers, Jr. (CEOSE Liaison)

Roy Wilkins Professor of Human Relations
And Social Justice
Hubert H. Humphrey Institute of Public Affairs
University of Minnesota
257 Humphrey Center
Room 130 HHH Center 7451
301 19th Avenue South
Minneapolis, MN 55455
Fax: (612) 625-6351
Phone: (612) 625-9821
Email: myers006@umn.edu
Assistant: Carletta Yancy
Email: yancy002@umn.edu

CORE QUESTIONS and REPORT TEMPLATE

for

FY 2008 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2008 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2008. Specific guidance for NSF staff describing the COV review process is described in Subchapter 300-Committee of Visitors Reviews (NSF Manual 1, Section VIII) that can be obtained at <www.inside.nsf.gov/od/oia/cov>.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and managerial matters pertaining to proposal decisions; and (2) comments on how the results generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals.

Many of the Core Questions are derived from NSF performance goals and apply to the portfolio of activities represented in the program(s) under review. The program(s) under review may include several subactivities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the subactivities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at <http://budg-eis-01/eisportal/default.aspx>. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the **processes** related to proposal review; and (B) the quality of the **results** of NSF's investments that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. Discussions leading to answers for Part A of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. *COV reports should not contain confidential material or specific information about declined proposals.* Discussions leading to answers for Part B of the Core Questions will involve study of non-confidential material such as results of NSF-funded projects. The reports generated by COVs are used in assessing agency progress in order to meet government-wide performance reporting requirements, and are made available to the public. Since material from COV reports is used in NSF performance reports, the COV report may be subject to an audit.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see <http://www.nsf.gov/od/oia/activities/cov/covs.jsp>.

FY 2008 REPORT TEMPLATE FOR

NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: May 12 –May 14, 2008				
Program/Cluster/Section: HSD				
Division: NA				
Directorate: SBE				
Number of actions reviewed:				
Area of Emphasis	AOC	DRU	DHB	ALL
Awards	20	20	20	60
Declinations	20	20	20	60
Other	NA	NA	NA	

Total number of actions within Program/Cluster/Division during period under review:

Area of Emphasis	AOC	DRU	DHB	ALL
Awards	50	47	44	141
Declinations	152	165	165	482
Other	NA	NA	NA	

Manner in which reviewed actions were selected:

Agents of Change (AOC)

1. Set target of 10 projects per panel – Environmental HSD (ENV) and Social, Political, and Economic Dynamics (SPED) – weighted by year, for a total of 20 projects
2. Created master list of all AOC awards (lead proposals only) in fiscal years 2005, 2006, 2007 (n=50)
3. Removed any proposals from list with which COV members have institutional conflicts
4. Separated master list by panel and fiscal year (see table below)

	Number of projects per year			
	2005	2006	2007	Total
ENV	13	9	5	27
SPED	11	7	5	23
total	24	16	10	50

5. Determined percentage of awards by fiscal year for both panels. For example, for the 27 awards made on the ENV panel, 48% were made in FY 2005, 33% in FY 2006, and 19% in FY 2007.
6. Applied these weights to determine the number to sample in each fiscal year for each emphasis area. For example, the sample of 10 ENV awards breaks down as follows: 5 from FY 2005, 3 from FY 2006, and 2 from FY 2007.
7. Created series of integers using random number generator (www.random.org) to assign to the full list of awards in each emphasis area and fiscal year. For example, to obtain a random sample of 5 ENV awards from 2005 (from the total pool of 13), a series of 13 integers was generated (ranging from 1 to 100) and assigned to the 13 awards. The resulting list was then sorted by random integer, and the first 5 on the list were selected for the sample.

Results of sampling are given in table below; the sample comprises roughly 40% of the total number of AOC awards.

	Number of projects per year			Total # in sample	Total # of awards	sample as % of total
	2005	2006	2007			
ENV	5	3	2	10	27	37.0%
SPED	5	3	2	10	23	43.4%
Total	10	6	4	20	50	40.0%

Decline sample: Same steps as above, but where n=162

	Number of projects per year

	2005	2006	2007	Total
ENV	24	17	22	63
SPED	40	27	32	99
total	64	44	54	162

Results of sampling are given in table below; the sample comprises roughly 13% of the total number of AOC declines.

	Number of projects per year			Total # in sample	Total # of declines	sample as % of total
	2005	2006	2007			
ENV	4	3	3	10	63	15.9%
SPED	4	3	3	10	99	10.1%
Total	8	6	6	20	162	12.3%

Decision, Risk Uncertainty (DRU)

1. Set target of 10 projects per panel – Decision Making (DEC) and Disasters (DIS) – weighted by year, for a total of 20 projects
2. Created master list of all AOC awards (lead proposals only) in fiscal years 2005, 2006, 2007 (n=47)
3. Removed any proposals from list with which COV members have institutional conflicts
4. Separated master list by panel and fiscal year (see table below)

	Number of projects per year			
	2005	2006	2007	Total
DEC	12	10	6	28
DIS	6	9	4	19
total	18	19	10	47

5. Determined percentage of awards by fiscal year for both panels. For example, for the 28 awards made on the DEC panel, 43% were made in FY 2005, 36% in FY 2006, and 21% in FY 2007.
6. Applied these weights to determine the number to sample in each fiscal year for each emphasis area. For example, the sample of 10 DEC awards breaks down as follows: 4 from FY 2005, 4 from FY 2006, and 2 from FY 2007.
7. Created series of integers using random number generator (www.random.org) to assign to the full list of awards in each emphasis area and fiscal year. For example, to obtain a random sample of 4 DEC awards from 2005 (from the total pool of 12), a series of 12 integers was generated (ranging from 1 to 100) and assigned to the 12 awards. The resulting list was then sorted by random integer, and the first 4 on the list were selected for the sample.

Results of sampling are given in table below; the sample comprises roughly 43% of the total number of DRU awards.

	Number of projects per year			Total # in sample	Total # of awards	sample as % of total
	2005	2006	2007			
DEC	4	4	2	10	28	35.7%
DIS	3	5	2	10	19	52.6%
Total	7	9	4	20	47	42.6%

Decline sample: Same steps as above, but where n=165

	Number of projects per year			
	2005	2006	2007	Total
DEC	49	30	18	97
DIS	15	28	25	68
total	64	58	43	165

Results of sampling are given in table below; the sample comprises roughly 12% of the total number of DRU declines.

	Number of projects per year			Total # in sample	Total # of declines	Sample as % of total
	2005	2006	2007			
DEC	5	3	2	10	97	10.3%
DIS	2	4	4	10	68	14.7%
Total	9	4	7	20	165	12.1%

DHB

Manner in which reviewed actions were selected:

Award sample:

1. Set target of 10 projects per panel – Cognition, Language, and Modeling (CLM) and Social, Organizational, and Cultural Dynamics (SOC) – weighted by year, for a total of 20 projects
2. Created master list of all AOC awards (lead proposals only) in fiscal years 2005, 2006, 2007 (n=44)
3. Removed any proposals from list with which COV members have institutional conflicts
4. Separated master list by panel and fiscal year (see table below)

	Number of projects per year			
	2005	2006	2007	Total
CLM	13	6	7	26
SOC	8	5	5	18
total	21	11	12	44

5. Determined percentage of awards by fiscal year for both panels. For example, for the 26 awards made on the CLM panel, 50% were made in FY 2005, 23% in FY 2006, and 27% in FY 2007.
6. Applied these weights to determine the number to sample in each fiscal year for each emphasis area. For example, the sample of 10 CLM awards breaks down as follows: 5 from FY 2005, 2 from FY 2006, and 3 from FY 2007.
7. Created series of integers using random number generator (www.random.org) to assign to the full list of awards in each emphasis area and fiscal year. For example, to obtain a random sample of 5 CLM awards from 2005 (from the total pool of 13), a series of 13 integers was generated

(ranging from 1 to 100) and assigned to the 13 awards. The resulting list was then sorted by random integer, and the first 5 on the list were selected for the sample.

Results of sampling are given in table below; the sample comprises roughly 45% of the total number of DHB awards.

	Number of projects per year			Total # in sample	Total # of awards	sample as % of total
	2005	2006	2007			
CLM	5	2	3	10	26	38.0%
SOC	4	3	3	10	18	56.0%
Total	9	5	6	20	44	45.5%

Decline sample: Same steps as above, but where n=165

	Number of projects per year			
	2005	2006	2007	Total
CLM	43	20	25	88
SOC	29	20	28	77
total	72	40	53	165

Results of sampling are given in table below; the sample comprises roughly 12% of the total number of DHB declines.

	Number of projects per year			Total # in sample	Total # of declines	sample as % of total
	2005	2006	2007			
CLM	5	2	3	10	88	11.4%
SOC	4	2	4	10	77	13.0%
Total	9	4	7	20	165	12.1%

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

A.1 Questions about the quality and effectiveness of the program's use of merit review process. Provide comments in the space below the question. Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE ¹
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <p>With an interdisciplinary initiative, a panel review seems essential. It provides an opportunity for individuals from different disciplines to compare and contrast views on individual proposals to reach a consensus. The use of a panel with disciplinary breadth – in both subject area and in methodology - supplemented with expertise from ad hoc reviewers as required is appropriate.</p>	YES
<p>2. Are both merit review criteria addressed</p> <p>a) In individual reviews?</p> <p>There was considerable variation across proposals. Some reviews were too terse and lacking in substance. Others were well developed. Generally, more weight was given to intellectual merit than to the broader impact component. The discussion of broader impact was sometimes perfunctory and lacking in imagination. Principal investigators confused intellectual merit criteria with broader impact. Several proposals were funded that lacked a serious broader impact</p>	YES AND NO

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

<p>statement.</p> <p>b) In panel summaries? Recent panel summaries offered well balanced discussions of intellectual merit and broader impact. Early panel summaries did not consistently reflect the discussion of both review criteria.</p> <p>c) In Program Officer review analyses? Well balanced in intellectual merit and broader impact.</p>	
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<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>COMMENTS. The reviews were predictably variable in their detail and thoughtful feedback to the Principal Investigators. In discipline-based programs, we expect variation in the diligence of individual reviewers. In an interdisciplinary program, we might expect more variation in the degree of detail in reviews because some readers are reviewing proposals that are outside their field of expertise.</p>	<p>YES</p>
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<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>In some cases, the individual reviewer ratings of a proposal varied widely, but the panel summary did not explain how a consensus was reached (or the disagreement resolved).</p>	<p>Qualified Yes</p>
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<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>(Note: Documentation in jacket usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.)</p> <p>Every proposal in the aggregate received substantive comments from the review provided, although there is variability in the nature of the comments provided.</p>	<p>Yes</p>

<p>6. Does the documentation to PI provide the rationale for the award/decline decision?</p> <p>(Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written or telephoned with diary note in jacket) of the basis for a declination.)</p> <p>Every proposal in the aggregate received substantive comments from the review provided as to the decision, although there is variability in the nature of the comments provided.</p>	<p>Yes</p>
<p>7. Is the time to decision appropriate?</p> <p>Note: Time to Decision --NSF Annual Performance Goal: For 70 percent of proposals, inform applicants about funding decisions within six months of proposal receipt or deadline or target date, whichever is later. The date of Division Director concurrence is used in determining the time to decision.</p>	<p>yes</p>

<p>Once the Division Director concurs, applicants may be informed that their proposals have been declined or recommended for funding. The NSF-wide goal of 70 percent recognizes that the time to decision is appropriately greater than six months for some programs or some individual proposals.</p> <p>With the exception of the DRU emphasis area, the program has met the goal of informing PIs within six months. The time to decision for awards is longer than for declines, as one might expect. An analysis of awards with unusually long decision times in the DHB area suggested that delays might have been due to (i) a decision to seek additional reviews after the panel review or (ii) applications submitted in one year but funded with money from the next year.</p>						
	AVERAGE # of MONTHS			PCT<6 Months		
	All	Awards	Declines	All	Awards	Declines
AOC	5.78	6.7	5.49	78.26	56.92	84.8
DHB	5.56	6.94	5.11	87.94	52.2	99.5
DRU	6.48	7.95	5.99	39.6	36.4	49.3

8. Additional comments on the quality and effectiveness of the program's use of merit review process:

In addition to the NSB-approved merit review criteria, the HSD priority has additional requirements: (1) Research teams that thoroughly integrate the perspectives of two or more disciplines and (2) a well-conceived management plan. Our review of proposals indicates that HSD is meeting its goal of funding interdisciplinary research, but we saw little evidence of strong management plans. We observed a correlation between the presence of a strong management plan and the quality of annual reports.

The committee questioned whether these projects involved "big thinking" along innovative lines. In the end, however, we agreed that creating and sustaining interdisciplinary teams to solve large societal problems such as disaster relief for Hurricane Katrina and new agricultural technologies in Bangladesh is a monumental task, and these projects accomplished that goal.

A.2 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	YES , NO, DATA NOT
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	AVAILABLE, or NOT APPLICABLE ²
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments: Based on the information provided, there seems to be an appropriate array of disciplines included. The group noticed few obvious representatives with PhDs from professional schools (<i>including law schools</i>), although it is possible they may be included under various disciplines, reflected in the disciplinary list, and an insufficient number of reviewers from the learning sciences.</p> <p>The number and breadth of proposal topics means that most panels lacked deep knowledge in any one discipline. It appeared to us that many of the reviewers lacked domain knowledge in the subject area covered in the proposal. It is likely that for some proposals panel members from other fields could address general issues such as methodological competence, but they lacked the expertise to address fully the substance and potential contribution of the project.</p>	Yes and No
<p>2. Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups?</p> <p>Note: Demographic data is self reported, with only about 25% of reviewers reporting this information.</p> <p>Comments:</p> <p>We do not have the data to speak to the gender, racial, ethnic, and geographical balance of reviewers. If NSF is interested in these issues, they must collect and maintain relevant data sets in this regard.</p> <p>Successful proposals were heavily weighted in favor of Ph.D. institutions, although this is to be expected because they are the institutions that are generated proposals. We believe, however, that NSF should make a stronger effort to bring more colleges and universities into the mainstream of interdisciplinary science.</p>	Yes

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

<p>3. Did the program recognize and resolve conflicts of interest when appropriate? Yes</p> <p>Comments: There is an appropriate policy in place and it is difficult to assess its implementation. We found no violations.</p>	Yes

4. Additional comments on reviewer selection:

A.3 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE ³ , OR DATA NOT AVAILABLE
1. Overall quality of the research and/or education projects supported by the program.	Appropriate

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

<p>With several exceptions, awards were very good to excellent with interesting ideas and strong interdisciplinary teams. It is too early to gauge their outcomes at this early date, although they appear to have considerable potential for quality research.</p> <p>There appeared to be considerable variation in the rigor of the analyses as well as the generalizations possible from the research. Further, the portfolio could be strengthened by proposals with stronger integrative frameworks. In most cases there were limited discussions of the educational impact of the research.</p> <p>There were, however, proposals from disciplines (e.g. economics and computer science) with a history of collaboration that did not appear to draw new groups of people together. Several of the economics proposals in particular would have been more appropriately submitted to the economics program.</p>	
<p>2. Does the program portfolio promote the integration of research and education?</p> <p>The proposed education programs were generally weak. The plans were not well thought out and unlikely to make significant contribution to the training of the next generation of interdisciplinary scholars.</p> <p>The jackets we reviewed, on balance, provided little evidence for any educational activities beyond the standard (e.g. funding of graduate students). That being said, we identified several awards that do a strong job incorporating – or even explicitly studying – education. For example, Ross, “Understanding Conceptual and Cultural Change: The Role of Expertise and Flexibility in Folk Medicine,” 0527707, and Penuel, “ Analyzing the Flow of Network-Embedded Expertise in Schools,” 0624307, focus on that aspect of the HSD mandate in a thoughtful way. In addition, we saw some proposals that included new interdisciplinary courses.</p>	<p>Appropriate</p>
<p>3. Are awards appropriate in size and duration for the scope of the projects?</p> <p>The budgets and durations of the projects do not vary very much, but the scope of work differed significantly across projects. Although most of the projects had reasonable budgets for the proposed work, a few seemed under-budgeted and others, over-budgeted. The duration is, for the most part, adequate. The appropriateness of funding is difficult to assess. To evaluate that requires seeing the outcomes. While the budgets do not seem out of proportion, it is hard to know whether more focused funding would have yielded comparable results.</p>	<p>Appropriate</p>

<p>4. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> Innovative/potentially transformative projects? <p>There was variation across the three emphasis areas.</p> <p>AOC projects: There were many potentially transformative questions/projects offered; the actual proposals, however, appeared to be less so in terms of innovative research methods, data collection, and analyses.</p> <p>DRU projects, in some cases, deal with significant societal problems, and they are staffed by interdisciplinary teams. The highlights that we were given are, with a few notable exceptions, more incremental than transformative. It is too early to tell how many of the incremental will rise to the standard of transformation, but we can say now that they are innovative and exciting.</p> <p>DHB Projects: The hope is that all the HSD projects are innovative. The DHB awards were judged to be innovative. We identified three awards that we deemed to be potentially transformative.</p>	<p>Appropriate</p>
<p>5. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> Inter- and Multi- disciplinary projects? <p>The proposals were stated in an interdisciplinary manner, the question was whether the appropriate disciplines were included and whether the range of disciplines was sufficiently broad. The program officers might take a more active role in communicating this aspect to the PIs given the range of responses in the panel summaries.</p>	<p>Appropriate</p>

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<p>6. Does the program portfolio have an appropriate balance considering, for example, award size, single and multiple investigator awards, or other characteristics as appropriate for the program?</p> <p>Yes, given the nature of the program. The proposals were interdisciplinary by definition. Projects were exploratory because of the preliminary nature of the research.</p>	<p>Appropriate</p>
<p>7. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Awards to new investigators? <p>NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant.</p> <p>Comments:</p> <p>Award rates for new investigators are not out of line with those of other NSF programs.</p>	<p>Appropriate</p>
<p>8. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Geographical distribution of Principal Investigators? <p>Comments:</p> <p>9 of 69 awards come from EPSCoR states, but we do not know the proportion of the national population coming from these states. This underscores the need for existing centers and networks to bring these groups into their interdisciplinary realms and to provide support in project management and proposal development.</p>	<p>Insufficient Information</p>
<p>9. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Institutional types? <p>Comments:</p> <p>See Above.</p>	<p>Appropriate</p>

<p>10. Does the program portfolio have an appropriate balance:</p> <ul style="list-style-type: none"> • Across disciplines and sub disciplines of the activity? <p>Comments: Awards in this panel were required to be interdisciplinary.</p>	<p>Not Applicable</p>
<p>11. Does the program portfolio have appropriate participation of underrepresented groups?</p> <p>Comments: There appears to be appropriate gender diversity, but inadequate representation of racial and ethnic minorities.</p>	<p>Appropriate</p>
<p>12. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports.</p> <p>Comments:</p> <p>The program responds broadly to national science goals of improving health, security, prosperity, and environmental quality—in a more expedited fashion than traditional NSF programs. Special programs for Katrina and tsunami response and the DMUU center addressing climate-change mitigation and adaption meet national needs specifically.</p> <p>The disaster proposals are consistent with NRC report: <i>Facing Hazards and Disasters: Under Human Dimensions</i>, 2006 and with the National Science and Technology Report: <i>Grand Challenges for Disaster Reduction</i>, 2005.</p>	<p>Appropriate</p>
<p>13. Additional comments on the quality of the projects or the balance of the portfolio:</p>	

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

1. Management of the program.

Comments: Management did a good job in soliciting applications, constructing panels, and awarding funds. Management made an early decision to emphasize flexibility and breadth. There were problems and opportunities from this strategy. The main problem was that not every proposal was reviewed by someone with a depth of knowledge in the subject area of the proposal. The opportunity was the ability to respond quickly to climate change, Katrina, the Indian Ocean tsunami. At the end of the day, a great deal was learned about managing new interdisciplinary initiatives. In our experience, the caliber of the program managers has been exceptional.

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

Comments: The program was very responsive to research opportunities related to climate change, Katrina, and the Indian Ocean tsunami. PIs will integrate students in their research and new topics into their course work.

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

Comments: The staff was thoughtful and knowledgeable in its responsiveness to changes that needed to be made year-to-year. The calls for proposals were appropriately clarified and expanded.

Review analyses were excellent. Clearly the team is enthusiastic about the program.

We were impressed that program officers worked hard to fund the best proposals across the sub-programs. Officers had considerable flexibility in making funding decisions. In several cases, they appeared to override panels, but overall, they appeared to use this flexibility wisely.

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

Comments:

No information.

5. Additional comments on program management:

In its evaluation of the annual reports, some members of the COV found that quantitative procedures, such as quantitative modeling, explicit research frameworks to guide survey design, and experimental research techniques, were often lacking. Such approaches should be encouraged because they are likely to promote fruitful learning outcomes as well as better metrics for discipline-based research. Not all COV members shared this opinion. The DRU group, in particular, disagreed with this assessment.

PART B. RESULTS OF NSF INVESTMENTS

The NSF mission is to:

- promote the progress of science;
- advance national health, prosperity, and welfare; and
- secure the national defense.

To fulfill this mission, NSF has identified four strategic outcome goals: Discovery, Learning, Research Infrastructure, and Stewardship. The COV should look carefully at and comment on (1) noteworthy achievements based on NSF awards; (2) ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcome goals; and (3) expectations for future performance based on the current set of awards.

NSF investments produce results that appear over time. Consequently, the COV review may include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made.

To assist the COV, NSF staff will provide award "highlights" as well as information about the program and its award portfolio as it relates to the three outcome goals of Discovery, Learning, and Research Infrastructure. The COV is not asked to review accomplishments under Stewardship, as that goal is represented by several annual performance goals and measures that are monitored by internal working groups that report to NSF senior management.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes ("highlights") as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 OUTCOME GOAL for Discovery: *"Foster research that will advance the frontier of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering."*

Of the 40 proposals reviewed under Agents of Change, 23 were funded and 17 had annual reports. Given the short time period for most of the projects, particularly those funded in 2007, many either had no annual reports or those with annual reports had limited research outcomes to describe. Most described the progress to date of the implementation of the research. There is a process of discovery as outlined in their research proposals. There was limited publication in peer-reviewed journals, but given the early date of the research, this is unsurprising. There were more book chapters and this outcome too reflects the process of assessing research in process and reporting preliminary outcomes that are not ready for peer review.

We identified three awards in the DHB area of emphasis that we considered exemplary in the context of HSD. Makse, "Dynamics of Social Networks," 0624116 has the potential to broaden significantly the applications of social network analysis by incorporating in a provocative way methodologies from physics, urban planning, and sociology. One interesting application is the analysis of the efficacy of mass immunizations programs. Taylor, "Biopsychosocial Bases of Social Responses to Threat," 0525713, potentially transforms theories of stress response and stress response differences between men and women based on social interactions and hormone levels. Griffin, "Modeling time, space, and behavior: Combining ABM & GIS to create typologies of playgroup dynamics in preschool children" 0624208 tackles a fundamental problem in social development by combining state-of-the-art knowledge in agent-based modeling, biology, sociology. Their analyses promise to revolutionize our understanding of group interactions over space and time.

Within the DRU area of emphasis, we were impressed with the innovative work at the boundaries of biology and economics by Santos, "Scientific Study of the Evolution of Preferences," #0624190 and Poldrack, "The Neural Basis of Risky Decision Making," #0433693. These are examples of fundamental work that probably would not be funded by disciplinary panels.

Also significant is the work by Holdguin-Veras. "Contending with Materiel Convergence: Optimal Control, Coordination, and Delivery of Critical Supplies to the Site of Extreme Events," #0624083 including transportation engineers and social scientists. They use the idea of "material convergence" to better link social needs after an extreme event with the human and material resources that are needed in rapidly changing post-disaster situations. This work has the potential to transform post-disaster relief operations with substantial improvements in the delivery of resources when and where they are needed most.

The HSD projects focused on the Indian Ocean Tsunami and Hurricane Katrina provide the critical mass of quantitatively-oriented case studies that support better metrics for pre-disaster planning and post-disaster response. Research on characterizing and improving the response to disasters is helping to develop an integrated theory of disaster management.

B.2 OUTCOME GOAL for Learning: “Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.”

All of the proposals with annual reports described the inclusion of graduate students, who were being trained in interdisciplinary research and who would be future researchers. However, we would liked to have seen more evidence of other educational outreach There also was inclusion of other groups, NGOs, labor unions, and other stake holders--national and international--depending on the proposal, who might be impacted by being included in a research process.

Examples include:

Brown, “Dynamics of idea generation in individual and group brainstorming: a multi-disciplinary approach using network models and behavioral experiments,” #0729470 deals with an important process in both individuals and groups, brainstorming. This research illuminates what situations optimize idea generation and decision making in a practice that pervades all work organizations.

Holdguin-Veras, #0624083, cited above, is an example of a highly inclusive and innovative student training program, in which both women and under-represented minorities are engaged in diverse, multi-disciplinary teams.

The Committee discussed the challenges of student training in interdisciplinary research teams and the need for new models for providing this training in the social sciences. The DMUU centers, because of their scale and mandate, have had the opportunity to experiment with integrated student training. The Columbia outreach program to local high school was noted positively by the site team. SPARC offers a “SPARC semester” consisting of upper-level 15 credit hour integrated set of courses organizing around decision making under uncertainty in the environmental studies program and a Summer Multicultural Access to Research Training to place underrepresented students into research internships. CMU has begun an interdisciplinary curriculum. DCDC offers a mandatory graduate seminar for students in the program. This process takes different forms in the different centers, but it does appear that the centers offer potential for experimentation in new forms of interdisciplinary student training.

B.3 OUTCOME GOAL for Research Infrastructure: “*Build the nation’s research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.*”

IPUMS provides a valuable integrated data set from the U.S. Census and census from across the world to support new social science research.

There are examples of interdisciplinary labs that are building cross-disciplinary tools that would not have been possible with disciplinary funding.

ASU’s Decision Theater is an example of physical infrastructure that could potentially improve societal decision making. WaterSim is used in the Decision Theater to evaluate whether exposure to visualization influences public perceptions of water issues and the water decision making by experts. These scientific and visualization tools offer the potential for stakeholders to view the outcomes of their decision making, understand the limitations of their current strategies, and transfer what they learn to operational settings.

<http://www.sciencedaily.com/releases/2007/02/070218132606.htm>Add Centers

The Committee voiced two concerns about the research examined within Agents of Change that would affect infrastructure development. One relates to the data sets being collected, specifically to how the data can be generalized and transferred. There was little clear motivation or justification described in the proposals that we examined. Two, most of the proposals had little quantitative data collection outcomes, and hence there may be limited opportunity to build a broad infrastructure from the research results. To build a scientific infrastructure, the approach and methods must be transparent and the data must be reported in a manner that is useful to other researchers. Even descriptive data must be replicable at least in terms of the process involved. Because of the limited duration of most of the examined projects, the Committee cannot assess whether the data collected through the funded research will meet these requirements for infrastructure investment.

PART C. OTHER TOPICS

We elected to answer the questions in Part C in narrative form.

While it is too early to identify specific outcomes or big ideas to emerge from HSD funding, there are reasons for cautious optimism. Many of HSD's accomplishments are unprecedented. They include:

- Highlighting the need for integration frameworks
- Formation of interdisciplinary teams that engage in a discourse
- Highlighting the changing characteristics of data and data legacies (e.g., archiving, access, and application) and infrastructure evolution (Adaptive Infrastructure).

We provide evidence of each of these accomplishments below and then address two questions posed to us by Dr. David Lightfoot at the start of our visit.

- 1) What are the big themes that emerge from HSD that the Foundation should pursue?
- 2) How do we incorporate the support for HSD type research after this funding expires?

Integration Frameworks

Many of the most impressive projects funded by HSD derive their appeal from the creative use of methods, often ported across disciplines. Methodological approaches have been expanded in a manner that might not have been possible with disciplinary panels. A simple example is project # 0433947 where researchers go beyond basic survey techniques to add ethnographic and GIS approaches. HSD has provided key funding in the new research area of biological aspects of economic decision making by translating models of human decision making to animal experiments and visa versa.

Projects in the HSD AOC area highlight the emergence of bottom-up, integrative frameworks which utilize complex dynamic systems, including agent-based models (ABMs) and other approaches. ABMs are a relatively new set of tools and approaches that allow diverse data to inform agent behaviors. Simultaneously, complexity theory, the idea that simple rules govern diverse systems and patterns observed across disciplines, is reflected in several projects. In Dalton, "Understanding linkages among governance factors of linked social and ecological systems," 0527304, researchers look at governance factors which couple social ecological systems. Another project, Naylor, "Agricultural Decision-Making in Indonesia with ENSO Variability: Integrating Climate Science, Risk Assessment, and Policy Analysis," 0433679, examines the cumulative effects of farming practices in rice food systems. Another example, Entwisle, Marginality in a Marginal Environment: An Agent-Based Approach to Population-Environment

Relationships,” 0728822 looks at how biophysical feedbacks affect migration in Thailand. Such approaches are transformative in that they engage a scale of interactions that have historically been ignored (that of individual behaviors).

There were two types of impacts of the development of these integrative frameworks. The first is an increasing capacity to tackle large, complex societal problems—more so than would be the case in traditional disciplinary programs. A prime example is Naylor’s (#0624359) study of agricultural decision making, “Impacts of El Nino-Southern Oscillation (ENSO) Events on Chinese Rice Production and the World Rice Market”, that resulted in the delivery of a rainfall-forecasting model that has been accepted by the Indonesian government. The second impact comes from projects that address previously intractable problem such as the biological basis for decision-making (Santos, #0624190) that can now be explored through interdisciplinary collaboration.

Formation of Interdisciplinary Teams

HSD funding has generated interdisciplinary collaborations, many of which would not have occurred without that funding. For example, in Naylor, 0624359, “Impacts of El Nino-Southern Oscillation (ENSO) Events on Chinese Rice Production and the World Rice Market, hydrologists, anthropologists, economists, physicists, environmental engineers, and geographers” are involved in analyzing and anticipating climate effects using existing knowledge about el Niño and other climatic information to develop models for insights about optimal agricultural production plans.

Some of the products may be long in coming, given the time and energy that it takes to build and sustain interdisciplinary teams. Impediments such as language barriers, lack of trust, and institutional problems will take many years to overcome. HSD is, in many ways, an investment in a new type of science that will be practiced 10 years from now. Recognition that some of the outcomes of this program will be recognized 10 years from now underscores the importance of the student training programs.

HSD has generated ‘new or novel’ teams across disciplines. For example, consider 0527180, “Offshore Outsourcing,” involved researchers from UCI’s and American University’s schools of management, an economist from UCI as well as researchers from UCI’s School of Information and Computer Sciences, including experimental psychologists, management information systems experts, and a political scientist. As another example, consider 0728822, “Marginality in a Marginal Environment” which involves researchers from sociology, engineering physics, public health, history, and political science.

HSD has highlighted the fact that we need to change the way we conduct science by changing culture among scientists themselves such that they become competent not only in their disciplines but also as cross-practitioners. Through

this program we realize that we can't be a team of specialists that coordinate but must approach science in such a way that creates an 'inquiry organism' in which members have functions that are complimentary toward understanding or addressing a common issue. The emergence of knowledge networks in the social sciences could be potentially transformative, particularly since they are not as well developed as the biophysical and mathematical sciences.

This change in culture is central to the American Competitiveness Act because it is a form of adaptation of our Knowledge Management Systems (KMS) to rapidly growing and diversifying information and data. Such adaptation and the resulting competitiveness are also transferable to other sectors of society such as business, management agencies, manufacturing, and service industries.

Adaptive Infrastructure

The development of infrastructures, such as IPUMs, allows for more direct empirical analyses of the dynamics of human and social systems. IPUMS, is an international, individual level dataset with samples drawn from censuses from the US and 25 other countries. The data cover over 200,000,000 individuals providing a critical data infrastructure for interdisciplinary scientific research. To date after less than 10 years of development, 2,349 publications cite this data set; at least 2,500 researchers are involved in using these data; and the webpage is very user friendly enabling researchers to study a range of questions that otherwise would not be possible.

The diverse types of research and the resulting data produced as a consequence of HSD highlight the need to be flexible (adaptive) in investments in infrastructure. This includes virtual organizations, community-based, dynamic data repositories that are open-source, as appropriate, and tied into distributed but organized Centers. This in no way criticizes current databases but rather emphasizes that infrastructure should adapt to reflect emerging methodologies which are used by interdisciplinary inquiry.

HSD funding supported the creation of centers. As with other HSD awards, it is too early to fully assess the outcomes of this funding, but Centers provide critical infrastructure to support interdisciplinary work. Centers expand the ability to take risks, primarily because of their scale. A Center can be a success even if not every initiative results in transformative research. A Center builds a critical mass of interdisciplinary research to engage with community problems. A Center can also provide leverage to access other resources. Centers supported by HSD have generated projects that have been funded through core NSF programs.

Broad Themes Emerging from HSD

In his opening conversation with our COV, Dr. Lightfoot identified three themes that, in the view of NSF staff, have emerged from HSD: Infrastructure, Complexity and the Environment. We have addressed the first two themes above. The HSD program has highlighted the need for adaptive infrastructure. It has also underscored the need for the development of complex, multi-level datasets associated with dynamic social systems. We identified several awards that illustrate the importance of an understanding of complexity to address problems that lie at the interstices of the natural and social and behavioral sciences.

This is particularly true with respect to the Environment. HSD funding provides an important social-science complement to the \$24 billion spent on climate research in the United States. It adds value to the climate science program by incorporating decision making aspects. In addition, it lays the groundwork for more informed policies.

HSD has added critical mass to the research about disaster relief and has moved this field from case studies of disaster impacts and response to more rigorous quantitative models that can be used to direct management strategies. It has also promoted more systematic interaction among physical scientists, engineers, and social scientists and allowed the development of a science of disaster research to inform national priorities.

Through HSD, NSF played a major and indispensable role in responding to Hurricane Katrina and the Indian Ocean Tsunami. No other agency supported the kind of interdisciplinary research that NSF did. As a result, NSF made significant contributions to improving national security through interdisciplinary teams that investigated the disasters, collected data, and developed models for disaster response and recovery.

The COV identified a fourth theme emerging from HSD funding: Human Resources. HSD has highlighted the importance of understanding the role of human resources within the natural and physical environment and how diverse human resources may be effectively integrated to solve problems and develop innovative ideas

Consider democratization as an agent of change, Backer, "Victims' Responses to Transitional Justice: A Comparative Study in West Africa," 0624278, for example, there is emphasis on the transition process of providing justice and human rights in the movement from an authoritarian regime to some form of representative democracy. Another related theme involves crises (civil wars, economic disasters, climatic events) and the human response as agents of change. In Entwisle 0728822, cited above, the researchers examine how households and communities respond to floods and other natural disasters. In this and related proposals, the researchers are examining the adaptive mechanisms that are

introduced to address these shocks. Another project, Fernandez, "Comparative Civic and Place Engagement in Three Latino Enclave Neighborhoods in Transition," 0433947, examines how immigration affects neighborhoods and the development of governance structures to promote civic engagement.

The HSD projects themselves should be the object of study to develop an understanding of the process of interdisciplinary work. As we observe above, one of the accomplishments of HSD is the formation of interdisciplinary groups of researchers. Understanding this process of collaboration and how it might be fostered should be key element in the development of science policy and more broadly will contribute insights into maintaining the competitiveness of the US workforce.

The HSD program has created a culture of collaboration for people from many disciplines. The inter-generational effects can be especially strong, as graduate students and junior faculty translate their interdisciplinary knowledge and networks into new proposals and research. Many of these networks are international.⁴ It is important to find a way to sustain this culture now that HSD will be coming to an end.

The Future Support of Interdisciplinary Research at NSF

We are profoundly enthusiastic about the prospects of interdisciplinarity. The HSD program has served as a catalyst for many innovative projects, and its administration has been solid.

That being said, based on the 2004-2009 portfolio, we believe that a substantial fraction of the HSD budget should go back to core SBE programs. We believe that many of the projects funded under HSD could have been reviewed through the core programs. Core programs should be encouraged to pursue joint review and co-funding with other programs to sustain the advantages and innovations of interdisciplinary research, including investigation of topics in human social dynamics. In fact, we suggest that calls from core programs make explicit that

⁴ In the Civil War Outcomes project, an international research team involving geographers at the University of Colorado, Temple, VPI and political scientists at UCSD and Washington University, as well as a political scientist from the University Pierre Mendes in France and two geographers from the Russian Academy of Sciences, examined the economic, social, environmental, and health outcomes of the conflicts in the Caucasus and southern Russia. In particular they are interested in the spatial distribution of these outcomes. They examine whether the post war interventions enhanced the prospects for lasting peace. This is a very ambitious project. Further, in 0624278, "Victims Responses to Transitional Justice," which a study about how societies view past civil rights, involving researchers from Ghana, Ireland, Nigeria, Sierra Leone, South Africa, as well as the US.

they encourage interdisciplinary proposals, and that there are mechanisms in place to permit appropriate review.

Although we believe that many interdisciplinary projects could be supported through the core programs, we recognize there are several obstacles that need to be overcome. These obstacles include:

- I. Interdisciplinary research tends to be riskier than discipline-based projects. There is a high potential for innovation but there is also a high variance in outcomes. There is likely to be a high variance of outcomes.
- II. Interdisciplinary projects take a longer time to mature. Collaborators from different disciplines have to overcome language and cultural barriers to communication. They have to teach each other their methodologies.
- III. In part because of the longer gestation period for interdisciplinary projects, it is more difficult to measure "success." In addition, there are likely to be fewer publication venues than for discipline-based projects
- IV. The scale of the interdisciplinary projects tends to be larger than what the funding available traditionally through the core programs can support.
- V. Discipline-based reviews will have difficulty assessing the potential for an interdisciplinary project

Given these obstacles, we argue that a portion of the HSD funding (roughly 1/3) should be reserved for interdisciplinary projects. There are several options for how this might be implemented: (i) maintenance of the HSD-like initiative; (ii) an incentive or matching fund to supplement the funding available from core programs if a project is interdisciplinary; (iii) a cross-directorate office for interdisciplinary research. The COV takes no position on the specific management of the pot of money, but it is noteworthy that each of our subgroups independently reached the conclusion that some dedicated funding for interdisciplinary work must be maintained.

In addition, it is critical that interdisciplinary projects are not reviewed exclusively by disciplinary specialists.

The COV makes no specific recommendation as to continuation of funding for the Centers. The consensus of the group is that the Centers could compete for the interdisciplinary funding identified above in addition to pursuing support through the core programs.

The COV encourages future interdisciplinary support for disaster-related research. HSD has been a catalyst for research on disaster response and recovery, and has helped NSF become a major player in this field, with significant contributions to the national agenda of developing resilient communities. This type of research should continue.

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

Program officers were available for questions (even as some were in panels).

Summary tables were very helpful.

- The computer technology must be improved. Too much time was spent on solving computer-related problems and in “waiting” for very slow computer systems to produce necessary information. Preparation of our report would have been easier with shared space.
- More plenary sessions to exchange ideas.
- Too many questions; Some are redundant; Part “A” of the template is over packed.
- Some data needed to be rechecked.
- More pre-meeting information about the COV process. (Even just the packet that we received the first day.)
- More information on the PIs, panels. Too little information currently is available—the bio sketches are insufficient.
- The AOC sample, for example, appears to have been unreflective of the more quantitative research projects—possibly due to conflict of interest and the research approach of the COV subcommittee.
- Is there a way for COV members to select proposals by discipline of the PI, which would have assisted in allocation of proposals to be read.
- May be more appropriate for COV members not to have currently funded projects.

SIGNATURE BLOCK:

For the Human and Social Dynamics Committee of Visitors, May 2008
Dr. Cecilia Conrad
Chair