HUMAN AND SOCIAL DYNAMICS

The Human and Social Dynamics (HSD) priority area supports multidisciplinary approaches to understanding change in human and social systems and their environments. HSD aims at scientific breakthroughs that will aid people, policy makers, and organizations as they seek to understand, manage, and adapt to change.

Almost every major challenge this country faces, ranging from climate change to terrorism to the need for an educated workforce, has at its core important human and social dynamics. New technologies, such as high-speed computers and functional magnetic resonance imaging machines, and new methods for collecting and analyzing data have dramatically increased the contributions that the social, behavioral, and economic sciences can make to understanding the processes that shape human and social action. HSD builds upon unprecedented opportunities for fruitful synergies across the social and behavioral sciences and with other fields of sciences and engineering. Together the NSF directorates can push the frontiers of knowledge, where discovery and innovation are likely.

The title *Human and Social Dynamics* captures the priority area's crucial defining elements. HSD focuses on human beings, with special attention to individual behavior and cognition. HSD focuses on groups, organizations, societies, and institutions, as they influence and are affected by changes in social and physical environments. HSD focuses on understanding systems that are constantly changing and being changed. Interactions and feedbacks in these dynamic systems are not adequately captured by standard linear models and transcend traditional disciplinary boundaries.

Human and Social Dynamics Funding

(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Change over FY 2006 Percent
Biological Sciences	$0.50	$0.50	$0.50	-	-
Computer and Information Science and Engineering	3.00	3.00	5.00	2.00	66.7%
Engineering	2.00	2.00	2.00	-	-
Geosciences	1.35	1.35	1.35	-	-
Mathematical and Physical Sciences	0.50	0.50	0.50	-	-
Social, Behavioral and Economic Sciences	30.90	31.40	31.40	-	-
Office of International Science and Engineering	0.06	0.50	0.50	-	-
Office of Polar Programs	-	0.20	0.20	-	-
Total, Human and Social Dynamics	$38.31	$39.45	$41.45	$2.00	5.1%

Totals may not add due to rounding.

This focus on the dynamic aspects of human and social behavior promises to bring about important advances in what is known about human action and development as well as organizational, cultural, societal, and technological adaptation and change. The HSD priority area requires research by interdisciplinary teams, and encourages international collaborations and proposals that link researchers from SBE science disciplines with those from other science and engineering disciplines.

This priority area began in FY 2003 within the Social, Behavioral, and Economic Sciences Directorate (SBE). In FY 2004, HSD expanded to reach across all NSF science and engineering disciplines. In response to the large number of meritorious FY 2004 submissions, NSF increased the funds available for support of HSD awards in FY 2005 and issued a solicitation in FY 2005 seeking proposals to be funded with FY 2005 and FY 2006 appropriations. This decision allowed a timely response to the earthquake/tsunami disasters in the Pacific in December 2004. The 2005 solicitation included a notice that HSD would accept proposals for Small Grants for Exploratory Research (SGER), resulting in the receipt of 33 SGER proposals and yielding six awards for multidisciplinary, time-sensitive research. Funded projects include studies of the roles of natural and social infrastructures in increasing or diminishing vulnerability to disasters, cultural issues in handling human remains, and responses to natural warning signs. In the FY 2005 competition, 448 exploratory research and research team proposals were considered. All proposals included three or more senior personnel from at least two different fields. HSD is supporting about 26 percent of these submissions, totaling nearly 120 awards. FY 2006 brought Hurricane Katrina, and HSD again issued a SGER notice that resulted in 190 proposals and 33 awards. These new projects are fielding interdisciplinary teams to examine how people and organizations responded to the disaster and how they are proceeding to rebuild their lives and their cities.

Long-term Goals: The Foundation is emphasizing interdisciplinary research that will:

- Improve decision making through research that focuses on individual, group, and societal attempts to identify, characterize, evaluate, and manage situations that call for choices and decisions and involve changing perceptions of uncertainty and risk.

- Explore the causes and consequences of large-scale social transformations, including globalization, democratization, scientific and technological innovation, and the changing development of human societies and their institutions and subsystems over time.

- Advance understanding of changes in human behavior and performance, at the individual, social, and population levels, by exploring the neurological, sensory-motor, psychological, informational, and social and organizational systems that produce or impede coordinated efforts within and between individuals.

- Develop new methods, tools, and enhancements in cyber and other scientific infrastructure needed to promote path-breaking disciplinary and interdisciplinary contributions in the natural and physical sciences, as well as in the social and behavioral sciences and engineering.

- Encourage researchers to "think big" about integrated research questions, through grants of a size and duration that allow substantial coordination across researchers, disciplines, and project areas.

- Significantly advance data resources and stimulate new problem definitions and framings within which novel research techniques can be tested and put into practice.

Long-term Funding for Human and Social Dynamics

(Dollars in Millions)

FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Plan	FY 2007 Request	FY 2008 Estimate	FY 2009 Estimate
$4.46	$30.07	$38.31	$39.45	$41.45	$42.00	$40.00

Estimates for 2008 and beyond do not reflect policy decisions and are for planning purposes only.

FY 2007 Areas of Emphasis: In FY 2007, NSF plans to invest $41.45 million in interdisciplinary research on *Human and Social Dynamics*. Team efforts and international collaborations will be encouraged and a mixed portfolio will be funded, including major research projects and exploratory projects aimed at research community development, education, and improvement of tools and infrastructure. Change remains the focus of the FY 2006 – FY 2007 competition, which will continue to support research at various scales, including individual, group, and organizational behavior as structured phenomena that develop over time. This focus continues with the substantive themes of prior HSD competitions: dynamics of human behavior; decision making, risk, and uncertainty; and agents of change. As part of a continuing five-year investment in conjunction with the Administration's Climate Change Science Program, $5.0 million will be devoted to decision making under uncertainty as it relates to climate change.

- **Dynamics of Human Behavior –** A wide range of intertwined sciences contributes to this research, which explores social, cognitive, linguistic, developmental, organizational, cultural, and biological processes that affect behavior. Relevant research includes work on the development of human communication, the cognitive requisites for effective human-machine interfaces, and the resilience of individuals, groups, and organizations to unexpected, exogenous shocks. Such research can model ways to improve human interaction in settings ranging from research laboratories to neighborhoods to school classrooms to nursing homes.

- **Decision Making, Risk, and Uncertainty –** Research on decision making, risk, and uncertainty enables a better understanding of such matters as the cognitive neuroscience of risk assessment, hypothesis construction and testing in the face of biases, distributed versus centralized decision making, the construction of effective decision support systems, and risks posed by extreme events, such as natural disasters and terrorist attacks. Development of test beds can examine vulnerability and resilience, and extrapolate and predict future losses and loss mitigation possibilities.

- **Agents of Change –** HSD research examines the dynamics and consequences of large-scale social transformations, such as the interactions of science and technology with globalization and democratization, and more focused systemic changes, such as the interactions of political, economic, environmental, and educational systems with agents of change. One goal is to gain a better understanding of how social systems and their constituent parts react to different drivers of change, ranging from ideology to the internet.

In these focal areas, HSD also supports advances in the infrastructure, tools, education, and resources needed to achieve breakthroughs. These include cybertools such as sensors and modes of connectivity; advances in modeling, including agent-based modeling, network analysis, and non-linear dynamics; improved methods to organize and analyze complex datasets; and projects to improve such infrastructure as instrumentation, virtual collaborations and laboratory networks, and data resources. Developments in spatial social science, for instance, use geo-spatial tools to integrate locational information with other social data to shed light on effects of neighborhood on crime, diffusion of innovations, and growth of virtual, regional, and global networks. Educational efforts aim at promoting interdisciplinary approaches, instructing user communities in the use of promising tools and models, and communicating the fruits of the HSD priority area to students at all levels.

Recent Research Highlight:

► **The Dynamics of Civil War Outcomes: Bosnia and the North Caucasus:** Scientists from five U.S. universities, with research partners in Russia and Bosnia, are collaborating to help determine the prospects for peaceful relations between war-torn regions. Using a combination of individual and aggregate data from opinion surveys, census counts, government agencies, and remote sensing., the project builds a Geographic Information System for each study region that integrates three types of data (satellite imagery, census and other aggregate data, survey data) at multiple scales.

This research deepens the empirical analysis of the underlying factors of possible future conflicts, gauging the prospects for peaceful relations between nationalities. Data and findings will help to answer key questions about the nature of community conditions in former war zones, as local, national and international agencies try to cope with disruptions to peoples, economies, and environments over the past 15 years. (Managed by SBE with cross-directorate support).