

HUMAN AND SOCIAL DYNAMICS

The Human and Social Dynamics (HSD) priority area supports multidisciplinary approaches to understanding the complex dynamics within and among human and social systems and their environments, at scales ranging from cellular to global and from nanoseconds to millennia. HSD aims to increase our collective ability to anticipate the complex consequences of change; to better understand the dynamics of human and social behavior, including that of the human mind; to better understand the cognitive and social structures that create and define change; and to help people and organizations better manage profound or rapid 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 underlie a dramatic increase in the contributions that the social, behavioral, and economic sciences can make to the understanding of processes that shape human and social action. HSD builds upon unprecedented opportunities for fruitful synergies across the social and behavioral sciences and other fields of sciences and engineering. Together all 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. The interactions and feedbacks in dynamic systems are not captured by standard linear models and transcend traditional disciplinary boundaries.

Human and Social Dynamics Funding

(Dollars in Millions)

	FY 2005			Change Over	
	FY 2004	Current	FY 2006	FY 2005	
	Actual	Plan	Request	Amount	Percent
Biological Sciences	0.50	0.50	0.50	0.00	0.0%
Computer and Information Science and Engineering	3.00	3.00	3.00	0.00	0.0%
Engineering	2.00	2.00	2.00	0.00	0.0%
Geosciences	1.35	1.35	1.35	0.00	0.0%
Mathematical and Physical Sciences	0.53	0.50	0.50	0.00	0.0%
Social, Behavioral and Economic Sciences	21.56	30.90	31.40	0.50	1.6%
Office of International Science and Engineering	0.15	0.00	0.50	0.50	0.0%
Office of Polar Programs	0.00	0.00	0.20	0.20	0.0%
Subtotal, R&RA	\$29.08	\$38.25	\$39.45	\$1.20	1.6%
Education and Human Resources	0.99	0.00	0.00	0.00	0.0%
Total, Human and Social Dynamics	\$30.07	\$38.25	\$39.45	\$1.20	1.6%

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 encourages widespread interdisciplinarity. Team research and international collaborations are explicitly encouraged, and proposals that link researchers from SBE science disciplines with those from other science disciplines are specifically invited.

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 disciplines, education, and engineering. The response to the FY 2004 announcement was enthusiastic, with over 800 proposals submitted. Fully half of the primary investigators on these proposals were from disciplines outside the SBE sciences, including 17 percent from the Directorate for Computer and Information Science and Engineering and 14 percent from the Directorate for Engineering.

Long-term Goals. In response to the large number of meritorious FY 2004 submissions, NSF issued a solicitation in FY 2005 encouraging proposals for funding with FY 2005 and FY 2006 appropriations. NSF is emphasizing interdisciplinary research related to human and social dynamics that will:

- Improve decision making through research that focuses on the cognitive and social processes of risk construction, communication, and evaluation; the role of biases in individual and organizational hypothesis development and testing; the construction of decision support systems, particularly in response to risks posed by extreme events; and other areas ripe for breakthroughs.
- Explore the causes and consequences of large-scale social transformations, including globalization, democratization, and scientific and technological change, and of agents of change in important social institutions and subsystems, such as political, economic, environmental, and educational systems.
- Advance understanding of human behavior and performance at individual, social, and population levels, by exploring the interplay of neurological, sensory-motor, psychological, informational, and social and organizational systems that produce coordinated efforts within and between individuals.
- 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.
- Stimulate significant advances in data resources and new problem definitions and framings within which novel research techniques can be tested and put into practice.
- Support enhancements to methods and tools, including geospatial and cybertools; sensors and new modes of connectivity; modeling, including network analysis and non-linear dynamics; technologies for dataset organization and analysis; and multi-user collaborative environments.
- Support HSD Small Grants for Exploratory Research.

Long-term Funding for Human and Social Dynamics

(Dollars in Millions)

FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Actual	Current Plan	Request		
\$30.07	\$38.25	\$39.45	\$40.24	\$41.04

Estimates for 2007 and beyond do not reflect policy decisions and are presented for planning purposes only.

FY 2006 Research Focus. In FY 2006, NSF plans to invest \$39.45 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 education and development of novel tools. As part of a five-year investment supporting the Climate Change Research Initiative, \$5.0 million will be devoted to decision making under uncertainty as it relates to climate change, in the form of continuing support for funded Centers.

Change remains the focus of the FY 2005 – FY 2006 competition with attention to the dynamics of changing human and social systems, from the internal workings of the human mind to the interplay of global social and cultural systems. The HSD competition supports 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 the first round of HSD competition: agents of change; dynamics of human behavior; and decision making, risk, and uncertainty.

Dynamics of Human Behavior. A wide range of intertwined sciences contributes to this research, which explores processes that are cognitive, linguistic, developmental, organizational, cultural, and biological. Relevant research includes development of human communication, cognitive requisites for effective human-machine interfaces, and robustness of organizational forms to unexpected, exogenous challenges. Such research can model ways to improve human interaction in settings ranging from research laboratories to elementary classrooms.

Decision Making, Risk, and Uncertainty. Research on decision making, risk, and uncertainty enables a better understanding of matters such 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 will also delve into 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 a variety of drivers, ranging from war and ideology to the Internet and home computers.



In conjunction with these areas, HSD also supports advances in the tools, education, and resources needed to achieve breakthroughs. These are likely to 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 build such infrastructure as instrumentation, laboratory networks, and data resources. Developments in spatial social science uses 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 will 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.