NETWORKING AND INFORMATION TECHNOLOGY R&D

The National Science Foundation is the lead federal agency in the Networking and Information Technology Research and Development (NITRD) Program (www.nitrd.gov). Every NSF directorate is involved in NITRD activities and NSF participates in every NITRD program component area (PCA).

Networking and Information Technology Research and Development Funding

(Dollars in Millions)

		FY 2006		Change over FY 2006	
	FY 2005 Actual	Current Plan	FY 2007 Request	Amount	Percent
Biological Sciences	$77.00	$77.00	$83.50	$6.50	8.4%
Computer and Information Science and Engineering	490.20	496.41	526.69	30.28	6.1%
Engineering	11.20	11.20	11.20	-	-
Geosciences	14.56	14.56	14.56	-	-
Mathematical and Physical Sciences	77.52	67.82	69.00	1.18	1.7%
Social, Behavioral and Economic Sciences	12.47	12.47	12.47	-	-
Office of Cyberinfrastructure	123.28	127.12	182.42	55.30	43.5%
Office of International Science and Engineering	0.38	-	-	-	N/A
Subtotal, Research and Related Activities	806.61	806.58	899.84	93.26	11.6%
Education and Human Resources	4.06	3.75	3.90	0.15	4.0%
Total, NITRD	$810.67	$810.33	$903.74	$93.41	11.5%

Totals may not add due to rounding.

NSF's FY 2007 request continues strong support for the NITRD Program. The total request of $903.74 million supports research and education in:

- High-end computing infrastructure and applications (HEC I&A) involving advanced computer systems, applications software, and related infrastructure, which are core necessities for cutting-edge discovery across all scientific and engineering fields;
- High-end computing research and development (HEC R&D) activities to optimize the performance of today's high-end computing systems and to develop future generations of systems to meet critical needs;
- Cybersecurity and information assurance (CSIA), a new program component area, focusing on improving the ability of information systems to prevent, resist, respond to, or recover from actions or events that compromise or threaten the availability, integrity, or confidentiality of data of the information systems themselves, or of related services;
- Human-computer interaction and information management (HCI&IM) to increase the benefit of computer technologies to humans, particularly the science and engineering community;
- Large-scale networking (LSN) to enhance high-performance networking, including leading-edge networking technologies and services;
- High-confidence software and systems (HCSS) for systems and verification technologies to assure computer-based system safety, dependability, and correctness;
- Software design and productivity (SDP) leading to fundamental advances in concepts, methods, techniques, and tools for software design; and

- Social, economic, and workforce aspects of IT and IT Workforce Development (SEW) focusing on the nature and dynamics of IT impacts on technical and social systems, interactions between people and IT devices and capabilities, and workforce development needs.

NSF works in close collaboration with other NITRD agencies and participates at the co-chair level in seven of the eight program component coordinating groups. NSF's Assistant Director for Computer and Information Science and Engineering Directorate is co-chair of the NITRD Subcommittee of the National Science and Technology Council's Committee on Technology.

NITRD and Cyberinfrastructure (CI)

A good deal of overlap exists between NSF's NITRD and CI portfolios. The majority - nearly sixty percent - of the agency's NITRD portfolio comprises fundamental research and education in computing supported by the Directorate of Computer and Information Science and Engineering. These NITRD activities represent high-risk, long-term, investments in the computing frontier. At the other end of the NITRD spectrum, some of the agency's NITRD investments are focused on the deployment of state-of-the-art NITRD technologies in service to the broad range of NSF-supported science and engineering disciplines; these NITRD investments are also reported as CI Tools. Examples of projects in this category include the Teragrid, which is supported by the Office of Cyberinfrastructure. NSF also makes research investments in a number of projects and programs that are driven by science and engineering applications, but which require varying degrees of information technology and networking research investments; these activities are reported both as CI and as NITRD.

FY 2007 Areas of Emphasis:

In FY 2007, NSF will emphasize investments in the following areas of NITRD:

High-End Computing R&D: CISE will continue support of the High-End Computing University Research Activity to support innovative research activities aimed at building complex software and tools on top of the operating system for high-end architectures.

High-End Computing Implementation and Applications: The first phase in the acquisition of a leadership-class high performance computing system in the Office of Cyberinfrastructure is included at a level of $50.0 million. Also, several NSF directorates will increase their investments in this area to capitalize on the growing importance of cyberinfrastructure in furthering their research and education goals. For example, MPS will increase activity in modeling and simulation of complex systems, including development of numerical algorithms and software implementations that push the boundaries of computing infrastructure in solving numerical problems that were previously intractable.

Cybersecurity and Information Assurance: CISE will increase support for the Cyber Trust program, which is based on a vision of society in which the computers and networks underlying national infrastructures, as well as in homes and offices, can be relied upon to work – even in the face of cyber attacks. Support will continue for a number of ongoing projects, including one focused on the design and technology for trustworthy voting systems and the other on securing electric power grids.

High Confidence Software and Systems: Funding in this area includes an increase in cybersecurity research funded through the CISE Directorate.

Human Computer Interfaces and Information Management: Funding in this area is increased in recognition of the need to provide responsible stewardship of scientific digital data. NSF will continue to

work with the Library of Congress through their newly established Digital Archiving and Long-Term Preservation program (DIGARCH). Digital preservation is of central importance for scientific data.

Social, Economic and Workforce: NSF will continue the Broadening Participation in Computing program aimed at significantly increasing the number of students who are U.S. citizens and permanent residents receiving post secondary degrees in the computing disciplines. Support also will continue for Cyberinfrastructure TEAM (CI-TEAM) projects designed to prepare current and future generations of scientists and engineers to create, advance and exploit cyberinfrastructure.

Recent Research Highlight

► **From "Research Testbed" to "Real LifeTest" in Gulf:** When advanced networking scientists at the University of Nebraska-Lincoln (UNL), Texas A&M, and the Ohio State University wrapped up their normal weekly call in late August 2005 they had no idea that their laboratory work on advanced networking via satellite would so quickly be put to a real life-and-death test. Only a short time later, working with their partners at the American Distance Education Consortium, the Indiana Higher Education Telecommunications System and private sector partner Tachyon, they were developing a plan to get these state-of-the-art communication capabilities into Katrina-ravaged institutions in Louisiana and Mississippi. Working with local emergency responders they established emergency telecommunications support for doctors and local communities. The "collaboratory" of scientists demonstrated that they could quickly move from laboratory to field to broadly impact the affected area.