EDUCATION AND HUMAN RESOURCES $750,600,000

The FY 2008 Budget Request for the Directorate for Education and Human Resources (EHR) is $750.60 million, an increase of $34.38 million, or 4.8 percent, over the FY 2007 Request of $716.22 million. The presentation here reflects the transfer of EPSCoR from Education and Human Resources to Research and Related Activities.

Education and Human Resources Funding
(Dollars in Millions)

	FY 2006 Actual [1]	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request	
				Amount	Percent
Research on Learning in Formal and Informal Settings (DRL)	$215.58	$215.00	$222.50	$7.50	3.5%
Undergraduate Education (DUE)	211.86	196.80	210.22	13.42	6.8%
Graduate Education (DGE)	153.07	160.57	169.50	8.93	5.6%
Human Resource Development (HRD)	119.75	143.85	148.38	4.53	3.1%
Total, EHR [2]	$700.26	$716.22	$750.60	$34.38	4.8%

Totals may not add due to rounding.

[1] FY 2006 Actual reflects FY 2007 and FY 2008 structure of programs.

[2] Excludes funding for EPSCoR for all years shown for comparability. EPSCoR has been transferred from EHR to R&RA. Also excludes $99.40 million in FY 2006 obligations and an estimated $100.0 million in FY 2007 and FY 2008 receipts from H-1B Nonimmigrant Petitioner Fees.

NSF, in accordance with the NSF Act of 1950, is the principal federal agency charged with promoting science and engineering (S&E) education. In support of this mission, EHR promotes the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians, and educators and a well-informed citizenry who have access to the ideas and tools of science and engineering. EHR supports education, research, and infrastructure development in all S&E disciplines. The purpose of these activities is to enhance the quality of life of all citizens, to improve the health, prosperity, welfare, and security of the Nation, and to build the science, technology, engineering, and mathematics (STEM) workforce of the 21st century.

EHR Subactivity Funding
(Dollars in Millions)
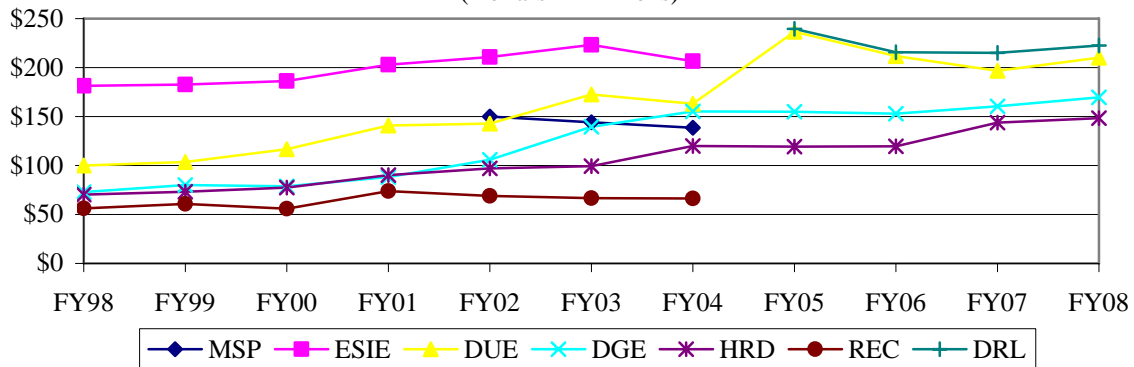
Beginning in FY 2005, data reflect the FY 2007 structure of programs and subactivities. At the subactivity level, ESIE and REC are combined to form DRL. MSP is merged into DUE.

The Experimental Program to Stimulate Competitive Research (EPSCoR) has been transferred to Integrative Activities (IA). Included in the FY 2008 Budget Request for IA is funding for EPSCoR. This places EPSCoR within the NSF Office of the Director to maximize cross-directorate interaction and to ensure continued integration with the research and education directorates. Additional information on EPSCoR can be found in the IA chapter of this Request.

EDUCATION AND HUMAN RESOURCES

Appropriation Language

For necessary expenses in carrying out science and engineering education and human resources programs and activities pursuant to the National Science Foundation Act of 1950, as amended (42 U.S.C. 1861-1875), including services as authorized by 5 U.S.C. 3109, authorized travel and rental of conference rooms in the District of Columbia, $750,600,000, to remain available until September 30, 2009.

Education and Human Resources
FY 2008 Summary Statement
(Dollars in Millions)

	Enacted/ Request	Rescission	Carryover/ Recoveries	Total Resources	EPSCoR	Expired	Adj. Total Resources	Obligations Incurred/Est.[1]
FY 2006 Appropriation	$807.00	-$10.31	$2.26	$798.95	-$98.22	-$0.34	$700.39	$700.26
FY 2007 Request	816.22	-	0.13	816.35	-100.00	-	716.35	716.35
FY 2008 Request	750.60	-	-	750.60	-	-	-	750.60
$ Change from FY 2007								$34.25
% Change from FY 2007								4.8%

Totals may not add due to rounding.

[1]The FY 2008 Request for R&RA includes $107.0 million for EPSCoR. Prior to FY 2008, EPSCoR was funded through the Education and Human Resources appropriation.

Adjustments to Base

In FY 2006 and FY 2007, $98.22 million and $100.0 million, respectively, are presented for EPSCoR in Integrative Activities within the R&RA appropriation.

Explanation of Carryover

Within the Education and Human Resources (EHR) appropriation, a total of $127,903 was carried forward into FY 2007 including $110,000 for funding of the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring Program (PAESMEM). The PAESMEM proposal recommendations are currently awaiting OSTP (White House) approval.

RELEVANCE

EHR is the principal source of federal support for strengthening S&E education through education research and development (R&D). EHR programs support technological innovation to enhance economic competitiveness and new job growth. EHR addresses the workforce needs of the Nation and ensures a scientifically literate population and a robust supply of qualified experts.

EHR activities strengthen U.S. education at all levels and help ensure continued U.S. economic and research preeminence. These activities respond to the need expressed in the President's American Competitiveness Initiative (ACI), which states:

> "Education is the gateway to opportunity and the foundation of a knowledge-based, innovation-driven economy. For the U.S. to maintain its global economic leadership, we must ensure a continuous supply of highly trained mathematicians, scientists, engineers, technicians, and scientific support staff as well as a scientifically, technically, and numerically literate population."

EHR's programs work to attract and retain people in STEM fields, increasing the Nation's ability to compete for and retain highly-skilled American workers. This includes:
- promoting cooperation among academic institutions, industry, and government to share STEM resources and ensure critical skills needed by employers are being taught in our schools and colleges;
- supporting robust R&D on effective STEM education practices that increase content knowledge and retention of STEM students and teachers;
- broadening participation of underrepresented groups, geographic regions, and types of institutions in all S&E fields;
- providing scholarships and fellowships to graduate and undergraduate students in STEM fields; and
- recognizing outstanding efforts in STEM education and mentoring.

The FY 2008 Request includes programs that support efforts to prepare a diverse, globally-engaged workforce and strengthen K-12 STEM education by enhancing our understanding of how students learn and applying that knowledge to train highly qualified teachers, develop effective curricular materials, and improve student learning. EHR's Budget Request proposes new and ongoing efforts that prepare the workforce by:
- developing interdisciplinary approaches to teaching and learning;
- stimulating institutional transformations via interdepartmental and interdisciplinary efforts to improve STEM education at all levels;
- developing instructional materials and methods for K-12, undergraduate, and graduate STEM education that reflect current knowledge, employ appropriate technology, and are informed by educational research; and
- promoting programs that increase public interest, understanding, engagement, and lifelong learning in STEM.

EHR's broadening participation efforts increase our Nation's ability to compete for and retain highly-skilled American workers by:
- building innovative and effective collaborations and partnerships to attract individuals from underrepresented groups into STEM;
- strengthening comprehensive planning and strategic implementation at minority-serving institutions;
- increasing pathways and lowering barriers from secondary to post-secondary STEM education; and
- supporting research, dissemination of research, and extension services in education that will lead to a larger and more diverse domestic STEM workforce.

NSF is the principal source of federal support for strengthening STEM education across all levels and is uniquely positioned to lead the Nation in STEM education due to its focus on STEM education research. EHR is working closely with the Academic Competitiveness Council (ACC) to continue to evaluate its portfolio of education programs in order to ensure U.S. students receive the highest quality STEM education. EHR programs increase American competitiveness in the global economy and support NSF's underlying strategy of integration of research and education.

Summary of Major Changes by Division   *(Dollars in Millions)*

FY 2007 Request, EHR……….….…..……………………………………………...............…$716.22

Research on Learning in Formal and Informal Settings (DRL)   +$7.50
  Although total support for Research and Evaluation on Education in Science and Engineering (REESE) is level with the FY 2007 Request, $7.50 million of funds that had been previously directed to project and program evaluation efforts will be available for core REESE activities. Project and Program Evaluation will be a new budget line in DRL, funded at $7.50 million.

Undergraduate Education (DUE)   +$13.42
  To further strengthen NSF's emphasis on increasing the quality and quantity of the science and engineering workforce, and the extent to which undergraduate students are well prepared for an increasingly technological global society, EHR will increase funding for the following programs: Advanced Technological Education (ATE), Course, Curriculum, and Laboratory Improvement (CCLI), STEM Talent Expansion Program (STEP), National STEM Education Digital Library (NSDL), and Federal Cyber Service: Scholarship for Service (SfS). Funding for the Robert Noyce Scholarship program and for Excellence Awards in Science & Engineering (EASE) is level with the FY 2007 Request. Support for the Math and Science Partnership (MSP) program is level with the FY 2007 Request. Approximately $30.0 million will be available for new MSP awards in FY 2008. MSP will coordinate its efforts with other education programs at NSF, the Department of Education, and state-funded efforts.

Graduate Education (DGE)   +$8.93
  Funding for the Graduate Research Fellowship (GRF) program will increase by $8.93 million over the FY 2007 Request, supporting an additional 200 graduate students. Funding for the Graduate Teaching Fellows in K-12 Education (GK-12) program and for the Integrative Graduate Education and Research Traineeships (IGERT) program is level with FY 2007.

Human Resource Development (HRD)   +$4.53
  Support increases by $4.53 million for the Centers of Research Excellence in Science and Technology program. The remaining HRD programs, which emphasize broadening participation in the S&E workforce, are funded at the FY 2007 Request. Many HRD programs are focal points for linking EHR activities with NSF's R&RA directorates to strengthen collaborations that integrate research and education. Support for these highly successful and respected programs will aid in addressing national S&E workforce needs to ensure a scientifically literate population and a robust supply of qualified experts across all fields.

Subtotal, Changes   +$34.38

FY 2008 Request, EHR …………………………………………………………………….......$750.60

Summary of Major Changes in Directorate-Wide Investments   *(Dollars in Millions)*

FY 2007 Request, EHR…………..…………..…………………………………............…$716.22

Preparing the Workforce of the 21st Century   +$12.85
- ATE increases by $5.12 million to $51.62 million. ATE will support 15-20 additional projects to improve the education of technicians in advanced technology areas and initiate one additional targeted research project.
- STEP increases by $3.20 million to $29.70 million. The increase will allow support of three additional projects to increase the number and diversity of students majoring in STEM fields.
- CREST increases by $4.53 million to $29.53 million. CREST expects to make up to eight new awards, including up to four new centers with special emphasis on those targeting innovation in nanotechnology and/or cyberinfrastructure.

Taken together these increases will strengthen NSF's efforts to promote innovation and develop a strong S&E workforce by broadening participation of underrepresented groups and types of institutions in STEM, two areas of emphasis in the ACI.

Transformational Facilities and Infrastructure   +$0.50

Support for NSDL will increase by $500,000 to $16.50 million. NSDL will support additional projects that select, catalog, and maintain digital resources for college classes and student projects.

Other
- Graduate Fellowships and Traineeships.   +$8.93
  This increase will support an additional 200 graduate students in the Graduate Research Fellowship program. Funding will remain equal to the FY 2007 Request for Graduate Teaching Fellows in K-12 Education (GK-12) and Integrative Graduate Education and Research Traineeships (IGERT).
- Research and Evaluation on Education in Science and Engineering (REESE).   +$7.50
  Although total support for Research and Evaluation on Education in Science and Engineering (REESE) is level with the FY 2007 Request, $7.50 million of funds that had been previously directed to project and program evaluation efforts will be available for core REESE activities, effectively increasing the REESE budget.
- Course, Curriculum, and Laboratory Improvement (CCLI).   +$3.50
  The increase will support new projects, with emphasis on ways to assess student learning, improve undergraduate curricula, and enhance faculty expertise.
- Scholarships for Service/Cybercorps (SfS).   +$1.10
  SfS will fund an additional scholarship grant, supporting an additional three cohorts of students who will become information assurance and computer security professionals.
- Cyber-enabled Discovery and Innovation (CDI)
  Within funding for its portfolio, EHR will provide $5.0 million for the new NSF-wide investment, Cyber-enabled Discovery and Innovation (CDI). EHR will fund proposals that study topics at the interface of information technology and education.

Subtotal, Changes   +$34.38

FY 2008 Request, EHR …………..……………………………………………………........$750.60

NSF-WIDE INVESTMENTS

In FY 2008, the Directorate for Education and Human Resources will support research and education efforts related to broad, Foundation-wide investments in a number of areas, including NSF's multidisciplinary priority areas and the Administration's interagency R&D priorities.

EHR NSF-wide Investments

(Dollars in Millions)

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request Amount	Percent
Cyber-enabled Discovery and Innovation (CDI)	-	-	$5.00	$5.00	N/A
Cyberinfrastructure	15.22	16.00	16.50	0.50	3.1%
International Polar Year	2.95	2.00	2.00	-	-
Mathematical Sciences	1.96	1.09	-	-1.09	-100.0%
National Nanotechnology Initiative	3.24	3.00	3.10	0.10	3.3%
Networking and Information Technology R&D	3.88	3.90	9.00	5.10	130.8%

EHR's support for the new **Cyber-enabled Discovery and Innovation** investment will include the study the impact of information technology on educational practice, new approaches to using technology in education, application and adaptation of technologies to promote learning, the effects of technology on learning, and up to four new CREST centers that target nanotechnology and/or cyberinfrastructure.

EHR's **cyberinfrastructure** support totals $16.50 million, an increase of $500,000 over the FY 2007 Request, and funds the NSDL, an online network of learning environments and resources for STEM education at all levels in both formal and informal settings. NSDL will fund projects that provide stewardship for the content and services needed by major communities of learners and projects that develop services to support users, collection providers, and integration efforts, and enhance the impact, efficiency, and value of the library.

EHR will provide $2.0 million in FY 2008 for activities that support education and outreach goals of the **International Polar Year** (IPY). EHR will engage the public through projects such as museum exhibits, large format films, and television and radio documentaries. EHR will also work to develop field experiences in polar research for college students and K-12 educators and help teachers bring polar research to their classrooms.

With the conclusion of the **Mathematical Sciences** priority area in FY 2007, key components of this investment will be transferred to core programs for continued support.

FY 2008 **National Nanotechnology Initiative** (NNI) support is $3.10 million, an increase of $100,000 over the FY 2007 Request. It will provide continuing support for nanoscience education activities.

FY 2008 support for **Networking and Information Technology R&D** (NITRD) totals $9.0 million, an increase of $5.10 million over the FY 2007 Request, continuing support for information technology education activities and initiating support for the new NSF-wide investment, Cyber-enabled Discovery and Innovation.

Additional detail may be found in the NSF-wide Investments chapter.

QUALITY

EHR maximizes the quality of the research and education it supports through the use of a competitive, merit-based review process. Project evaluation is required, with projects reporting their progress and impact through annual and final reports to NSF. In addition, external program evaluations are conducted for EHR-managed activities.

To ensure the highest quality in processing and recommending proposals for awards, EHR convenes Committees of Visitors, composed of qualified external evaluators, to review each program every three years. These experts assess the integrity and efficiency of the processes for proposal review and provide a retrospective assessment of the quality of results of NSF's investments. In FY 2006, COVs were held for the following programs: Teacher Professional Continuum, Advanced Technological Education, CCLI, STEP, GRF, Research on Gender in Science and Engineering, Research in Disabilities Education, and Evaluative Research and Evaluation Capacity. In FY 2007 COVs are planned for SfS, Historically Black Colleges and Universities – Undergraduate program, Tribal Colleges and Universities program, NSF Scholarships in STEM and Excellence Awards in Science and Education.

The Directorate also receives advice from the Education and Human Resources Advisory Committee (EHRAC) on such issues as: the mission, programs, and goals that can best serve the scientific community; how EHR can promote quality graduate and undergraduate education in S&E; and priority investment areas in S&E education research. The EHRAC meets twice a year and members represent a cross section of S&E disciplines; a cross section of institutions including industry; broad geographic representation; and balanced representation of women and underrepresented minorities.

EHR has taken an active role in the Academic Competitiveness Council (ACC), leading or co-leading and providing a number of active and engaged members for all three ACC work groups. There has been significant interagency coordination and conversation on broad national STEM education goals and metrics, which has led NSF to a better understanding of its role in the overall federal portfolio.

Evaluation of program effectiveness is a priority for the Foundation, and is a particular emphasis for its STEM education projects and programs. To that end, the Directorate for Education and Human Resources (EHR) has added a senior evaluation advisor to its senior management team, and all EHR solicitations specifically require that proposals include project-level evaluation plans. EHR also conducts a number of program evaluation activities on an ongoing basis to determine how effectively its programs are using current learning models in developing innovations, contributing to the knowledge base on STEM education, and building a community of practitioners and scholars in STEM education.

PERFORMANCE

The FY 2008 Budget Request is aligned to reflect funding levels associated with the Foundation's four strategic outcome goals stated in the FY 2006-2011 Strategic Plan. These goals provide an overarching framework for progress in fundamental research and education and facilitate budget and performance integration.

Education and Human Resources
By Strategic Outcome Goal
(Dollars in Millions)

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request	
				Amount	Percent
Discovery	$68.94	$66.13	$71.21	$5.08	7.7%
Learning	610.39	624.92	653.96	29.04	4.6%
Research Infrastructure	14.82	15.52	15.99	0.47	3.0%
Stewardship	6.11	9.65	9.44	-0.21	-2.2%
Total, EHR	$700.26	$716.22	$750.60	$34.38	4.8%

Totals may not add due to rounding.

Recent Research Highlights

The Polar Submersibles ROV team gets wet in a practice session in Fairbanks, Alaska. *Credit: Patrick Endres.*

► **Marine Advanced Technology Education Center Organizes Remotely Operated Vehicle Competition for Students:** In June 2005, students from around the United States gathered at the NASA Johnson Space Center's Neutral Buoyancy Lab for the fourth annual international Student Remotely Operated Vehicle (ROV) competition. The competition is coordinated every year by the Marine Advanced Technology Education (MATE) Center at Monterey Peninsular College in Monterey, Calif., and the Marine Technology Society's ROV Committee. MATE is an NSF-funded Advanced Technological Education Center of Excellence. More than 2,000 students, from middle schoolers to college seniors, have participated in the competition since it began in 2001. Currently more than 60 organizations and 70 industry professionals support the events by contributing funds, facilities, equipment, building materials, and time and technical expertise as team mentors, judges, and technical advisors. The MATE center is partnering with the National Office for Integrated and Sustained Ocean Observations and the Ocean Research Interactive Observatory Networks (ORION) program to challenge teams to develop ROVs to support ocean observing systems in the 2006 competition. (DUE)

► **Texas Students and Teachers Study Water Health, Help Decision Makers:** Eighteen major research projects are either currently underway or have been completed since October 2002, when the Research on Environmental Sustainability of Semi-Arid Coastal Areas (RESSACA) project began at Texas A&M University, Kingsville. RESSACA is funded by NSF's Centers of Research Excellence in Science and Technology (CREST) program, which seeks to enhance the research capabilities of minority-serving institutions. RESSACA's results have provided stakeholders in South Texas with information for groundwater management and decision-making. Its current research on sustainable technologies includes biofiltration for wastewater gas emissions, as well as the construction of wetlands for effluent treatment and

Research on Environmental Sustainability of Semi-Arid Coastal Areas (RESSACA) logo. *Credit: Texas Engineering Experiment Station.*

water reuse. Its planned river-analysis model for the Lower Rio Grande Basin should help with broader water management issues. On the education front, the RESSACA program is seeking to increase high-

school students' interest in science and engineering careers. Its Research Education for Teachers program is designed to enhance the skills of high-school teachers and encourage them to increase laboratory or field-based learning in their classrooms. (HRD)


Students learn from the Oglala Lakota College robotics project. *Credit: Mike Fredenberg.*

► **Native American Students Work to Improve Community Environment:** Oglala Lakota College (OLC), on South Dakota's Pine Ridge Reservation, is using NSF funding to improve its curriculum in science, technology, engineering and mathematics education, with an emphasis on environmental sciences and related analytical fields. The project's impact on the enrollment of American Indian students has been significant, particularly in information technology, where their numbers have quadrupled in the past four years. The project has had a similar impact on academic achievement. In Calculus I, for example, the rate of successful completion has grown from 21% before the project started, to approximately 70% in recent years. Currently, fourteen minority students are involved in undergraduate research projects. The program's graduates, highly skilled scientists and technicians, work in their communities, contributing to the economic growth of the reservation. The college's Lakota Center for Science and Technology, developed through support from NSF's Tribal Colleges and Universities Program (TCUP) and other sources, received EPA certification and is now employing OLC graduates to perform water quality analyses for the reservation's water and sewer agencies. The TCUP project is also engaged in preparing the next generation of K-12 teachers for reservation schools, as well as working with current K-12 teachers, improving their knowledge and skills in areas such as robotics. The robotics project will be implemented in about six area schools this academic year. (HRD)

► **Edible Micro-Robots Assist With Delicate Surgeries:** With support from an NSF Graduate Research Fellowship, Robert J. Webster of Johns Hopkins University is designing and testing robotic medical instruments, including two types of very small surgical tools that can extend a doctor's reach into the human body without having to make incisions. Participating in research in Pisa, Italy, Webster has designed and modeled an Assembling Reconfigurable Endoluminal Surgical system (ARES). The idea is to have many interlocking robot modules encased in a pill-like capsule. When the capsule dissolved in the stomach, it would release the robot modules to assemble into one large working unit. The devices could then conduct diagnostic procedures or carry surgical tools to treat disorders of the GI tract. Webster is also creating steerable needle systems and very small and flexible surgical instruments (actively bendable tube-like structures) to perform surgery in confined areas of the body. (DGE)
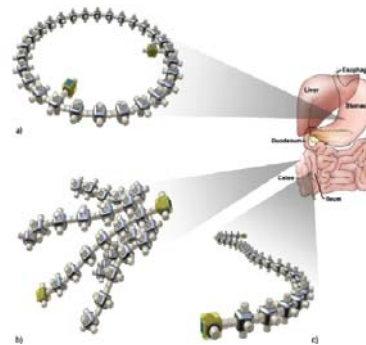
Micro-minimally Invasive Surgical Robots for the Gastrointestinal Tract. *Credit: Institute of Robotics and Intelligent Systems.*

The twelve students (ten UHD and two SJCN students) who presented and were awarded either second or third place in their presentation categories at the Fall 2005 National Sigma Xi Conference in Seattle Washington. *Credit: Drs. Phil Lyons (UHD biology faculty) and Eric Carson (SJCN geology faculty member).*

► **Award-Winning Scholars Academy Expands Students' Pathways to Success:** In an effort to increase the number of students receiving undergraduate degrees in the technical disciplines, NSF invests in the Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP). The initiative funds a small number of "Type 2" projects, which seek to understand why students do or do not stay to get their degree. But mostly it funds "Type 1" projects, which look for ways to draw students into the technical fields and then keep them there. One good example of a Type 1 STEP project is the University of Houston-Downtown (UHD) Scholars Academy, which gives undergraduate science and technology majors an opportunity to spend the summer working on research projects with faculty and advanced student mentors. The students come from both UHD and San Jacinto College North (SJCN), a public 2-year community college. In 2004 the Scholars Academy received the Texas Higher Education Star Award, established by the Texas Higher Education Coordinating Board to recognize exemplary contributions toward closing educational gaps in the state. And in November 2005, twelve academy students presented scientific research posters at the Sigma Xi Annual Meeting in Seattle, Washington, and were awarded either second or third place in their presentation categories. (DUE)

► **Science Meets Imagination in Star Wars Exhibit:** The "Star Wars: Where Science Meets Imagination" exhibition, developed by Boston's Museum of Science in collaboration with Lucasfilm, Ltd., explores the possibility that technologies portrayed in science fiction may someday become real. Through hands-on exhibits, immersive experiences, and cutting-edge innovations, the exhibition uses the imagination of Star Wars to promote the goals and standards for technological literacy articulated by the National Academy of Engineering and the International Technology Education Association.   The exhibition, funded by NSF's Informal Science Education program, allows museum-goers to learn about fantasy technologies in the Star Wars universe through film clips, props, and models, as well as discover how such ideas become real-life technologies. The exhibition includes two engineering design labs where visitors build and test solutions to challenges; an immersive "object theater" that compares today's robotic technology with capabilities of R2-D2; and a reality interactive where visitors build a spaceport. The exhibition includes for the first time in one handheld device cutting-edge multi-media, American Sign Language (ASL) interpretation and in-depth learning opportunities for use both during and after a visit. Developed specifically for the Star Wars exhibition, this innovative and accessible device enables visitors to extend their exhibit experience by "bookmarking" content and e-mailing it to themselves for later access. It features audio, video, ASL interpretation and closed-captioning.   Star Wars: Where Science Meets Imagination premiered at the Museum of Science in Boston and toured science centers in Columbus, OH and Portland, OR. It is now headed to Los Angeles, CA, Fort Worth, TX; Chicago, IL, Philadelphia, PA., and St. Paul, MN. (DRL)

At the 'Robots and People' EDL (Engineering Design Lab) section, the challenge is "How would you design a robot like R2-D2?" *Credit: Museum of Science, Boston.*

► **Parents Have the Greatest Influence on School Performance:** The Partnership for Reform in Science and Mathematics (PRISM), an NSF-funded Math and Science Partnership (MSP) at the University System of Georgia, bridges higher education and K-12 communities as well as parents interested in engaging children to pursue careers in mathematics, the sciences or engineering. After a year of research, PRISM adopted the equation "math + science = success" as its central theme for the first wave of a public awareness campaign early in 2006. To set the stage for the campaign, research instruments were developed by Maguire Associates, a leading educational research firm, in collaboration with the PRISM leadership team of science and mathematics educators from K-12 and higher education. In an important finding from Phase I of the baseline research, researchers found that high school students surveyed in four diverse regions of Georgia overwhelmingly identified their parents – not their teachers, coaches, religious leaders, peers, or celebrities – as exerting the greatest influence on how they do in school. Surprisingly, parents surveyed in the same baseline research underestimated the significance of their influence. An important aspect of the public relations campaign is its coherence with PRISM's other strategies for advancing high-quality mathematics and science education. (DUE/MSP)
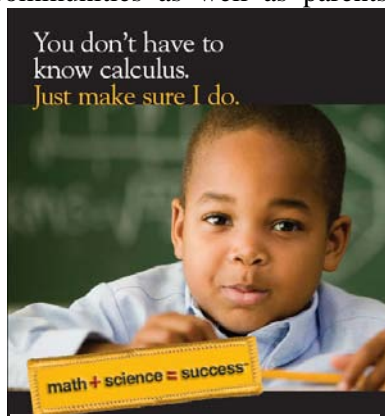
Bus shelter signage used in "math + science = success" public awareness campaign. *Credit: Mindpower Incorporated, Atlanta, GA.*

► **Preparing Science Teachers for High-Need Schools:** The University of California, Los Angeles (UCLA) Robert Noyce Scholarship program is enabling 52 students, who would not otherwise have the financial resources, to pursue a science teaching credential and master's degree at UCLA. The project targets and recruits science majors interested in teaching and who are committed to underserved communities of the urban partner schools in Los Angeles. The Noyce Scholars participate in the research-based Science Teacher Education Program, which prepares teachers to have the commitment, capacity, and resilience to teach in schools with diverse populations that are underrepresented in science, technology, engineering, and math disciplines. A cadre of faculty and peers support students beginning with the first credential year of coursework, through the challenging initial year of teaching and M.Ed. completion, and into the early career years. Teacher isolation is mitigated by developing cohorts within the targeted schools, placement into the schools in pairs, and providing a built-in peer support network. The program emphasizes an inquiry-based approach to teaching science that empowers students and helps overcome the obstacles many urban students face on a daily basis. By using an inquiry-based teaching observation instrument, the Noyce scholars demonstrate a strong understanding of inquiry-based instructional practices. (DUE)

Parents and children delve into science at Family Science Night organized by a UCLA Noyce Scholar. *Credit: The College of Letters and Science, University of California, Los Angeles.*

► **Understanding Science Through Models and Simulations:** The NSF-funded Modeling Across the Curriculum project, spearheaded by the Concord Consortium in Mass., is developing learning tools that enable students to visualize and understand complex scientific phenomena. The tools are easy to use, easy to incorporate into curriculum, freely distributed, and cover all of high-school science from biology to chemistry to physics. The simulations are being used in curricula affecting more than 2000 students in high school science classes around the country. Now in its fifth year, the study of over 40 schools is yielding longitudinal results. Initial results using chemical reaction simulations within the Connected Chemistry curriculum, for example, show significant score gains for those students who used the simulations compared with students who did not. Over 200 schools not in the study are using the curriculum, raising the probability that the project will have a lasting affect on science instruction. More longitudinal studies are being conducted to further understand the properties of the simulations that contribute most to learning science. (DRL)
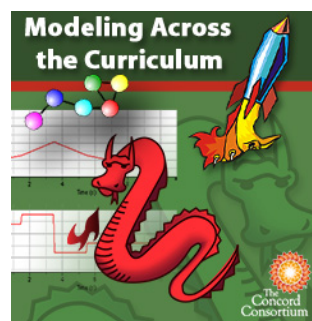
Modeling across the curriculum logo. *Credit: Paul Horwitz.*

Other Performance Indicators

The table below shows the number of people that participate in EHR funded activities.

Number of People Involved in EHR Activities

	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate
Senior Researchers	4,380	4,400	4,500
Other Professionals	2,440	2,500	2,600
Postdoctorates	290	300	325
Graduate Students	7,075	7,200	7,500
Undergraduate Students	2,610	2,700	3,075
K-12 Students	22,600	23,000	25,000
K-12 Teachers	95,530	96,000	100,000
Total Number of People	134,925	136,100	143,000

In addition, it is estimated that in FY 2006 EHR programs directly impacted more than 400,000 K-12 teachers and more than 16 million K-12 students nationwide. Examples of direct impact include use of EHR-funded instructional materials by teachers and students, and students that benefit from teacher attendance at EHR-supported workshops and training seminars.

RESEARCH ON LEARNING IN FORMAL AND INFORMAL SETTINGS

$222,500,000

The FY 2008 Budget Request for the Division of Research on Learning in Formal and Informal Settings (DRL) is $222.50 million, an increase of $7.50 million, or 3.5 percent, over the FY 2007 Request of $215.0 million.

Research on Learning in Formal and Informal Settings Funding
(Dollars in Millions)

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request	
				Amount	Percent
Research on Learning in Formal and Informal Settings	$215.58	$215.00	$222.50	$7.50	3.5%
Major Components:					
Discovery Research K-12	94.92	107.00	107.00	-	-
Informal Science Education (ISE)	62.65	66.00	66.00	-	-
Research and Evaluation on Education in S&E	51.07	42.00	42.00	-	-
NSF Academies for Young Scientists	6.94	-	-	-	N/A
Project and Program Evaluation	-	-	7.50	7.50	N/A

About DRL:

The Division of Research on Learning in Formal and Informal Settings advances the coherent integration of science, technology, engineering, and mathematics (STEM) education research, development, evaluation, and synthesis activities. DRL focuses on the full spectrum of basic and applied research in STEM education in both formal and informal settings, at all levels. There is a strong emphasis on improving STEM teaching and learning in the K-12 domain through cutting-edge development and applied research.

DRL programs provide national leadership for advancing discovery and innovation at the frontiers of STEM teaching and learning in the K-12, undergraduate, and graduate settings, and in lifelong learning. The Division is committed to improving STEM learning, particularly in K-12 schools, and in informal education environments; advancing equity and participation in STEM for all; and integrating research and practice. DRL research and development addresses significant educational challenges, including preparing and supporting highly qualified teachers in the STEM disciplines with strong, integrated knowledge of the disciplines and of pedagogy. DRL sponsors the design of research-based K-12 learning tools, resources, and materials that embody high expectations for all students, and studies and evaluations of their strategic implementation and impact. Research in DRL addresses issues of STEM learning at the undergraduate and graduate levels, and across the lifespan. The Division is concerned with expanding the number of students interested in and educated for careers in STEM fields and ensuring that the citizenry has the opportunities to continue their learning of science in a variety of exciting and compelling venues.

DRL Priorities for FY 2008:

DRL's major priorities include the REESE, DRK-12 and ISE programs, as well as significant emphasis on evaluation research and initiatives.

Research and Evaluation on Education in Science and Engineering (REESE) supports basic and applied research and evaluation that enhances understanding of STEM learning and teaching. The

program seeks proposals for syntheses of research and evaluation in order to accumulate knowledge, identify gaps, and integrate across literatures and disciplines. REESE also supports empirical studies that advance discovery and innovation at the frontiers of STEM learning. The REESE program spans formal and informal education and all stages of learners, including undergraduate, graduate and adult learners. The program encourages collaborations of social scientists and cognitive scientists with experts in teaching and learning in the STEM disciplines.

Discovery Research K-12 (DR-K12) supports applied research and innovation aimed at improving STEM education at the K-12 level. The research and evaluation in DR-K12 projects focus on K-12 instructional resources and tools developed with NSF funding, and includes development, implementation, and evaluation activities conducted in K-12 settings. Discovery Research addresses problems generated by practice and implementation and is focused on targeted, strategic interventions rather than implementation of educational innovations at large-scale. The program allows for continued work on efforts to develop and evaluate cutting-edge materials in K-12 STEM.

Informal Science Education (ISE) supports the design and development of experiences that encourage learning in informal settings and that promote public engagement with, and understanding of, the STEM disciplines. ISE projects advance leading-edge, state-of-the art efforts to expand the venues and opportunities for science learning, for all learners at all ages. Projects that strengthen infrastructure, engage underserved audiences, involve the public, and introduce innovative uses of technologies will be of highest priority.

Project and Program Evaluation is a strong focus of EHR/DRL. Emphases include the planning and oversight for third-party evaluations of EHR programs and thematic STEM evaluation studies; providing evaluation technical assistance throughout EHR and NSF as well as providing training opportunities and tools to build capacity in the field. EHR's evaluation team coordinates data collection efforts for performance monitoring and responding to GPRA and other federal reporting requirements; disseminates broader information and evaluation findings to various stakeholders; and addresses directorate-wide knowledge management concerns for improved productivity.

Changes from FY 2007:

- The FY 2008 Request for **REESE** is $42.0 million, equal to the FY 2007 Request, but EHR's overall Project and Program Evaluation work will no longer be part of this budget line. This translates into an additional $7.50 million for REESE, which will be used to fund collaborations with the Research and Related Activities (R&RA) directorates on education research projects designed for stronger scientific workforce development.

- The **Project and Program Evaluation** line supports evaluation efforts for all EHR programs. The $7.50 million in this budget line reflects the consolidation of funding in a single location in the budget display. Previously funding was included in program budgets.

UNDERGRADUATE EDUCATION $210,220,000

The FY 2008 Budget Request for the Division of Undergraduate Education (DUE) is $210.22 million, an increase of $13.42 million, or 6.8 percent, over the FY 2007 Request of $196.80 million.

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Undergraduate Education Funding
(Dollars in Millions)

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	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request Amount	Percent
Curriculum, Laboratory and Instructional Development	$87.93	$86.50	$93.70	$7.20	8.3%
Workforce Development	60.77	64.30	70.52	6.22	9.7%
Math and Science Partnership	63.17	46.00	46.00	-	-
Total, DUE	**$211.86**	**$196.80**	**$210.22**	**$13.42**	**6.8%**
Selected Programs:					
Advanced Technological Education	45.40	46.50	51.62	5.12	11.0%
Course, Curriculum, and Laboratory Improvement	38.43	34.00	37.50	3.50	10.3%
Robert Noyce Scholarship Program	8.91	10.00	10.00	-	-
Scholarship for Service	10.41	11.00	12.10	1.10	10.0%
STEM Talent Expansion Program	25.36	26.50	29.70	3.20	12.1%

Totals may not add due to rounding.

About DUE:

DUE is the NSF focal point for transforming undergraduate STEM education to meet the needs of the 21st century. DUE's objective is to increase the quality and quantity of the science and engineering workforce, and the extent to which all undergraduate students are well prepared for an increasingly technological global society. DUE programs create leverage for institutional change. They emphasize innovation and ongoing improvement in curricula, teaching procedures, and laboratories, so that the next generation is always learning by using the tools and methods of inquiry that working professionals use. Grants are made to 2- and 4-year colleges and universities. Collaborations among institutions, and between higher education, industry, and the K-12 sector are encouraged. So that best practices penetrate deeply into the community, DUE grants provide for faculty development, support for new instructional materials, the reform of courses, laboratories, and curricula, and assessment of outcomes.

DUE Priorities for FY 2008:

- The **Course, Curriculum, and Laboratory Improvement** (CCLI) program funds the development of new learning materials, faculty expertise, and assessment and evaluation. CCLI is the core program in the DUE portfolio. It supports the innovative educators who build the STEM workforce, and it keeps the teaching enterprise aligned with the pace of change in the knowledge base and technical capability of the STEM disciplines.

- The **STEM Talent Expansion Program** (STEP) supports colleges and universities to increase the number of U.S. citizens and permanent residents receiving associate or baccalaureate degrees in established or emerging STEM fields. It also supports educational research that leads to improvement in persistence to the associate or baccalaureate degree in STEM. The transformational STEM learning

experiences gained during the early undergraduate years for both STEM and non-STEM majors will better equip students to participate in more advanced discovery-based experiences, pursue STEM careers, and/or better understand the relevance of STEM disciplines to the workplace and society. Planned collaborations with states, especially partnerships with governors' offices and state-wide systems of higher education, is expected to greatly enhance NSF's institutional reform efforts at the undergraduate level.

- The **National STEM Education Digital Library** (NSDL) is an online network of resources for STEM education at all levels in both formal and informal settings. It funds projects that provide stewardship for the content and services needed by major communities of learners. It also funds projects that develop services to support users, collection providers, and integration efforts, and enhance the impact, efficiency, and value of the library.

- **Excellence Awards in Science & Engineering** (EASE) are designed to recognize achievement in education. EASE includes the Distinguished Teaching Scholars (DTS) track, which recognizes distinguished individuals who integrate their discipline scholarship with education, the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST), and the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM).

- The **Robert Noyce Scholarship Program** encourages talented STEM undergraduate students and postgraduate professionals to become K-12 mathematics and science teachers. It offers scholarships to juniors and seniors majoring in mathematics, science or engineering, and stipends for science, mathematics, or engineering professionals in the workforce seeking to become teachers. Projects help recipients obtain certification and become math and science teachers in high-need K-12 schools.

- The **Federal Cyber Service: Scholarship for Service** (SfS) program builds a cadre of professionals in the federal sector with the skills required to protect the Nation's critical information infrastructure. Scholarships provide full tuition, fees, and stipends in exchange for service in federal agencies after graduation. Capacity building grants improve the quality of academic programs and increase the number of information assurance and computer security professionals.

- **Advanced Technological Education** (ATE) emphasizes two-year colleges and supports improvement in technician education in the science- and engineering-related fields that drive the Nation's economy. The ATE program supports the design and implementation of new curricula, courses, laboratories, educational materials, opportunities for faculty and student development, and collaboration among educational institutions and partners from business, industry, and government.

- As a crosscutting program housed in DUE, the **Math and Science Partnership** (MSP) at NSF is a research and development effort to build capacity and integrate the work of higher education, especially its STEM disciplinary faculty, with that of K-12 to strengthen and reform science and mathematics education. MSP seeks to improve student outcomes in mathematics and science for K-12 students. MSP currently supports (a) Comprehensive Partnerships that implement change across the K-12 continuum in mathematics and/or science; (b) Targeted Partnerships that focus on a narrower grade range or disciplinary focus in mathematics and/or science; (c) Research, Evaluation and Technical Assistance (RETA) projects that develop tools to assess the Partnerships' progress and make their work more strategic, build evaluation capacity and conduct focused research; and (d) Institute Partnerships: Teacher Institutes for the 21st Century that respond to 21st century needs for accomplished teachers with expertise in school mathematics and the sciences.

MSP builds upon the knowledge base it has developed to emphasize the preparation of new teachers and the ongoing professional development of inservice teachers through critical collaborations among STEM departments in higher education, colleges of education, school districts, state level teacher certification officials, and business and industry. New *Targeted Partnerships* will emphasize the critical junctures of K-12 STEM education that impede student progress in mathematics and science between (a) middle and high school and (b) high school and college. New *Teacher Institutes* will support the development of school-based teacher intellectual leaders with deep content expertise and the leadership skills that are important for strategically navigating the complex curricular, instructional, and classroom assessment challenges embedded within the critical years of transition.

MSP leverages its cross-cutting attributes through integration of its work with other STEM educational programs at NSF, and through ongoing coordination with the Department of Education (ED) and its state-funded MSP sites. Within NSF's Partnerships and RETA projects, innovative, needed tools and other deliverables are in various stages of development and are being piloted or used by both NSF's and ED's Partnerships, as well as by other educational programs at NSF. These include (a) instruments to assess teachers' knowledge of mathematics/science content and how this content is used in teaching, especially for middle school; (b) an innovative system to help school principals identify the instructional methods teachers use, spot instructional problems, and make decisions that inform teacher development, towards improved student achievement; and (c) deliverables that inform and improve evaluation. NSF coordinates with ED and state MSP sites through co-management of two Partnerships jointly funded by the two agencies; sharing of tools and promising strategies developed and field-tested by NSF's MSP projects; and substantial cooperation in the field between projects/partners funded by NSF and those connected with state departments of education and state MSP sites. Almost two-thirds of NSF's funded Partnerships report direct collaboration with state MSP sites.

Changes from FY 2007:

Curriculum, Laboratory, and Instructional Development Programs
- The FY 2008 Request for **CCLI** is $37.50 million, an increase of $3.50 million from the FY 2007 Request of $34.0 million. New funds will permit an increase in the success rate for this core program.

- The FY 2008 Request for **STEP** is $29.70 million, an increase of $3.20 million over the FY 2007 Request. STEP will support student discovery-based experiences; cyber-enabled learning; innovative instructional delivery; adaptive learning strategies; the education of future teachers; and discovery-based experiences for current teachers to strengthen their educational practice.

- The FY 2008 Request for **NSDL** is $16.50 million. This is an increase of $500,000 over the FY 2007 Request. These additional funds will allow an increase in both the number of users of NSDL and in the capability to offer customizable user interfaces to the digital library.

Workforce Development Programs
- FY 2008 funding for **SfS** is increased by $1.10 million over the FY 2007 Request to $12.10 million, which will to support an additional three cohorts of up to 10 students each.

- In FY 2008, funding for **ATE** is increased to $51.62 million, $5.12 million above the FY 2007 Request. The ATE program has two new opportunities in FY 2008 - small grants for institutions new to the ATE program and targeted research in technician education. Additional funds will support 15 to 20 additional small grants to broaden participation and one additional targeted research project.

Math and Science Partnership

- The FY 2008 Request for **MSP** is level to the FY 2007 Request of $46.0 million. Approximately $30.0 million will be available for new awards in FY 2008. Awards will be made for a small number of new MSP *Targeted Partnerships* and *Teacher Institutes for the 21ˢᵗ Century* that emphasize the critical junctures in K-12 mathematics and science education between middle and high school, and between high school and college. These efforts will engage middle and high school teachers and their students in educationally appropriate and relevant topics that support the high-leverage fields of the physical sciences and engineering, as delineated for NSF in the *American Competitiveness Initiative*, coupled with the mathematics content and technology essential for study and success in these areas. Informed by the most promising ideas and strategies in existing NSF programs and by a rigorous system of both project- and program-level evaluation, NSF-funded scientists and educators will bring the expertise and capability needed to provide the initial research and development necessary to grow innovative ideas and approaches to STEM education and take them "to market" through demonstration sites. These sites will provide opportunities for educators not affiliated with the sites to observe and learn in depth about their work in order to replicate/adapt well-researched and field-tested findings and products to their local educational settings. Funds will also be used for data collection, evaluation, and knowledge management and dissemination, consonant with program and Academic Competitiveness Council goals and requirements.

GRADUATE EDUCATION $169,500,000

The FY 2008 Budget Request for the Division of Graduate Education (DGE) is $169.50 million, an increase of $8.93 million, or 5.6 percent, over the FY 2007 Request of $160.57 million.

Graduate Education Funding
(Dollars in Millions)

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request	
				Amount	Percent
Graduate Education	$153.07	$160.57	$169.50	$8.93	5.6%
Major Components:					
Integrative Graduate Education and					
Research Traineeships (IGERT)	23.76	25.00	25.00	-	-
Graduate Research Fellowships (GRF)	86.35	88.57	97.50	8.93	10.1%
Graduate Teaching Fellows in					
K-12 Education (GK-12)	42.96	47.00	47.00	-	-

About DGE:

DGE investments support graduate students and innovative graduate programs that prepare tomorrow's leaders in science and engineering. DGE support for science, technology, engineering, and mathematics (STEM) graduate education supports the creation of a diverse STEM workforce to meet the needs of the Nation in the 21st century. DGE accomplishes this by providing fellowships and traineeships, by supporting innovations in STEM graduate education to prepare students for the challenges of the new century, and by building stronger links between higher education and K-12 education. These efforts help strengthen U.S. education at all levels and help ensure continued U.S. economic and research preeminence.

DGE meets its objectives through three graduate education programs: the Integrative Graduate Education and Research Traineeship program (IGERT), the Graduate Research Fellowship program (GRF), and the Graduate Teaching Fellows in K-12 Education program (GK-12). Approximately 5,375 graduate fellowships and traineeships will be supported NSF-wide in FY 2008.

DGE Priorities for FY 2008:

- The **Integrative Graduate Education and Research Traineeship** program is an NSF-wide program administered by DGE. IGERT prepares U.S. doctoral students to lead the Nation in advancing knowledge in emerging areas of research and to pursue successful careers in academia, industry, or the public sector. IGERT (institutional) awardees prepare doctoral students by integrating research and education in innovative ways that are tailored to the unique requirements of newly emerging interdisciplinary fields and new career options. IGERT campuses train students to be leading scientists and engineers in the 21st century, provide several trainees with international experiences, and focus on broadening participation. Approximately 1,510 IGERT trainees will be supported across NSF in FY 2008.

- The **Graduate Research Fellowship** program strategically invests in intellectual capital, providing support to individuals who are pursuing graduate education. It prepares the most promising science, mathematics, and engineering students in the U.S. for a broad range of disciplinary and cross-

disciplinary careers. It offers three years of financial support, which may be used by students over a five-year period, providing a flexible operational framework. In FY 2008, priorities include broadening participation in the applicant and awardee pools.

Since 1952, over 41,000 U.S. students have received GRFs. In FY 2008 approximately 2,950 fellows will be supported, primarily with DGE funds. The Directorates for Engineering (ENG) and Computer and Information Science and Engineering (CISE) also provide support for the GRF program. Although at early stages of their careers, Fellows begin building distinguished records of accomplishment.

- The **Graduate Teaching Fellows in K-12 Education** program supports fellowships and associated training that enable graduate students in NSF-supported STEM disciplines to acquire additional skills that will broadly prepare them for professional and scientific careers. Through interactions with teachers in K-12 schools, graduate students improve communication and teaching skills while enriching STEM instruction in these schools. Approximately 915 GK-12 fellows will be supported NSF-wide in FY 2008. Through collaboration with the Office of Cyberinfrastructure (OCI), GK-12 is developing opportunities for fellows to explore CI applications in research and education.

Each of the three major DGE programs recognizes the growing significance of the changing global environment for future scientists and is taking steps to bring more international emphasis and provide more opportunities to students for expanding their knowledge of research and education in other nations and international issues affecting STEM careers.

Changes from FY 2007:

- GRF is widely recognized as a unique fellowship grant program because it supports the broad array of science and engineering disciplines across all fields as well as international research activity. In FY 2007, DGE received over 8,100 applications for its highly prestigious and competitive awards, and was able to award approximately 900 fellowships. The EHR FY 2008 Request for GRF is $97.50 million, an increase of $8.93 million over the FY 2007 Request. This increase will provide support for an additional 200 graduate students.

HUMAN RESOURCE DEVELOPMENT $148,380,000

The FY 2008 Budget Request for the Division of Human Resource Development (HRD) is $148.38 million, an increase of $4.53 million, or 3.1 percent, over the FY 2007 Request of $143.85 million.

Human Resource Development Funding
(Dollars in Millions)

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request Amount	Percent
Undergraduate/Graduate Student Support	$72.44	$82.85	$82.85	-	-
Research and Education Infrastructure	32.36	44.00	48.53	4.53	10.3%
Opportunies for Women and Persons with Disabilities	14.95	17.00	17.00	-	-
Total, HRD	**$119.75**	**$143.85**	**$148.38**	**$4.53**	**3.1%**

Totals may not add due to rounding.

About HRD:

HRD supports programs and activities that enhance the quantity, quality, and diversity of individuals engaged in U.S. science, technology, engineering, and mathematics (STEM). HRD plays a central role in increasing opportunities in STEM education for individuals from historically underserved populations – particularly minorities, women, and persons with disabilities – as well as the educators, researchers, and institutions dedicated to serving these populations.

HRD Priorities for FY 2008:

The FY 2008 Request supports programs with a proven track record of broadening participation in the science and engineering workforce. Five highly successful programs are focal points for linking activities in EHR with NSF's Research and Related Activities (R&RA) directorates to strengthen collaborations that integrate research and education:

- Louis Stokes Alliances for Minority Participation (LSAMP),
- Alliances for Graduate Education and the Professoriate (AGEP),
- Centers of Research Excellence in Science and Technology (CREST),
- Tribal Colleges and Universities Program (TCUP), and
- Historically Black Colleges and Universities Undergraduate Program (HBCU-UP).

Undergraduate/Graduate Student Support
- **LSAMP** strengthen and encourage STEM baccalaureate degree production of students from underrepresented populations by utilizing the knowledge, resources, and capabilities of a broad range of organizations. LSAMP will expand the number of alliances to enhance the geographical balance of its portfolio. The Bridge to the Doctorate (BD) initiative supports the initial two years of graduate study for selected LSAMP baccalaureate degree recipients. Twenty BD supplements are anticipated in FY 2008.

- The **HBCU-UP** supports awards that enhance the quality of undergraduate STEM programs through curricular reform and enhancement, faculty development, research experiences for undergraduates,

upgrade of scientific instrumentation, and improvement of research infrastructure. In FY 2008, in addition to continuing to strengthen STEM programs at the Nation's HBCUs, HBCU-UP will allocate resources to encourage education research and develop the education research capabilities of HBCUs.

- The **Tribal Colleges and Universities Program** (TCUP) promotes the improvement of STEM instructional and community outreach programs, with an emphasis on the leveraged use of information technologies at Tribal Colleges and Universities, Alaska Native-serving institutions, and Native Hawaiian-serving institutions. TCUP supports teacher education programs, as well as targeted projects to improve STEM programs at TCUs. Ten new awards are planned in FY 2008.

Research and Education Infrastructure
- **Alliances for Graduate Education and the Professoriate** (AGEP) implement innovative models for increasing STEM Ph.D. attainment among students from underrepresented minority populations and encouraging those students to enter the professoriate. In FY 2008 AGEP will facilitate bridging of LSAMP BD fellows into AGEP, provide resources to enhance recruitment of new enrollees into AGEP, and enhance retention/advancement of AGEP student participants.

- **Centers of Research Excellence in Science and Technology** (CREST) serve as hubs for conducting competitive research at minority institutions, including those that produce well-trained doctoral students in STEM. The HBCU Research University Science and Technology (THRUST) program (the HBCU institutional capacity building activity within CREST, which is also known as Research Infrastructure in Science & Engineering, or "RISE") strengthens the research capacity of doctoral degree granting Historically Black Colleges and Universities in STEM disciplines by investing in collaborative research, training, equipment, and doctoral student support.

Opportunities for Women and Persons with Disabilities
- The **Research on Gender in Science and Engineering** (GSE) program seeks to broaden the participation of girls and women in all fields of STEM education by supporting research, dissemination of research, and extension services in education that will lead to a larger and more diverse domestic science and engineering workforce.

- The **Research in Disabilities Education** (RDE) program supports efforts to increase the participation and achievement of individuals with disabilities in STEM education and careers. RDE will make a total of 1-2 additional awards in FY 2008, pursuing "talent" irrespective of "ability" and working towards parity in the U.S. STEM workforce by providing opportunities for persons with disabilities to enter and participate at all levels of STEM education**.**

Changes from FY 2007:

- **CREST** funding for FY 2008 is $29.53 million, an increase of $4.53 million over the FY 2007 Request. This increase will be used to support up to four new CREST center awards in addition to up to five HBCU-RISE awards. CREST awards strengthen research and education in minority-serving institutions and increase student matriculation in STEM disciplines. In addition, CREST will continue pursuing its goal to broaden participation by building the research capability of minority-serving institutions.

H-1B NONIMMIGRANT PETITIONER FEES $100,000,000

The FY 2008 H-1B Nonimmigrant Petitioner Fees are projected to be $100.0 million, equivalent to the FY 2007 projection.

H-1B Nonimmigrant Petitioner Fees Funding

(Dollars in Millions)

	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	Change over FY 2007 Estimate Amount	Percent
H-1B Nonimmigrant Petitioner Fees Funding	$99.40	$100.00	$100.00	-	-

Beginning in FY 1999, Title IV of the American Competitiveness and Workforce Improvement Act of 1998 (P.L. 105-277) established an H-1B Nonimmigrant Petitioner Account in the general fund of the U.S. Treasury for fees collected for each petition for alien nonimmigrant status. That law required that a prescribed percentage of funds in the account be made available to NSF for the following activities:

- **Computer Science, Engineering, and Mathematics Scholarships** (CSEMS). The program supported grants for scholarships to academically-talented, financially needy students pursuing associate, baccalaureate, or graduate degrees in computer science, computer technology, engineering, engineering technology, or mathematics. Grantee institutions awarded scholarships of up to $2,500 per year for two years to eligible students.

- **Grants for Mathematics, Engineering, or Science Enrichment Courses.** These funds provided opportunities to students for enrollment in year-round academic enrichment courses in mathematics, engineering, or science.

- **Systemic Reform Activities.** These funds supplemented the rural systemic reform efforts administered under the former Division of Educational System Reform (ESR).

In FY 2001, Public Law 106-311 increased the funds available by increasing the petitioner fees. Also, the American Competitiveness in the 21st Century Act (P.L. 106-313) amended P.L. 105-277 and changed the way petitioner fees were to be expended.

- The CSEMS activity continued under P.L. 106-313 with a prescribed percentage of H-1B receipts. The maximum scholarship duration was four years and the annual stipend was $3,125. Funds for this scholarship program totaled 59.5 percent of the total H-1B funding for NSF.

- Private-Public Partnerships in K-12. P.L. 106-313 directed the remaining 40.5 percent of receipts toward K-12 activities involving private-public partnerships in a range of areas such as materials development, student externships, and mathematics and science teacher professional development.

- Information Technology Experiences for Students and Teachers (ITEST) developed as a partnership activity in K-12 to increase opportunities for students and teachers to learn about, experience, and use information technologies within the context of STEM, including Information Technology (IT) courses.

In FY 2005, Public Law 108-447 reauthorized H-1B funding. NSF was provided with 40 percent of the total H-1B receipts collected. Thirty percent of H-1B receipts (75 percent of the receipts that NSF

receives) are to be used for the Low-income Scholarship Program. Ten percent of receipts (25 percent of the receipts that NSF receives) are designated for support of the Grants for Mathematics, Science, or Engineering Enrichment Courses.

Low-income Scholarship Program. Eligibility for the scholarships was expanded from the original fields of computer science, engineering, and mathematics to include "other technology and science programs designated by the Director." The maximum annual scholarship award amount was raised from $3,125 to $10,000. NSF may use up to 50 percent of funds "for undergraduate programs for curriculum development, professional and workforce development, and to advance technological education." Because of the changes, the program was renamed in 2006 from CSEMS to Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM).

Since its inception the low-income scholarship program has received approximately 1,700 proposals from all types of colleges and universities and has made awards for 671 projects. Approximately 40,000 students have received scholarships ranging from one to four years. In addition to scholarships, projects include student support activities featuring close involvement of faculty, student mentoring, academic support, and recognition of the students. Such activities are important in recruiting and retaining students in high-technology fields through graduation and into employment. Approximately 100 awards are expected to be made in FY 2008.

ITEST Grants for Mathematics, Science, or Engineering Enrichment Courses. The ITEST program invests in K-12 activities, including informal education programs for middle and high school students and teachers that are intended to stimulate interest in high technology fields and that emphasize IT-intensive STEM subject areas. ITEST provides substantive learning opportunities that expand upon science experiences received as part of formal classroom instruction. Categories of awards include: (1) *Youth Projects* for school-age children, grades 6-12; (2) *Comprehensive Projects* that include opportunities for STEM teachers to gain familiarity with IT that can be used in their classrooms; and (3) the *ITEST Learning Resource Center* that serves as a national resource disseminating best practices, research on student learning, and strategies for project evaluation. In FY 2007, current awardees also have the opportunity to apply for two-year *Traditional Project Renewals* to continue projects that have the potential to significantly increase the understanding of effective strategies for the engagement of diverse populations of students and teachers.

The ITEST portfolio consists of 77 local projects that allow students and teachers to work hand-in-hand with scientists and engineers on extended research projects, ranging from biotechnology to environmental resource management to programming and problem-solving. Projects draw on a wide mix of local resources, including universities, industry, museums, science and technology centers, and school districts. ITEST engages both informal and formal communities in order to identify the characteristics of informal settings – content and format – that make them successful for a wide range of young people, especially those not successful in traditional school settings. Through a projected $79.5 million federal investment, ITEST impacts an estimated 80,000 students (grades 6-12), 3,700 teachers and 1,500 parents / caregivers. Interest in ITEST continues. In FY 2006, ITEST received 146 full proposals, a 15% increase over the 2005 submission rate and a 36% increase over the 2004 submission rate. It is anticipated that submissions for 2007 and 2008 will be comparable to 2006.

In November 2005, Public Law 109-108 was signed and directed EHR to initiate a K-8 pilot program using funds in the FY 2006 EHR appropriation. EHR used approximately $7 million of funds from its formal K-12 programming and approximately $7 million of funds from H-1B nonimmigrant petitioner fees for this pilot. The initiative, Academies for Young Scientists, called for proposals to develop

stimulating, intensive STEM learning experiences that engage K-8 students; develop sustainable, district-based partnership demonstration projects; and promote strategies that further develop skills in K-8 STEM teachers. This activity was a demonstration project in FY 2006 and thus no funds are requested in FY 2008.

H-1B Financial Activities from FY 1999 - FY 2006

(Dollars in Millions)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Receipts	**$26.61**	**$48.61**	**$88.34**	**$61.04**	**$65.34**	**$0.57**	**$83.68**	**$105.32**
Obligations incurred								
Computer Science, Engineering, and Mathematics Scholarships	0.26	23.16	68.37	34.69	25.30	33.91	0.54	80.95
Grants for Mathematics, Engineering or Science Enrichment Courses	-	0.20	4.22	5.83	16.27	-	-	-
Systemic Reform Activities	-	1.70	3.70	3.97	5.00	2.50	2.72	-
Private-Public Partnership in K-12[1/]	-	-	2.22	12.82	-	20.87	22.69	18.45
Total Obligations	**$0.26**	**$25.06**	**$78.51**	**$57.31**	**$46.57**	**$57.28**	**$25.95**	**$99.40**
Unobligated Balance end of year	$26.35	$49.89	$59.72	$63.45	$83.90	$29.10	$89.58	$98.19

1/P.L 106-313 directs that 15 percent of the H-1B Petitioner funds go toward K-12 activities involving private-public partnerships in a range of areas such as materials development, student externships, math and science teacher professional development, etc.

Explanation of Carryover

With regard to the carryover into FY 2007, significant amounts of receipts arrived late in the fiscal year and there was not adequate time to obligate the total amounts. NSF is planning earlier deadlines for the S-STEM and ITEST programs in FY 2007 so that it can make awards from H-1B Visa Funds earlier in the fiscal year, and plans to move the deadlines even earlier starting in FY 2008. A carryover from FY 2007 into FY 2008 is likely, but it is expected to be less than the carryover into FY 2007.