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## ABSTRACT

This National Science Foundation (NSF) report, prepared by NSF's Division of Undergraduate Education (DUE), analyzes the role the Foundation plays in recognizing and supporting the critical function of community colleges in science, mathematics, engineering, and technology (SMET) education. The Foundation aims to improve and strengthen SMET programs for all students. Two-year colleges serve students with varying needs and goals, including: (1) those who intend to transfer to four-year colleges and universities; (2) those enrolled in technical and career-oriented programs; (3) underprepared students enrolled in developmental programs; and (4) students with advanced degrees who desire to change careers or seek professional advancement. The Advanced Technological Education (ATE) program was created primarily to serve two-year colleges and their academic and industrial partners. The ATE program is a major component of the NSF's support of two-year colleges. There are currently 12 ATE Centers of Excellence in the United States. Three of the centers focus on information technology, two on engineering technology, two on environmental technology, and one each on biotechnology, distance learning, marine technology, manufacturing, and microelectronics. The report includes NSF award data, including ATE awards, non-ATE awards, and awards co-funded by ATE. The report also includes selected examples of funded programs. (NB)

**NATIONAL SCIENCE FOUNDATION  
SUPPORT FOR TWO-YEAR COLLEGES**

**Fiscal Years 1997-1999**

**A Report of the  
Division of Undergraduate Education**

**NSF 01-44**



**NATIONAL SCIENCE FOUNDATION  
Directorate for Education and Human Resources  
Division of Undergraduate Education**

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**NATIONAL SCIENCE FOUNDATION  
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**ADDITIONAL INFORMATION ABOUT NSF AWARDS**

- Abstracts of awards funded by NSF are available (and searchable) on the Web at  
<http://www.fastlane.nsf.gov/a6/A6AwardSearch.htm>
  
- Abstracts and additional information about awards funded by the Division of Undergraduate Education can be found on the Web at  
[http://www.ehr.nsf.gov/pirs\\_prs\\_web/search/](http://www.ehr.nsf.gov/pirs_prs_web/search/)
  
- The NSF Web site at  
<http://www.nsf.gov/>  
provides a gateway to the Web sites of individual directorates and divisions, which often provide information about awards in particular programs.

## Chapter 1

### OVERVIEW

The National Science Foundation (NSF) continues to recognize and support the critical role that two-year colleges play in science, mathematics, engineering, and technology (SMET) education. Activities supported by NSF include (1) grants made directly to two-year colleges, (2) collaborative efforts in which two-year colleges play a major role, (3) curriculum materials and faculty enhancement activities that benefit students and faculty in two-year colleges as well as others in the academic community, and (4) workshops, conferences, studies, and other special activities. As is to be expected given its focus, activities supported by the Division of Undergraduate Education (DUE) predominate in this report. However, this report also highlights and showcases activities supported by units across the Directorate for Education and Human Resources (EHR) and across the Foundation as a whole.

Direct NSF support to two-year colleges has increased almost five-fold from FY1993 to FY1999. Support grew from about \$7 million in FY1993 to over \$35 million in FY1999. Support to two-year colleges reached a maximum of approximately \$40 million per year in FY 1997 and FY1998, when two-year colleges received 47 and 44 awards, respectively, through the Instrumentation and Laboratory Improvement (ILI) program and 21 and 5 awards, respectively, through the network connection programs in the Directorate for Computer and Information Science and Engineering (CISE). The ILI program witnessed a declining proposal load for several years and was incorporated into the Course, Curriculum, and Laboratory Improvement (CCLI) program in 1999. The CISE network connection programs were discontinued in 1999.

In addition to the grants made directly to two-year colleges, two-year college faculty and students are increasingly involved in many programs. Unlike previous editions of this report, this edition only counts awards where two-year colleges are the fiscal agents or the Principal Investigator (PI) is at a two-year college (see the Appendix). This change, which results in more conservative data, has been made in order to enhance accountability. However, Chapters 2 and 3 include descriptions of the broad range of activities by which two-year colleges are supported by the Foundation. Examples include projects which have co-PIs from two-year colleges or which explicitly indicate involvement of two-year colleges in the award abstracts.

A major component of NSF's support of two-year colleges is the Advanced Technological Education (ATE) program, which was created in FY1994 and primarily serves two-year colleges and their academic and industrial partners. The ATE program accounted for approximately \$28.1 million, or about 70% of NSF direct support of two-year colleges, in FY1997; \$28.8 million, or about 73%, in FY1998; and \$27.5 million, or about 77%, in FY1999.

The Foundation's goal of improving and strengthening SMET programs for *all* students is reflected in its support for two-year colleges. Two-year colleges address a diverse set of student learning objectives, including (1) courses of study that articulate with, and transfer to, four-year colleges and universities, (2) technical education and other career-oriented programs, (3) developmental education for students underprepared to begin college-level work, and (4) additional coursework for students who have baccalaureate and other advanced degrees but desire to change careers or seek professional advancement.

The Scientific and Advanced-Technology Act of 1992 (PL 102-476), which resulted in the creation of the ATE program, had among its purposes "to improve the educational opportunities of postsecondary students by creating comprehensive articulation partnerships between 2-year and 4-year institutions." This is further clarified as authorizing grants "to encourage students to pursue bachelor's degrees in mathematics,

science, engineering, or technology, and to assist students pursuing bachelor's degrees in mathematics, science, engineering, or technology to make the transition from associate-degree-granting colleges to bachelor-degree-granting institutions . . . ." NSF particularly sees opportunity in pursuing this objective with respect to prospective K-12 teachers. NSF's response is embodied primarily within the ATE program, the NSF Collaboratives for Excellence in Teacher Preparation (CETP) program, the CCLI program and its precursors, and the Louis Stokes Alliances for Minority Participation (LSAMP) program.

The evidence is clear that large percentages of newly certified teachers have taken much or all of their SMET coursework in two-year colleges (e.g., 70% of elementary school teachers in California). This necessity for developing SMET preparation of future teachers is increasingly recognized among two-year college faculty and administrators. The goal of several activities supported was to leverage this awareness into plans for action by two-year colleges to strengthen their role in recruiting, and improving the science and mathematics preparation of, future teachers. A major leadership activity was support of the conference "Investing in Tomorrow's Teachers," which looked at the role of two-year colleges in the science and mathematics preparation of future teachers. The conference report (NSF 99-49) was published in 1999.

The two-year college is a relatively new entity in American higher education. Few two-year colleges existed until after World War II, and most have opened in the past 37 years. Between 1960 and 1975, community colleges increased two and a half times in number, opening at a rate of almost one per week. As one indication of the tremendous growth of two-year colleges, from 1969 to 1992 enrollment in two-year colleges tripled to over 5.7 million students in credit classes. This enrollment accounted for 44% of the nation's undergraduates and 49% of first-time freshmen. About 27% of students in community colleges are underrepresented minorities. Women comprise 58% of community college enrollment.\* As evidenced in Figure 1 (page 36), the enrollment of undergraduate students in higher education is being dramatically changed by enrollments in two-year colleges.

The Division of Undergraduate Education (DUE) is the focal point of NSF's activities in support of SMET education in two-year colleges. Dr. Norman L. Fortenberry, Director, Division of Undergraduate Education, serves as NSF's "Official Liaison with Community Colleges" as called for in the Scientific and Advanced-Technology Act of 1992. In FY1997-FY1999, DUE accounted for \$90.6 million, or 79%, of the total NSF direct support to two-year colleges, as well as much of the collaborative support involving all DUE programs.

This report was prepared by staff in DUE. Information was reviewed and supplemented by program officers in the Division of Elementary, Secondary, and Informal Education; the Division of Educational System Reform; the Division of Graduate Education; the Division of Human Resource Development; the Division of Research, Evaluation, and Communication; and the Directorate for Computer and Information Science and Engineering (CISE).

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\* Data from *National Profile of Community Colleges: Trends and Statistics, FY1995-FY1996*, published by the American Association of Community Colleges.

## Chapter 2

# **SUPPORT FROM THE DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES (EHR)**

### **Introduction**

Within the National Science Foundation, the Directorate for Education and Human Resources (EHR) has primary responsibility for programs that contribute to maintaining the health and continued vitality of the nation's science, mathematics, engineering, and technology (SMET) education and providing leadership in the effort to improve education in these areas. Within EHR, seven divisions—the Division of Undergraduate Education (DUE), the Division of Graduate Education (DGE), the Experimental Program to Stimulate Competitive Research (EPSCoR), the Division of Elementary, Secondary, and Informal Education (ESIE), the Division of Educational System Reform (ESR), the Division of Human Resource Development (HRD), and the Division of Research, Evaluation, and Communication (REC)—are the focal points for these efforts. Many of these divisions directly support efforts in two-year colleges.

### **Division of Undergraduate Education (DUE)**

Faculty members who vigorously combine teaching with scholarship are essential to the creation of vital SMET education. The Foundation seeks to provide incentives and rewards to stimulate and motivate faculty members so that creative teaching and instructional scholarship become a part of the “faculty culture” at all institutions. Faculty members who are primarily teachers need opportunities to deepen their knowledge, as well as opportunities to work in the creative renewal of undergraduate courses, curricula, and laboratories. DUE provided direct support to two-year colleges in FY1997–FY1999 through the programs described below.

#### ***Advanced Technological Education (ATE)***

The ATE program was created in response to the Scientific and Advanced-Technology Act of 1992 (PL 102-476), which directed NSF to develop models of advanced technological education centered at two-year colleges in order “to expand the pool of skilled technicians in strategic advanced-technology fields, to increase the productivity of the nation's industries, and to improve the competitiveness of the United States.” The program, which made its first grants in 1994, funds projects to prepare students—both traditional students and experienced workers wanting to gain new skills—for rewarding careers as technicians in fields such as biotechnology, chemical technology, environmental technology, information technology, and manufacturing. The program targets both the undergraduate and secondary school levels, and is administered jointly by DUE and the Division of Elementary, Secondary, and Informal Education (ESIE).

Projects supported by the ATE program vary greatly in size and focus. Some concentrate on particular areas of technology; others focus on the fundamental science and mathematics that technicians need in order to succeed in their area of specialization; and others address a broad spectrum of educational needs, from basic to advanced. Projects create and disseminate new educational materials, courses, and degree programs; provide professional development for high school and college faculty; provide internships and other workplace training mechanisms for students and faculty; establish innovative partnerships between educational institutions, business and industry, and government agencies; and allow students to gain hands-on experience with state-of-the-art machinery and instrumentation used in the modern workplace. All ATE projects are expected to be guided by a coherent vision of technological education—a vision that



recognizes the needs of the modern workplace, of students as lifelong learners, and for articulation of educational programs at different levels.

Two-year colleges play a key role in ATE projects, and usually they collaborate with secondary schools, four-year colleges and universities, companies, and government organizations.

ATE Centers of Excellence are the program's flagship projects. They pursue systemic approaches to technician education, usually within a specific field of technology, and are expected to have a broad impact on two-year colleges and secondary schools within a region or across the nation. Currently there are 12 ATE Centers of Excellence spread around the United States. Three focus on information technology, two on engineering technology, two on environmental technology, and one each on biotechnology, distance learning, marine technology, manufacturing, and microelectronics. Other ATE projects, having narrower missions and smaller budgets than the centers, focus on specific aspects of technician education, such as developing or adapting educational materials, providing professional development workshops for college faculty and secondary school teachers, or providing internships and other technical experiences to students.

The following short profiles of particular projects illustrate the range of activities and fields that the ATE program supports. Many other funded projects are described in the program's annual *Awards and Activities* books, electronic versions of which can be found on the Web at <http://www.ehr.nsf.gov/ehr/duel/programs/ate/>.

- At Vice President Gore's summit on "21st Century Skills for 21st Century Workers" in January 1999, Bellevue Community College in Bellevue, Washington, was recognized as one of the top 10 community colleges in the nation for updating people's skills for the new millennium, because of the high-quality information technology (IT) curricula offered by the NorthWest Center for Emerging Technologies (Award Nos. 9553727 and 9813446), which is based at the college. This center's main focus has been on developing industry-validated skill standards and associated curricula for IT. It recently received a National Skill Standards Board Recognition Award for its "outstanding achievement and contribution to the development and implementation of skill standards, assessment, and certification in the education and training industry." Microsoft—one of the center's major supporters and an employer of its graduates—also recently produced a video profiling how the center stays on the cutting edge of IT education.
- The Northeast Center for Telecommunications Technologies (Award Nos. 9751990 and 0003014) at Springfield Technical Community College in Massachusetts has assisted the rapid growth of telecommunications programs in community colleges throughout New England. When the center was founded in 1997, no community colleges in the region offered telecommunications programs. By March 2000, 18 community colleges were offering such programs, which enrolled over 3,000 students and utilized educational materials developed at the center. Faculty from 24 colleges have participated in the center's intensive workshops, which give instructors an understanding of the full spectrum of the telecommunications field by integrating the study of wireless, light-wave/photonics, and networking.
- The Maricopa Advanced Technology Education Center (Award Nos. 9602373 and 9908419), a division of the Maricopa Community College District in Arizona, focuses on improving educational programs in semiconductor manufacturing and supporting industries. The center works closely with International SEMATECH (a consortium of 13 semiconductor manufacturing companies from seven countries), the Semiconductor Industry Association (the leading trade association representing the computer chip industry), major companies (including Intel, Motorola, and STMicroelectronics), and over 100 educational partners (high schools, two-year colleges, four-

year colleges, and universities) to develop and field-test educational materials and curricula and to provide internships and other workplace experiences for students and faculty.

- The Marine Advanced Technology Education Center (Award Nos. 9752028 and 0085345) at Monterey Peninsula College in California is developing a modern, national program for marine technology education involving high schools, community colleges, technical schools, and four-year colleges. Recently, staff and students from the center joined a research project (led by Rutgers University scientists) that visited deep-sea hydrothermal vents along the East Pacific Rise and the Galapagos Rift. The expedition was accompanied by IMAX and National Geographic film crews. During the project, the center hosted a Web site with daily cruise updates, scientific data, information about the scientists involved, and an “ask us” feature that allowed students and teachers to ask questions to the scientists out at sea. The center is creating educational modules and activities using the data gathered in the project.
- The project “Advancing Careers in Technology and Science” (Award No. 9950025), based at Collin County Community College in Texas, emphasizes the changing skills and educational requirements in mathematics and science that accompany the transition from the 20th century’s skilled blue-collar technician to the 21st century’s high-tech “gold-collar” technician. The project has collaborated with Southwestern Bell to launch a credit-granting telecommunications program based on industry-developed curricula. This program is intended to provide the skills necessary for Southwestern Bell employees to advance from a non-technical position to a technical position. During the project’s first year, 22 colleges in Texas adopted the program, enrollment grew from 11 to 275, 11 students completed the program and received promotions to technical positions, and the number of faculty members certified to teach the new curriculum grew from 1 to 26.
- In April 2000, the International Technology Education Association’s “Technology for All Americans” project published *Standards for Technological Literacy: Content for the Study of Technology*, a 248-page book which defines what students should know and be able to do in order to be “technologically literate” and which prescribes desired outcomes for the study of technology in grades K–12. Professional societies and educational organizations have strongly endorsed the standards, and the National Academy of Engineering has called them “a key tool for creating lasting, systemic educational improvement.” The project was jointly funded by ESIE’s Instructional Materials Development (IMD) program and the ATE program (Award Nos. 9355826 and 9626809).
- Over 30 of the 40 community college instructors in Virginia who teach drafting and computer-aided design (CAD) courses, and 78 of the approximately 200 Virginia high school teachers who teach such courses, have participated in workshops sponsored by the project “Reinventing Computer-Aided Drafting and Design in a Total Modeling Environment” (Award No. 9752021), which is based at Piedmont Community College. These workshops prepare faculty to teach solid-modeling courses, which are now required for most industry positions in the field. In 1998, 117 community college and high school students participated in pilot courses. In 1999, 300 students participated in pilot courses at six community colleges and six high schools.
- The “Connections Across Cultures” project (Award No. 9602345), managed by the West Valley–Mission Community College District Office in California, has conducted 30 training sessions for more than 780 college faculty members and schoolteachers in 5 states. An online course developed by the project is being offered through Seattle Pacific University and now has students in Colorado, Illinois, Indiana, Oregon, Minnesota, and Washington. The project focuses on helping science and technology teachers learn teaching methods that are well-suited for diverse student populations, so that the teachers can attract and retain more minority and women students in courses and programs that lead to careers as technicians.

- Phi Theta Kappa, the honor society for community colleges, in cooperation with the American Association of Community Colleges, is conducting a project (Award Nos. 9602459 and 9811926) to encourage and assist community colleges in replicating model ATE projects. Leaders of exemplary ATE projects in geographic information systems (GIS), mathematics, biotechnology, environmental technology, precision agriculture, image processing, and engineering technology are mentoring faculty members at over 30 colleges, helping them to adapt educational materials and provide faculty development to meet the particular needs on their campuses. The objective of this project is to improve and strengthen the teaching of science, mathematics, engineering, and technology at the nation's community colleges by disseminating the results of mature NSF-supported projects.
- The American Association of Physics Teachers has undertaken a project, "The Two-Year College in the Twenty-First Century: Breaking Down Barriers," whose aim is to improve learning opportunities for students and support two-year college physics faculty through regional and national activities. The project has developed a network of faculty and significantly enlarged the group of faculty who are regional or national leaders in the two-year college physics community. In addition, through a series of meetings, conferences, and reports, the project has assisted two-year college physics faculty in building a community and in incorporating contemporary developments in physics and physics teaching into their courses. Physics faculty from both transfer and technical programs have been involved.

#### ***NSF Collaboratives for Excellence in Teacher Preparation (CETP)***

Many future teachers, particularly elementary and middle school teachers, receive all their postsecondary mathematics and science instruction at two-year colleges. In some states, such as Texas and California, over half the teachers begin their academic studies at two-year colleges. The CETP program supports efforts to improve the SMET preparation of future K-12 teachers. Recognizing the important role that two-year colleges play in the education of prospective teachers, the CETP program includes two-year colleges working collaboratively with four-year colleges, universities, and school districts to improve the science and mathematics preparation of teachers colleges. Currently, 102 two-year colleges are involved in CETP projects, representing 30% of the institutions participating in the program. Major areas of focus include the recruitment of prospective teachers, the development of curricula and courses that reflect national standards in science and mathematics and incorporate best practices in pedagogy, faculty enhancement, early field experiences for pre-service teachers, articulation between two-year and four-year institutions, and support for new teachers during their first years of teaching.

- Two-year colleges participating in the Los Angeles Collaborative for Teacher Excellence (LACTE) (Award No. 9453608), which is based at California State University, Dominguez Hills, are tightly involved in designing new articulation agreements with universities and new tracks for pre-service teachers. Teams composed of representatives from two- and four-year institutions have successfully applied for funding from federal and state sources for producing new articulated paths between the two-year and four-year campuses. Glendale College and California State University, Los Angeles, have designed a program that recruits students from Glendale High School, sends them to Glendale College for their first two years, and then moves them to Cal State-L.A. for their last two years and their teacher credentialing classes. Every two-year college in the collaborative has activities that provide students with knowledge, experience, and connections with in-service teachers. Student group activities include meeting with current teachers, getting instruction in teaching SMET concepts, exploring the national standards, and going on field trips to educational resources in the Los Angeles area. The student groups also offer two-year transfer students a point of contact in their new four-year institutions.

- The El Paso Partnership for Excellence in Teacher Preparation (PETE) (Award No. 9453612), based at the University of Texas, El Paso (UTEP), involves the university's College of Education and College of Science, El Paso Community College (EPCC), and the three major public school districts in El Paso. EPCC and UTEP are working together to align courses so that students can make seamless transitions from the two-year institutions to the university. The collaborative has recruited and retained promising students in the teaching profession, with particular attention to students from underrepresented groups. Over 90 students at EPCC have been supported as PETE NSF Scholars. Approximately 70% of the students have come from Hispanic backgrounds. At EPCC's Transmountain Campus, PETE NSF Scholars practice-teach by presenting short lessons to invited classes of K-12 students. These lessons are videotaped to document the interaction among the K-12 students, the PETE pre-ed students, and the post-secondary instructors, so that the instructors of the courses and the pre-ed students presenting the concepts can evaluate the lessons.
- The Virginia Collaborative for Excellence in the Preparation of Teachers (VCEPT) (Award No. 9553789), centered at Virginia Commonwealth University (VCU), includes three two-year colleges: J. Sargeant Reynolds Community College (JSRCC), Germanna Community College, and Tidewater Community College. VCEPT faculty and administrators have led statewide efforts to engage two-year colleges in teacher preparation, culminating in the adoption of teacher preparation as a key priority of the Virginia Community College System. Two-year college faculty in the collaborative are team-teaching courses with faculty from partnering four-year institutions. The collaboration between JSRCC and VCU was recognized as a model program by the Virginia General Assembly. A teacher apprentice program also recruits students from two-year college mathematics and science classes to work with mentor teachers in the local school districts.
- The University of Illinois at Chicago (UIC)–Community College Collaborative for Excellence in Teacher Preparation (Award No. 9852167) involves six two-year colleges that are major sources of transfer students for UIC: William Rainey Harper Community College, Oakton Community College, Olive-Harvey College, Triton College, Truman College, and Harold Washington College. The collaborative's activities include faculty development; course and curriculum development in mathematics and science; mentoring and induction support for new teachers; recruitment and retention of teacher candidates, with an emphasis on underrepresented groups; articulation and collaboration between UIC, two-year colleges, and schools; institutionalization; and research and evaluation. The annual Institute for Developing Excellence in Teaching Undergraduate Science and Mathematics includes two week-long faculty development workshops as well as follow-up meetings throughout the year. Participants develop a teaching project to implement curricular or instructional changes in particular mathematics or science courses. Of the 62 participants in the annual institutes, 46 are two-year college faculty.
- Project TEACH (Award No. 9876589), a CETP project centered at Green River Community College (GRCC) in Washington, is a collaboration with Central Washington University and six local school districts, including the Muckelshoet Tribal Schools. The project has developed a new pre-professional Associate of Arts degree in elementary education at GRCC that provides a foundation for the university's teacher certification program. The two-year degree includes a mathematics course sequence designed for elementary teachers, an interdisciplinary and thematically based science course sequence, and introductory teacher education courses with field-based activities. Students in Project TEACH courses are paired with elementary school teachers to observe and help design exemplary mathematics and science lessons. Students also tutor in K-12 schools and participate in a summer mathematics camp for elementary students located on the GRCC campus. A certificate for paraprofessionals includes options for early childhood education and elementary education and articulates with the pre-professional degree.



### **Course, Curriculum, and Laboratory Improvement (CCLI)**

The CCLI program was launched in FY1999 by combining major features from the Course and Curriculum Development (CCD), Instrumentation and Laboratory Improvement (ILI), and Undergraduate Faculty Enhancement (UFE) programs. The goal of the new program is to revitalize and improve the quality of SMET education obtained by all undergraduate students at all types of institutions. The CCLI program supports projects at all levels of undergraduate education, with emphasis on introductory-level courses, curricula, and laboratories. The program has three tracks to accomplish these goals:

- The Educational Materials Development (EMD) track supports the development of educational materials that incorporate educational practices that are effective in improving learning of SMET by undergraduates with diverse backgrounds and career aspirations (i.e., all students).
- The Adaptation and Implementation (A&I) track promotes the improvement of undergraduate SMET education through the adaptation and implementation of materials, techniques, and practices developed elsewhere, which have been shown to be effective, in order to accomplish positive change at an institution.
- The National Dissemination (ND) track supports the national dissemination of exemplary materials and practices through the provision of faculty professional development opportunities.

Examples of CCLI projects involving two-year colleges include the following:

- The Community College of Southern Nevada is leading four other community colleges in the Southwest—Fullerton College in California, Albuquerque Technical Vocational Institute in New Mexico, the City College of San Francisco, and Montgomery College in Texas—in a project to transfer reforms in undergraduate chemistry education to two-year colleges (Award No. 9950320). This consortium impacts almost 5,000 first-year chemistry students per year. The project is adapting and adopting the methodology and materials developed by the “Molecular Science” project and others funded through the “Systemic Changes in the Undergraduate Chemistry Curriculum” initiative within NSF’s Course and Curriculum Development (CCD) program.
- To improve students’ success in developmental mathematics courses, a project at Bunker Hill Community College in Massachusetts (Award No. 9950568) is developing and testing a collection of mathematics software for use in the classroom or by individual students and is linking the developmental mathematics course to a one-credit course, “Strategies for Student Success,” which covers study strategies specifically related to the learning of mathematics. In addition to the software tools, this project is producing a companion resource guide for instructors and a series of “Success in Mathematics” modules.
- The National Chautauqua Workshop Program (Award No. 9950627), coordinated by the University of Pittsburgh, offers an annual series of workshops in which scholars at the frontiers of science, mathematics, and engineering work intensively for several days with undergraduate faculty to bring them up-to-date with the state of the art. It is anticipated that the workshops offered across the United States between 2000 and 2004 will provide enrichment experiences to 15,000 college instructors, 5,000 of whom will be drawn from two-year colleges.
- Blue Ridge Community College in Virginia is revising the content and curricular framework of its Mechanical Engineering Technology (MET) cluster to create an innovative, comprehensive educational program that will provide highly skilled technicians for manufacturing industries (Award No 9950726). Projects in the college’s new Mechanical Engineering Technology Center and courses in the MET cluster are adapting computer numeric control conversational programming applications and 3-D modeling modules previously developed by Virginia Highlands

Community College and Piedmont Virginia Community College to enhance the cluster's holistic approach to learning.

- Seven instructional modules to improve students' estimation, reasoning, and problem solving skills in intermediate algebra are being designed at San Diego State University (Award No. 9950746), and the curriculum is being evaluated in the Minority Science Improvement Program at Southwestern Community College, where the student population is composed of 78% ethnic minorities. Southwestern's program aims to improve the transfer rates of minority students who have an interest in mathematics, science, or engineering.
- Two two-year colleges—SUNY Farmingdale and Adirondack Community College—are participating with five other colleges, representing a subset of the New York State Coalition of 30 two- and four-year colleges, in a project to reform science, mathematics, and technology curricula on the campuses by adapting educational materials and practices developed by other NSF and privately funded projects (Award No. 9950803). In particular, the colleges are adapting and implementing materials developed by projects funded through the "Mathematics Across the Curriculum" initiative within NSF's Course and Curriculum Development (CCD) program. Faculty and administrators at the colleges are committed to making institution-wide changes and are centering their efforts around five themes: mathematical modeling, inquiry-based learning, partnerships, technology, and programmatic change.
- The Delaware Technical and Community College Stanton-Newark Campus is implementing a new A.A.S. degree program in chemical process operator technology (Award No. 9950887), which is based on the American Chemical Society's Voluntary Standards for Chemical Process Industries Technical Workers. The project is also helping to equip four state-of-the-art laboratories for integrated use in the Chemical Process Operator Technology, Mechanical Engineering Technology, Industrial Plant Maintenance Technology, and Process Instrumentation Technology programs. By working with an advisory committee representing local chemical industries, faculty are ensuring that the new curriculum and laboratories meet standards of industry, the American Chemical Society, and the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

#### ***Course and Curriculum Development (CCD)***

The CCD program, which made its last awards in FY1998 and was subsequently subsumed into the new Course, Curriculum, and Laboratory Improvement (CCLI) program, supported projects to improve the quality of courses and curricula in SMET. It encompassed activities affecting the learning environment, content, and experience of instruction.

Within the CCD program, the initiative "Systemic Changes in the Undergraduate Chemistry Curriculum" was launched to enhance the learning and appreciation of science through significant changes in chemistry instruction. Two-year colleges were part of the consortia of institutions involved in the five major projects funded through this initiative. The materials and educational practices developed by these projects were initially tested at the consortium institutions and then disseminated to other institutions via special symposia and workshops, and through direct grants from NSF to other institutions, including a large number of two-year colleges, interested in adapting and implementing these materials and practices.

The CCD initiative "Institution-Wide Reform of Undergraduate Education in Science, Mathematics, Engineering, and Technology" supported projects to stimulate reform of SMET education for all students and to provide national models of excellence. The initiative aimed for visionary, comprehensive plans based on successful and significant accomplishments to catalyze modifications in the institutional culture and infrastructure that are prerequisite to systemic reform. Awards were intended to motivate changes in

priorities and the allocation of resources so that institutions could produce self-supporting reform initiatives.

Examples of CCD projects involving two-year colleges include the following:

- Sinclair Community College in Ohio has created a “parallel college” to pilot-test institution-wide reform efforts in science, mathematics, and engineering technology education (Award No. 9653670). This effort is testing methods of correcting common problems that face two-year colleges across the country: misalignment of curricular formats with modern delivery systems, misalignment of curricular outcomes with modern workplace requirements, and misalignment of college operating systems with modern operating systems. The test is revealing the changes required in day-to-day operating systems to achieve the goals of higher quality and greater responsiveness to the needs of students and employers.
- The project “Beyond Formulas” at Brevard Community College in Florida (Award No. 9752241) is developing interdisciplinary, workplace-oriented modules involving five areas of mathematics: algebra, statistics, trigonometry, precalculus, and calculus. Each module exposes students to real-world problems through case studies, provides overviews of the industries to which the case studies relate, and integrates mathematical theory within the industrial context. By relating abstract concepts to meaningful problems from the workplace, the project is improving students’ appreciation of mathematics and increasing their critical thinking and intuitive abilities—beyond the rote memorization of formulas—so that they will be able to effectively solve problems and make decisions as employees in a highly technological workplace. The modules are being pilot-tested and evaluated by faculty from other two-year colleges and an external evaluator from Manatee Community College.
- A team of 13 mathematicians, scientists, and science educators at three institutions—the University of Delaware, Delaware State University, and Delaware Technical and Community College—have joined together in a project (Award No. 9752285) to reform teacher preparation courses on their campuses, making the courses student-centered, inquiry-based, and aligned with the national K-12 science standards. The faculty members are coordinating the three institutions’ courses for pre-service teachers and are integrating mathematics and science content with pedagogy in the courses.
- A project at Turtle Mountain Community College (Award No. 9752568) aims to increase the number of students majoring in science and to produce attractive, effective modular materials in interdisciplinary science for use at Turtle Mountain and other tribal colleges. The project has designed modules on fish species composition, fish life histories, and the effects of water quality on fish. In each module, students perform field exercises (in local lakes) and laboratory exercises in cooperative groups. The final product is a CD-ROM-based interactive program for beginning biology, chemistry, ecology, and wildlife courses.
- Led by Oakton Community College, chemistry faculty from nine Illinois two-year colleges have formed a consortium to reform the first-year chemistry curriculum on member campuses (Award No. 9752885) by adapting and adopting materials produced by the Modular Chemistry Consortium and the ChemLinks Coalition, two of the flagship projects funded through the CCD program’s “Systemic Changes in the Undergraduate Chemistry Curriculum” initiative. The new chemistry curriculum is active and inquiry-based and is flexible enough to address the many learning styles represented by a diverse student population. The two-year colleges in the consortium have a combined annual chemistry enrollment of over 6,000 students.
- Prince George’s Community College in Maryland is undertaking an institution-wide reform of courses and curricula with the goal of increasing students’ technological skills and their under-

standing of the interdisciplinary nature of the natural sciences, mathematics, social sciences, and technology (Award No. 9850052). Faculty members from a range of disciplines are developing and testing a set of educational modules that utilize technology, have an interdisciplinary character, and are capable of spawning other curriculum products across the college.

### ***Instrumentation and Laboratory Improvement (ILI)***

The ILI program also made its last awards in FY1998 and was subsequently subsumed into the new CCLI program. The ILI program supported the development of new or improved laboratory courses or experiments in SMET. The program largely provided matching grants for equipment to carry out a proposed project, which could then serve as a model for the use of instrumentation at other institutions.

Examples of ILI projects involving two-year colleges include the following:

- Guilford Technical Community College in North Carolina is equipping a modern, accessible astronomical observatory that will serve students at the college, as well as students at nearby colleges, high schools, and elementary schools and the general public (Award No. 9750802). The centerpiece of the program is an observatory with a 16-inch telescope, equipped with a CCD camera, spectroscope, photometer, and auxiliary equipment.
- Trident Technical College in South Carolina is developing a new laboratory to incorporate state-of-the-art dimensional measuring into the technology programs at the college (Award No. 9751185). Students are learning to use both mechanical and digital dimensional measuring instruments, gaining exposure to advanced instrumentation used by industry leaders, coming to understand better the metric system and its purpose in the manufacturing and engineering community, and learning the theory and application of data collection equipment in statistical process control in manufacturing.
- The Laser Electro-Optics Technology Department at Springfield Technical Community College in Massachusetts is enhancing its curriculum by developing a lightwave communications laboratory (Award No. 9751333). Each of the laboratory's workstations can emulate a real-world fiber optic communications system, capable of transmitting analog and digital information at rates of up to 2.5 GHz through several kilometers of both single-mode and multi-mode fiber. Hands-on experience with a working lightwave communications system makes students better-prepared to pursue careers in the rapidly growing field of photonics or telecommunications.
- To enhance physics instruction, the "Amusement Park Physics" project at Porterville College in California (Award No. 9850683) is collecting high-resolution inertial data from a variety of popular amusement park rides and designing multimedia software to process and display the data. The displays include an animated re-creation of the ride, with vector diagrams attached to the moving cart, bar graphs showing scalar quantities such as potential and kinetic energy, and a synchronized video display. This educational tool is being tested and evaluated in the physics, physical science, and calculus classes at Porterville College and in classes at two local high schools.
- With new state-of-the-art equipment, Lakeland Community College in Ohio is preparing and retraining bioscience technicians; conducting biotechnology workshops for college faculty, high school faculty, and high school students; making systemic changes in college and high school science curricula; and developing a biotechnology Tech Prep program (Award No. 9851385). The college's Bioscience Technology Program is being developed jointly by scientists in the biotechnology industry and researcher-educators in academic institutions.



### ***Undergraduate Faculty Enhancement (UFE)***

The UFE program also made its last awards in FY1998 and was subsequently subsumed into the new CCLI program (especially the CCLI program's "National Dissemination" track). The UFE program supported projects enabling faculty members who teach undergraduate courses to gain experience with recent advances and new experimental techniques in their fields and to learn new ways to incorporate these into undergraduate instruction. Projects were regional or national in scope and typically consisted of hands-on workshops or short courses, along with follow-up activities. UFE workshops were often held on two-year campuses, as well as on four-year college and university campuses, to encourage collaboration of faculty from many types of institutions. Regional coalitions of two- and four-year colleges and universities were a major feature of many UFE projects. Two-year college faculty attended many of the workshops supported by the UFE program.

Examples of UFE projects involving two-year colleges include the following:

- For seven years, Joliet Junior College in Illinois and Lee College in Texas have organized a series of intensive workshops for physics faculty at geographically-dispersed two-year college campuses (Award No. 9554683). So far, 34 week-long workshops have involved 778 faculty from 281 two-year colleges in 46 states and U.S. territories. Topics have included microcomputer-based laboratories in mechanics and heat; digital video, modeling, and microcomputer-based laboratories in electricity, magnetism, and optics; physics simulations; active learning problem-solving strategies using conceptual exercises and case studies; recent developments and findings of physics education research; and new developments and technologies for introductory physics courses. These workshops have assisted two-year college faculty in keeping up with recent developments in physics and physics teaching, and they have also helped connect two-year college faculty with the physics research community. After the workshops, participants have continued their interactions through an electronic bulletin board and a newsletter.
- During the summer of 1997, Prince George's Community College (PGCC) in Maryland conducted a four-day workshop for 24 psychology faculty from two-year and small four-year colleges in the mid-Atlantic states (Award No. 9653441). Workshop topics, which were developed from a survey distributed to two-year college faculty in four states, included biopsychology, research methodology and statistics, implementation of technology in psychology courses and its effect on student performance, and the integration of multiculturalism into the curriculum. Follow-up activities included the development of teaching modules based on workshop topics and a one-day return workshop at PGCC during the spring of 1998.
- The Two-Year College Physics Faculty Enhancement Program, coordinated by the Texas Engineering Experiment Station, was designed to serve as model for utilizing cooperative relationships between university professors and outstanding two-year college faculty members, who worked together to provide professional enrichment opportunities for two-year college physics faculty from across the United States (Award No. 9752718). The two-year program sponsored national workshops focusing on recent developments in physics research, innovative methods for teaching physics, and successful techniques for recruiting minority students into science and engineering programs at two-year colleges.
- In 1998 and 1999, DIMACS—the Center for Discrete Mathematics and Theoretical Computer Science, based at Rutgers University in New Jersey—conducted workshops to “reconnect” to mathematical sciences research many two- and four-year college faculty who do not have time to keep up with research developments (Award No. 9752776). Two-week summer workshops presented recent research results in topics such as computational molecular biology, network visualization, clustering, and visibility in geometry. A sequence of two-day workshops, directed mainly at two-year college faculty, presented an introduction to discrete mathematics and theoretical

computer science. Both the two-day and the two-week workshops engaged the participants in writing and publishing curriculum materials and exposed them to research being conducted at DIMACS, an NSF Science and Technology Center involving Rutgers, Princeton University, AT&T Labs, Bell Labs, Telecordia Technologies, and the NEC Research Institute.

- Working with the Community Colleges for Innovative Technology Transfer, Foothill College in California sponsored eight regional workshops during the summers of 1998 and 1999, providing faculty with training in remote sensing, image processing, geographic information systems, and geographic positioning systems (Award No. 9752778). Approximately 180 faculty members from two-year colleges and senior institutions participated in the workshops, which enabled them to develop additional curriculum modules integrating the four technologies into their individual instructional areas.

## **Division of Elementary, Secondary, and Informal Education (ESIE)**

ESIE supports programs designed to improve the educational experiences of all students in school settings and to increase and improve the opportunities for all individuals to explore science, mathematics, and technology beyond the school setting. The division achieves these goals by supporting projects to develop and implement high-quality instructional materials and assessments; to enhance the mathematical, scientific, pedagogical, and technological knowledge of teachers and create a cadre of teacher change-agents; and to provide stimulating environments outside of school to increase the understanding and appreciation of science and mathematics and their applications by individuals of all ages.

### ***Advanced Technological Education (ATE)***

ESIE co-manages the ATE program. During the years 1997–1999, approximately 25% of the program's budget was in ESIE, and 75% in DUE. Funding decisions, however, were always jointly made. An overview of the ATE program was given earlier in this chapter.

### ***Local Systemic Change (LSC)***

The Local Systemic Change Through Teacher Enhancement in Science Grades 6–12 (LSCS) initiative encourages schools, school systems, or collaborations of schools, with their partners, to initiate systemic efforts that will result in teachers making significant progress towards reaching national goals for the teaching of science. Projects that align policy and practice include (1) a shared comprehensive vision of science, which includes goals and objectives for student learning and incorporates national and state standards for curriculum, teaching practice, and assessment; (2) active partnerships and commitments among stakeholders; (3) a detailed self-study that provides a realistic assessment of the current system's strengths and needs; (4) strategic planning that incorporates mechanisms for engaging each teacher in intensive professional development activities; (5) leadership and technical support for the participating school districts to design, develop, and enact a framework for science curriculum and instruction; (6) appropriate integration of educational technologies; and (7) an evaluation plan that provides on-going feedback for the project. For example, Radford University, in cooperation with local schools, is implementing a project in which all K-8 teachers in 39 schools are changing their elementary science curricula (Award No. 9819562). Southwest Virginia Community College is providing the facility to host the workshop and is involved in other substantive ways.

The Local Systemic Change Through Teacher Enhancement in Mathematics Grades 7–12 (LSCM) initiative is designed to initiate systemic efforts that will result in teachers making significant progress towards reaching national goals for the teaching of mathematics. For example, the Maricopa Community College

District is implementing the Interactive Mathematics Program (IMP) through the use of seven integrated components: in-service enhancement on the mathematics and pedagogy of IMP, follow-up support activities, internal capacity for professional development, school teams for support of teachers, teachers from schools considering IMP, articulation with feeder schools, and impact on pre-service teacher training. This five-year project (Award No. 9634034), led by Maricopa, involves mathematics teachers in grades 9–12, Arizona State University, and the Intel Corporation.

### ***Young Scholars (YS)***

The YS program targeted high-potential and high-ability students in grades 7-12 and was designed to inform and excite these students about SMET disciplines and to encourage them to investigate careers in these fields. The program emphasized student participation in the process of scientific discovery through interaction with practicing scientists and science educators both in the laboratory and in the field. Projects offered a combination of instruction, research, and problem-solving activities, along with a discussion of career preparation and scientific ethics. For example, Atlanta Metropolitan College's YS project in chemistry and mathematics for students in grades 7 and 8 (Award No. 9553538) included classroom discussions, laboratories, and field experiences stemming from the investigation of the chemistry of the environment. Prince George's Community College's YS project in field biology (Award No. 9553500) involved students in researching endangered cranes, osprey banding, aquatic ecology, and turfgrass.

## **Division of Human Resource Development (HRD)**

The programs in HRD reflect NSF's commitment to developing the resources of the scientific and technical community as a whole. The division has primary responsibility for broadening participation of individuals from groups underrepresented in SMET, and the division operates and coordinates a range of programs that focus on increasing the presence of minorities, women and girls, and persons with disabilities in SMET.

### ***Louis Stokes Alliances for Minority Participation (LSAMP)***

The LSAMP program is designed to develop the comprehensive strategies necessary to strengthen the preparation and increase the number of minority students who successfully complete baccalaureates in SMET fields. Institutions participating in the program are committed to better serve all SMET students today and to institutionalize changes that will ensure that all students have access to quality SMET educational opportunities.

LSAMP projects are administered through cooperative agreements in partnership with NSF. These agreements contain each alliance's goal (the current number of minorities obtaining BS degrees in SMET and the alliance's five-year goal) and specific work statements that describe how the alliance will achieve its goal.

As necessary to achieve LSAMP objectives, alliances establish partnerships among two-year colleges, four-year colleges and universities, school systems, other government agencies, major national SMET laboratories and centers, industry, private foundations, and SMET professional organizations.

As indicated in the following table (Table 1), two-year colleges are involved in virtually every LSAMP project.

Table 1  
**TWO-YEAR COLLEGES IN THE  
 LOUIS STOKES ALLIANCES FOR MINORITY PARTICIPATION**

Alliance	Award No.	Total Colleges	Two-Year Colleges	
Colorado	9623946	13	CC of Denver Front Range CC	Pueblo CC
Florida-Georgia	9703197	12	Florida CC at Jacksonville Miami-Dade CC	Tallahassee CC
Heartland	9550704	10	Metropolitan CC	St. Louis CC
Louisiana	9550765	13	Nunez CC	
Mid-South	9553315	11	Mid-South CC	Shelby State CC
Montana	9450369	20	Bay Mills CC Blackfeet CC Cheyenne River CC Fond Du Lac Tribal & CC Fort Berthold CC	Fort Peck CC Haskell Indian Nations U. Lac Courte Oreilles Ojibwa CC Little Hoop CC Little Priest Tribal College
New Mexico	9802223	27	Albuquerque Tech. Voc. Inst. Clovis CC Diné College Eastern NM U., Roswell Luna Voc. Tech. Inst. Mesa Tech. College NM Junior College NM Military Inst. NM State U., Alamogordo NM State U., Carlsbad	NM State U., Dona Ana NM State U., Grants Northern NM CC San Juan College Santa Fe CC Southwestern Indian Polytechnic Inst. U. of NM, Gallup U. of NM, Los Alamos U. of NM, Taos U. of NM, Valencia
New York City	9703600	16	Borough of Manhattan CC Bronx CC Hostos CC Kingsborough CC	La Guardia CC New York City Tech. College Queensborough CC
State University of New York	9623931	16	Broome CC Dutchess CC Nassau CC Orange County CC Schenectady County CC	Suffolk County CC SUNY at Farmingdale Tompkins-Cortland CC Ulster County CC
Texas A&M University System	9624602	14	Blinn College Coastal Bend College Del Mar College El Centro College Houston CC	Laredo CC Palo Alto College Richland College San Antonio College
University of Texas System	9701775	19	Alamo CC Austin CC Collin County CC Dallas County CC El Paso CC	Howard College Midland College Odessa College South Texas CC Tarrant County Junior College

(continued)

Alliance	Award No.	Total Colleges	Two-Year Colleges	
Western	9623615	41	Chandler-Gilbert CC Cochise College Diné College El Paso CC Estrella Mountain CC Gateway CC Glendale CC Mesa CC Northern NM CC Paradise Valley CC	Phoenix College Pikes Peak CC Pima CC Pueblo CC Rio Salado College Salt Lake CC Santa Fe CC Scottsdale CC South Mountain CC Southern Nevada CC

### Other HRD Programs

The Model Institutions for Excellence initiative continued to offer an opportunity for Oyate tribal colleges and their 26 tribal counterparts to reach underrepresented American Indian students and to bring academic and technical expertise to tribal nations in ways that may make the difference between extinction and tribal self-sufficiency (Award No. 9550533). In this program, Cheyenne River, Standing Rock, and Sisseton Wahpeton community colleges are joining with Oglala Lakota College and Sinte Gleska University to develop programs in environmental science and software engineering.

The Model Projects for Women and Girls initiative seeks to encourage the design and implementation of innovative, short-term, and highly focused activities, strategies, and materials to improve educational achievement and to encourage entry and improvement of women and girls into SMET fields. For example:

- Borough of Manhattan Community College is building and expanding on a successful calculus reform project to recruit and retain women (Award No. 9710273). The program emphasizes collaborative work on complex, real world problems, using appropriate technology, creating portfolios, and involving students in research projects.
- Muskingum Area Technical College's program for encouraging women and girls in science (Award No. 9714792) involves an international wildlife research and conservation center in an intensive science, mathematics, and engineering (SME) intervention program for females in grades 6–12. Key offerings are monthly seminars and informal discussions with women in SME professions, field trips involving hands-on activities, academic instruction, and a mentoring program.
- A grant to the Old Dominion Research Foundation (Award No. 9714637) involves a co-PI from Southwest Virginia Community College in the implementation of a statewide institute for gender-balanced education to serve K-12 counselors. The primary goals of the project include raising awareness about gender issues as they relate to the interest and success of girls in elementary through secondary schools and assisting counselors in fostering a gender-fair learning environment in their work with teachers, administrators, parents, and students.
- The Harbor Branch Oceanographic Institution is working with Indian River Community College and the local school district to provide transition-point young women (middle to high school, high school to college, and women re-entering college) with experiences and materials geared to support them in the pursuit of science-oriented career paths (Award No. 9710971).



The Program for Persons with Disabilities promotes the development and dissemination of innovative intervention strategies that reduce the barriers that inhibit the interest, retention, and advancement of students with disabilities in science, mathematics, and engineering (SME) education and career tracks. For example, an alliance of 20 community colleges and universities, led by New Mexico State University (NMSU), has initiated multiple projects to alleviate the lack of representation in SME by students with disabilities (Award No. 9800298). Typical outreach projects include "Netsurf" at NMSU, which excites middle and high school students with Web page computer experiences; the Children's College at the University of New Mexico, Los Alamos, which touches 5th and 6th graders with hands-on science experiences; and a project at Diné College that brings two weeks of science fun to middle school Navajo students. Teacher workshops reinforce inclusion and promote bridging of high school students into college through cooperation between special and general education teachers.

The Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring program, administered by NSF on behalf of the White House, seeks to identify outstanding mentoring efforts or programs designed to enhance the participation of groups underrepresented in science, mathematics, and engineering. The awardees serve as exemplars to their colleagues and are leaders in the national effort to more fully develop the nation's human resources in science, mathematics, and engineering. For example, the Scientific Knowledge for Indian Learning and Leadership (SKILL) program at Oglala Lakota College in South Dakota addresses academic support and career guidance for a large number of Native American students at the elementary, middle, and high school levels. The program indicates an excellent record of influencing transition into postsecondary institutions. The high school graduation rate among participants is 100 percent. Complementing this record is an ACT performance average that exceeds the national average. SKILL has reached a relatively large number of American Indian students (3,000), fostering their interest in science and mathematics. The program shows good success in student retention and transition to college from high school. The strengths of the awardee include continuity of focus on Native Americans, early and sustained intervention, demonstrated staff dedication and leadership, and a holistic approach to supplemental learning.

## **Division of Research, Evaluation, and Communication (REC)**

### ***Networking Infrastructure for Education (NIE)***

The NIE program was designed to build synergy among technology and education researchers. It was a joint effort between the Computer and Information Science and Engineering (CISE) and Education and Human Resources (EHR) directorates. The aims of the program were to expedite the development of a widespread high-performance electronic communications infrastructure in support of SMET education reform and to lay a foundation on which strategies for the appropriate use of technology in support of increased student achievement could be developed. NIE awards built synergy between technology and education researchers, developers, and implementers to explore networking costs and benefits; tested self-sustaining strategies; and developed models of a flexible educational networking infrastructure to speed the pace of educational innovation and reform.

The NIE program supported projects in the areas of (1) programmatic evaluation of the impact of existing technology programs on the infrastructure of education and on systemic reform; (2) widespread dissemination to appropriate audiences of the outcomes of existing models, both successful and unsuccessful; and (3) electronic library implementation prototypes. Many projects funded by the program included collaborations of groups interested in mathematics and science education. Two-year colleges were often represented on such teams and participated through advisory committees and dissemination and outreach activities. For example, the New Jersey NIE project worked with community colleges in collaboration with the New Jersey Statewide Systemic Initiative; and the University of Hawaii trained faculty from

community colleges and provided mechanisms through which community colleges worked with K-12 faculty to articulate common educational goals and concerns.

In several projects, two-year colleges were the lead institutions. For example, the NIE program continued to provide support for Diné College to implement the Navajo Learning Network (NLN), a four-part project with the overall objective of establishing a single virtual campus linking all educational institutions within the Navajo Nation (Award No. 9554344). Teaching, research, and curriculum development activities are being carried out collaboratively by K-12 as well as Diné faculty and students. A base level of connectivity between participating institutions is being accomplished by utilizing the wide area network developed by the Navajo Nation government that connects participating Navajo Nation K-12 schools to Diné College's system and out to the Internet. The NLN project team, together with trainers from Los Alamos National Laboratory, provide training on both NLN and Internet access and are working closely with Diné and K-12 faculty to develop effective strategies for utilizing information technology as a teaching and learning tool in a way that is sensitive to the learning styles prevalent among Navajo school-children.

A project based at the Monterey Peninsula Unified School District (Award No. 9554325) involves a co-PI from Cabrillo College. The consortium is a broad-based collaboration of scientific research organizations, education and government agencies, libraries, museums, and business/industry partners working to develop a collaborative educational networking infrastructure, "Monterey BayNet," that would build a sustainable base and serve as a national model for the application of telecommunications technology to science education. Teams of scientists, educators, and students design initial electronic field trips around four exemplars: the Virtual Canyon Project with the Monterey Bay Aquarium and the Monterey Bay Aquarium Research Institute; the Watershed Project with the Monterey Bay National Marine Sanctuary and Moss Landing Marine Laboratories; the Virtual Telescope Project with the Monterey Institute for Research in Astronomy; and Building Bridges on the Super Highway with Cabrillo College.

### ***Studies and Indicators (SI)***

The SI program sponsored research on significant factors, trends, and practices that assist NSF and other agencies and organizations to strengthen SMET education. Priorities focused on five broad policy areas: (1) participation in science, (2) teacher supply and qualifications, (3) instructional and school practices, (4) educational reform, and (5) the role of science and mathematics skills in the workforce. For example, Indian River Community College in Florida is identifying sets of core competencies and skills in SMET that are required by industries that hire two-year college graduates with technical degrees (Award No. 9628036). The project has investigated five technology-based industries, interviewed technicians and their supervisors, and produced research papers on the integration of community college curricula with industrial needs.

### ***Applications of Advanced Technologies (AAT)***

The AAT program provided support for a project led by Arizona State University that involves the integration of nanoscience and nanotechnology concepts into upper-division high school and lower-division college curricula (Award No. 9632740). This "Interactive Nano-Visualization in Science and Engineering Education" project uses innovative educational approaches that help students understand the structures and properties of matter on a scale below 100 nanometers—i.e., the nanoscale. The project is creating a consortium of university and industry scientists, two-year college and high school science faculty, and museum educators with a common vision of creating an interactive Web site to develop a new educational thrust based on remote operation of advanced microscopes and nanofabrication tools coupled to powerful surface characterization methods. The centerpiece of this project is the revolutionary scanning probe

microscope, which has evolved rapidly into a relatively simple, yet powerful, technique capable of imaging and manipulating materials at resolutions down to the atomic scale. This allows students and teachers nationwide to operate and learn about nanotechnology using this Nobel prize-winning technique.

## **Division of Educational System Reform (ESR)**

ESR supports the statewide, urban, and rural systemic initiatives. Two-year colleges are involved, as appropriate, in numerous state and urban systemic initiatives. The focus of these programs is to improve science, mathematics, and technology education for grades pre-K through 12. The Rural Systemic Initiatives (RSIs) involve two-year colleges in substantive ways. ESR's urban efforts, such as the Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) program, also encourage the involvement of two-year colleges and four-year colleges.

### ***Rural Systemic Initiatives (RSI)***

The goal of the RSI program is to promote systemic improvements in science, mathematics, and technology education for students in rural, economically disadvantaged regions of the nation and to ensure sustainability of these improvements by encouraging community development in conjunction with instructional and policy reform. In addition, programs should help prepare a technologically competent workforce to enhance the infrastructure of economic development activities within a community or region by strengthening the SMET instructional capacities of regional colleges and universities, particularly community and technical colleges responsible for technician education. Programs also strengthen other lower-division instruction of technical curricula and entry-level science and mathematics curricula of the future teaching workforce. These collaborations extend across K-12 school systems and into institutions of higher education. Each of the RSI projects includes participation of two-year colleges and other institutions that award associate degrees.

The RSIs that include two-year college representation are geographically and intellectually related networks established to address local challenges, goals, and commitments. These projects are located at regional institutions of higher education and serve as conduits of information and expertise between the students and the outside world. For example, the High Plains Rural Systemic Initiative (HPRSI) (Award No. 9554467), led by Turtle Mountain Community College, continues to bring together 17 tribal colleges and other entities involved in SMET education in Montana, Nebraska, North Dakota, South Dakota, and Wyoming. HPRSI directs capacity-building at the other colleges and has implementation activities at all 17 sites. This initiative is seeking to identify and coordinate efforts to remove impediments for exemplary student performance in SMET education among American Indians.

### ***Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA)***

The CPMSA program, one of ESR's urban efforts, encourages the involvement of two- and four-year colleges in urban areas to improve achievement in the K-12 schools. For example:

- In the Kansas City, Kansas, CPMSA (Award No. 9701863), Kansas City Kansas Community College (KCKCC) works with the Kansas City Public Schools. The project blends the efforts of an urban school district and an array of partners in a long-range project to significantly increase minority enrollments and success rates in courses making up the SMET pipeline. A policy change has allowed for the implementation of a unique hook-up between high school computer labs and the KCKCC mathematics lab. This allows students to receive dual enrollment in college algebra while physically accessing the college math lab at the high school site. Potentially, high school



students can take courses ranging from pre-algebra to calculus by accessing the college's math lab via the Internet. An additional resource available to students and teachers has been the Saturday Academy, which was developed in cooperation with the school district, the University of Kansas Medical School, and KCKCC. Children participated in the Science Academy held on the KCKCC campus on designated Saturdays throughout the 1999–2000 school year. This event provided a time of enrichment in science and mathematics, and each student used KCKCC facilities to conduct research in an area of interest, culminating in a presentation to peers, parents, and the community.

- The Richmond, Virginia, CPMSA has established a dual-degree program with J. Sargeant Reynolds Community College (JSRCC). In this program, Richmond schoolteachers who have a master's degree in a content area become adjunct faculty at JSRCC. Students who enroll in the courses are taught at the high school where the teacher normally works. Students can take courses in English composition, English literature, computer programming (Visual BASIC and COBOL), auto mechanical design, calculus, algebra, marketing, and several other technology-based areas. Students who successfully complete the courses are awarded college credit. For working as adjuncts in the college, the teachers are provided a stipend from JSRCC that is awarded to the Richmond Public School District. The district then pays back to the college the cost of the tuition for the high school students who are enrolled in the dual-degree program.
- The Prince George's, Maryland, CPMSA has fostered an excellent relationship between the Prince George's Public Schools and Prince George's Community College (PGCC). At PGCC, a dozen teachers and over 30 students have participated in a Saturday program in computer technology. In addition, the partnership has made the college well-poised to advance the local production of K-12 teachers. PGCC has an interest in being a seedbed for the development of new teachers, and it awards an A.S. degree in teacher education.

## **The Experimental Program to Stimulate Competitive Research (EPSCoR)**

EPSCoR is based on the premise that universities and their science and engineering faculty and students are valuable resources that can potentially influence a state's development in the 21st century much in the same way that agricultural, industrial, and natural resources did in the 20th century. EPSCoR's goal, therefore, is to identify, develop, and utilize a state's academic science and technology resources in a way that will support wealth creation and a more productive and fulfilling way of life for a state's citizenry. NSF's EPSCoR Office actively cooperates with state leaders in government, higher education, and business to establish productive long-term partnerships. In each EPSCoR state, NSF's role is catalytic in nature and is designed to stimulate local action that will result in lasting improvements to the state's academic research infrastructure and increased national R&D competitiveness. For example, a project based at the University of Alabama at Tuscaloosa (Award No. 9977661) was a collaborative effort between three universities and Shelton State Community College. This shared effort involved research on the use of electromechanical mechanisms in industry for motion control and other applications, including refrigeration systems for superconducting devices.

## **Division of Graduate Education (DGE)**

### ***Postdoctoral Fellowships in Science, Mathematics, Engineering, and Technology Education (PFSMETE)***

The PFSMETE program is aimed at recent Ph.D. graduates in SMET fields and seeks to draw broadly on the diversity of talent available in the U.S. population. The primary objectives of the program are to pre-

pare Ph.D. graduates in SMET fields with the necessary skills to assume leadership roles in science education in the nation's diverse academic institutions, and to provide opportunities for outstanding Ph.D. graduates to develop expertise in a facet of science education research that would qualify them for the new range of academic positions that will come with the 21st century. For example, Anne Arundel Community College in Maryland has employed a postdoctoral fellow who worked on evaluation and assessment issues (Award No. 9714489).

## Chapter 3

# SUPPORT FROM THE RESEARCH DIRECTORATES

### Introduction

Between 1960 and 1975, the number of U.S. community colleges increased 250%, with an average of one new campus opening every week. As a result, credit enrollment at two-year colleges has increased at nearly triple the rate of that at baccalaureate-granting institutions, so that now approximately half the nation's first time college freshmen attend two-year colleges. Moreover, two-year college attendance is higher among nontraditional students, students from low socioeconomic backgrounds, and students who are the first in their family to attend college. It is this population from which the nation's future technical workforce will increasingly be drawn. For these reasons, NSF has, for a number of years, developed programs to strengthen SMET education and training provided by two-year colleges. What follows is a discussion of some ways in which this is being accomplished through the research directorates.

### Research Experiences for Undergraduates (REU)

In SMET disciplines, it is especially important that students be exposed early and in progressively greater depth to authentic, practical, problem-solving experiences. To do otherwise would ill prepare them for work in a knowledge-based economy where technical skills and strong reasoning ability are highly valued. The REU program is supported by all the Foundation's disciplinary research programs. It provides opportunities for undergraduate students to experience hands-on participation in research or related scholarly activities in areas of science, mathematics, and engineering.

Several REU awards were made directly to community colleges. Through the Directorate for Biological Sciences, Massachusetts Bay Community College is developing an innovative summer program which targets students from two-year colleges (Award No. 9731991). Students are being extensively trained in various techniques used in molecular biology and biotechnology research. Each student undertakes at least one summer research externship designed to provide preparation both for graduate school and for the workplace. Participating research institutions include the Marine Biological Laboratory, the Texas Medical Center, Woods Hole, and the Molecular Biology Institute. Georgia Perimeter College, formerly Dekalb Community College, cooperated with Georgia State University to extend opportunities for students to participate in geoscience research using the regional geology of Georgia (Award No. 9820699).

Other awards were made to four-year institutions to provide two-year college students with opportunities for research. At Occidental College, a chemistry professor provides eight Southern California community college students with such an experience during a ten-week summer program supported by NSF's Chemistry Division (Award No. 9820255). During the program, the two-year college students live on the Occidental College campus while they investigate the biophysics of phospholipids, analyze protein structure, synthesize novel organometallic compounds, and determine the reaction rates of human erythrocyte dimers. Participants publish their results on the Web and present them at campus and regional undergraduate research symposia.

At California State University, Los Angeles, another chemistry professor provides a similar experience to a dozen two-year college students drawn from the surrounding low socioeconomic East and South Central Los Angeles neighborhoods. These students are usually the first in their families with any postsecondary education. The Chemistry Division's REU program (Award No. 9731839) supports training of these stu-

dents to use nuclear magnetic resonance and laser spectroscopy in investigating the synthesis, structure, and chemical reactivity of important organic and inorganic compounds; study significant chemical reactions occurring in the atmosphere; determine the mode of action of enzymes in plant growth; and determine how hemoglobin functions in respiration. As a result of this experience, most of these students go on to earn baccalaureate and post-graduate degrees in chemistry or biology. Also at California State University, an associate professor of physics and astronomy has developed an REU project, funded by NSF's Astronomical Sciences Division (Award No. 9820546), which supports the participation of a half dozen Los Angeles two-year college students in a year-round program that provides them with observing time at the Table Mountain facility that the Jet Propulsion Laboratory (JPL) operates for NASA. Access to these telescopes and the research scientists who operate them would be highly unlikely without NSF and JPL support, which provides inner city students a chance to participate in discovery and experience the fascination of observing the universe.

These projects are typical of the way the REU program enhances SMET education at two-year colleges. Many of the approximately 500 REU Site projects conducted annually by the nation's baccalaureate-granting colleges and universities include two-year college students as participants, and many more REU Supplement projects provide additional funding to regular NSF research awards to support the participation of undergraduates, including two-year college students, in the research.

## **Research Sites for Educators in Chemistry (RSEC)**

NSF supports innovative approaches to enhancing the undergraduate curriculum and sustaining the disciplinary currency of faculty who teach undergraduates at two-year institutions as well as baccalaureate-granting institutions. One example of this support is the RSEC program, which is jointly funded by the Office of Multidisciplinary Activities and the Chemistry Division of the Directorate for Mathematical and Physical Sciences. Project Emerald, conducted by a chemist at the University of New Mexico with support from the RSEC program, allows two-year college faculty and their students to work with research scientists at the university as well as at the nearby Los Alamos and Sandia national laboratories. A large proportion of baccalaureate students in New Mexico start their undergraduate education at the state's two year colleges and do not have the same access to the skills, practices, and ethics of modern research as their counterparts at campuses that award doctoral degrees. With the assistance of the RSEC program, access to these largely federally funded programs and facilities is being significantly broadened.

## **Research in Undergraduate Institutions (RUI)**

The RUI program is part of NSF's effort to help assure a broad base for science and engineering research, and thereby enhance the scientific and technical training of students in undergraduate institutions. The specific objectives of the program are to (1) support high-quality research by faculty with active involvement of undergraduate students, (2) strengthen the research environment in academic departments that are oriented primarily toward undergraduate instruction, and (3) promote the integration of research and education at predominantly undergraduate institutions. Through the RUI program, NSF provides support for research and research instrumentation for investigators in non-doctoral departments in predominantly undergraduate institutions (including two-year colleges). For example, the Astronomy Division supported Beville State Community College in Alabama to study spiral galaxies (Award No. 9902918). Analytic studies and computer simulations of the inner resonance rings are being carried out to understand the disk and halo properties of the galaxies. The Berks Campus of Pennsylvania State University, one of the two-year colleges in the Penn State system, was supported by the Division of Materials Research to research the symmetry classification of domain structures (Award No. 9722799). The work on crystallographic

tables enhances understanding of symmetry properties of crystal growth and magnetic domain walls. Paul Smith's College in New York used an RUI grant (Award No. 9808972) to conduct a high-resolution analysis of the diatoms preserved in Lake Victoria, East Africa. The results of the study contribute to an understanding the history of, and forcing mechanisms of, equatorial climates of the Holocene. This understanding helps put the climatic history of Lake Victoria into a global context.

## **Network Infrastructure (NI)**

This program encouraged and facilitated scholarly communication and collaboration by providing data network access to researchers and educators, supercomputer centers, and information resources. In FY1997, the NI program supported 21 two-year colleges to gain direct Internet access; in FY1998, it similarly supported four two-year colleges. By FY1999, the program was phased out. Two-year colleges were also supported through larger grants under the CISE Institutional Infrastructure program. Other two-year colleges were supported through larger grants that help consortia of institutions gain access to the Internet.

For example, J. F. Drake Technical College in Alabama gained access to the Internet to allow students and faculty to access informational resources (Award No. 9729704). A project based at Utah Valley State College (Award No. 9613949) connected three Native American two-year colleges (Provo College in Utah, Northwest Indian College in Washington, and Fort Peck Community College in Montana) and one museum to the Internet. Palm Beach Community College in Florida used its NSF support to serve approximately 50,000 students in a wide range of academic programs that led to both associate degrees and transfer to four-year institutions (Award No. 9616884). Cambria County Community College in Pennsylvania, one of the nation's oldest trade and technical schools dedicated to the comprehensive rehabilitation of persons with disabilities, used its NSF funding to benefit its special population of students (Award No. 9710334).

## **Engineering Education and Centers (EEC)**

The EEC Division seeks to stimulate new paradigms in engineering research and education that will accelerate technological and educational innovation and improve the quality and diversity of engineering graduates entering the technical workforce. To achieve its mission, the division facilitates integrated partnerships that cross disciplines and focus on technological systems. For example, academe is linked with industry and the states, and diverse academic institutions are joined in curricular and educational innovations. The objective is to yield well-rounded, professionally oriented engineers with a global outlook and the ability to assume leadership roles in industry, academe, and society. For example, a project at SUNY Farmingdale (Award No. 9727876) was established to assist the region's defense manufacturing companies in developing dual-use technologies, so that those companies could diversify into commercial markets. This award continues work originally made possible through the Technology Reinvestment Project and helps the Regional Center for Workforce Education transition to self-sufficiency and enables it to provide bridge support to the small businesses involved.

## **Other Selected Examples**

El Paso Community College in Texas received support in FY1997 under the Instrumentation and Instrument Development program to conduct a study of the environmental factors that affect virus survival in ground water and surface water and the structural changes associated with viral inactivation and reactivation (Award No. 9604760). The instrument also supports research on isolation and characteriza-

tion of microorganisms, the use of bacteria and peat moss in the design of electrodes specific to heavy metals, and the use of a liquid scintillation system to purify and analyze radioactively labeled proteins.

Several professors at two-year colleges are actively involved in research projects. A PI at Honolulu Community College, supported through the Integrative Systems Program in Engineering and Computer Science (Award No. 9625557), studied models in noisy and changing environments. The research analyzed the behavior of supervised learning algorithms but focused on more complex reinforcement learning algorithms, including sequential detection problems and networking problems. A professor at Portland Community College in Oregon is participating in a study led by Oregon Graduate Institute of Science and Technology to determine, characterize, and model a new mechanism for solidification cracking observed in high purity iron-base alloys (Award No. 9972052). The Metals Program in NSF's Division of Materials Research is supporting this project. At New Mexico State University, Carlsbad Branch, a professor is taking an active leadership role in a study of the sulfur chemistry in the Antarctic atmosphere, including two summer field trips to the South Pole (Award No. 9809164). This study, which is supported through the Antarctic Oceans and Climate Systems program, is improving the understanding of oxidation chemistry of biogenic sulfur in the polar environment and the climatic interpretation of sulfur-based signals in Antarctic ice cores. In a project led by the University of California, Santa Barbara (Award No. 9818545), a professor at Bowling Green State University Firelands College in Ohio is working with others to address the effects of route comprehension on spatial knowledge acquisition. This study is being conducted to identify effective strategies of spatial learning that can contribute to the mobility and quality of life of visually impaired persons.

Other projects have a large effect on two-year colleges by involving two-year college faculty in professional development activities. For example, the Ultraviolet Impacts Network project (Award No. 9907674), led by the University of Nevada Desert Research Institute, is establishing a geosciences education network of two-year college faculty and students. The project aims to improve instruction in the physical concepts and processes that control ozone depletion and the resulting influences on ultraviolet climatology and health risk. This project is supported through the Geosciences Directorate's Awards to Facilitate Geoscience Education.



## Chapter 4

### LEADERSHIP ACTIVITIES

#### Introduction

The Directorate for Education and Human Resources (EHR) has undertaken numerous leadership activities involving two-year colleges. Many of these activities are centered in the Division of Undergraduate Education (DUE).

#### Outreach Workshops

In FY1997–FY1999, regional workshops targeted administrators and faculty members from two-year colleges. The goals of the workshops were (1) to discuss funding opportunities with the two-year college community and their academic and industrial partners, (2) to encourage quality proposals from two-year colleges to more NSF programs, and (3) to give the two-year college community an opportunity to interact with NSF program officers.

DUE program officers participated in a series of multi-agency funding workshops organized by the U.S. Department of Education. From 1997 to 1999, six of these workshops were held at rural colleges in North Carolina, Virginia, Hawaii, Iowa, Arkansas, and Texas. This initiative was designed to familiarize colleges that do not normally have access to information about federal programs and to give two-year college participants an opportunity to hear about programs and discuss their ideas with program officers. At the workshops, government representatives discussed funding opportunities and leadership activities involving two-year colleges. The agencies included NSF, the Department of Education (e.g., FIPSE, Community Learning Centers program, School-to-Work, Title III, International Education Programs, Trio, Gear-Up), NASA, the U.S. Department of Agriculture, the U.S. Information Agency (Fulbright program), the National Endowment for the Humanities, and the U.S. Department of Defense. Approximately 1,000 people from rural colleges have been served by these workshops.

In conjunction with professional meetings, program directors have organized symposia that focused on innovations that have taken place specifically at community colleges as a result of funding from NSF programs. These symposia gave community college faculty the opportunity to discuss and disseminate innovative materials that they developed and novel approaches that they used in their NSF-funded projects. Community college faculty were also featured, along with faculty from other types of institutions, in symposia that showcased results from funded projects originating from all types of institutions, from two-year colleges to research universities. Proposal-writing workshops have been presented for faculty in state community college systems and for members of the Council for Resource Development (CRD), an organization that has responsibility for grants acquisition at many community colleges. CRD arranged for groups of community college grant writers and faculty to attend such a workshop each year. In addition, presentations were made at CRD regional meetings. A special panel on the ATE program, which included biologists and engineers as well as mathematicians, was held at the annual conference of the American Mathematical Association of Two-Year Colleges (AMATYC). AMATYC has held special panels and initiatives highlighting the report *Investing in Tomorrow's Teachers* (NSF 99-49) on teacher preparation in community colleges. The American Society for Engineering Education's Two-Year College Division sponsored special sessions on NSF funding opportunities at its national conference.

In 1999, a special symposium on “NSF-Catalyzed Innovations in the Undergraduate Laboratory” was held in conjunction with the 218th American Chemical Society National Meeting in New Orleans, Louisiana. This particular symposium highlighted 16 NSF-funded laboratory curriculum innovations, including one from a community college on “Technology as a Discovery-Based Learning Tool in the Chemistry Curriculum.”

## “Shaping the Future” Workshops

An ambitious yearlong study that provides a detailed look at the state of undergraduate education in science, mathematics, engineering, and technology (SMET) in U.S. colleges and universities was completed in 1996. A subcommittee of the EHR Advisory Committee conducted the study, the first of its kind in a decade. The report from the study, *Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology* (NSF 96-139), provides action-oriented recommendations for improving the quality of undergraduate education in SMET. It is broad in scope, reflecting the advice and contributions of hundreds of individuals representing the public and private sectors, professional societies, and diverse academic groups.

Within the context of a broader study of the centrality and importance to society of an undergraduate education, the report urges attention to the needs of all undergraduate students in all types of educational institutions, recognizes the importance of two-year colleges as the starting point (and often re-starting point) in higher education for increasing numbers of students, and suggests increased attention to the potential role of two-year institutions in addressing the nation’s need for well-trained K-12 teachers.

The report provides a rich set of recommendations that, when taken together, constitute a coherent, broad-reaching call to action to improve SMET education for *all* undergraduate students. Four ideas constitute a firm foundation for this plan:

- Every undergraduate should have access to an excellent education in SMET and be encouraged to study and learn these subjects.
- A flexible SMET curriculum should provide students with greater awareness of, and preparation for, career opportunities.
- The educational environment should be supportive of students, promote active learning, encourage collaboration, and emphasize inquiry more than rote acquisition of facts.
- All links in the education chain, including K-12, undergraduate, graduate, and professional schools, must work together to provide, assure, and reward sound learning.

From 1997 to 1999, DUE sponsored 24 regional “Shaping the Future” workshops. Three of these were organized by community colleges: the workshops in South Carolina (Trident Technical College), New York (Borough of Manhattan Community College), and North Carolina (the North Carolina Community College System). Other community colleges served as co-organizers with four-year institutions. For example, the Maricopa Community College District was one of the co-organizers with Arizona State University for the workshop held in Arizona, and St. Louis Community College co-organized the Missouri workshop with the University of Missouri. Of the over 4,300 participants in the workshops, it is estimated that approximately 17% were from two-year institutions.



## **Advanced Technological Education: Publications**

For each fiscal year, the ATE program has published an *Awards and Activities* book. For FY1997, FY1998, and FY1999, these publications are NSF 98-110, NSF 99-113, and NSF 00-112, respectively. In addition to award abstracts, the books include an overview of the ATE program, a summary of the program's activities during the fiscal year, and indexes of active ATE awards by area of technology, state, and PI.

The May 1999 issue of *Synergy*, EHR's newsletter, highlighted the ATE program and a number of projects that the program has funded. This publication, NSF 99-71, was mailed to over 19,000 educators, industry representatives, and professional societies and was also distributed at conferences.

The publications mentioned above (as well as other NSF publications) are available in electronic formats through NSF's Online Document System at <<http://www.nsf.gov/cgi-bin/pubsys/browser/odbrowse.pl>>.

## **Phi Theta Kappa Summer Internship Program**

During the summers of 1997, 1998, and 1999, NSF cooperated with Phi Theta Kappa, the international honor society for two-year colleges, to offer a summer internship program at NSF for two-year college honor students. Two interns worked each summer on the ATE program and other two-year college activities. The internship program was designed (1) to allow students to work with senior agency staff on special projects, (2) to give them exposure to SMET education programs, (3) to let them interact with policymakers, and (4) to give them experience working in an office.

Projects assigned to the interns capitalized on their creative skills and strengths. During the summer of 1997, interns Sarah Asbury Miller, from Stark Technical College in Alabama, and Allan Tagayuna, from Leeward Community College in Hawaii, worked on a Web site for the ATE program and helped to organize Community College Day at NSF (see the description of this event below). In 1998, Jason Edington, from Saddleback College in California, and Andria Mallernee, from Kellogg Community College in Michigan, investigated teacher preparation activities in NSF-funded projects at community colleges. An article entitled "Community Colleges Can Help Prepare Future Teachers," published in the *Community College Times*, highlighted this activity. In 1999, Augustine Adda, from the County College of Morris in New Jersey, and Heath Strong, from Broome Community College in New York, developed a collection of one-page profiles of 21 exemplary ATE projects across a variety of science and technology fields. These profiles were published by the Maricopa Advanced Technology Education Center as a booklet entitled *Broadening the Impact: Resources for Advanced Technological Education*. Five thousand copies of this booklet were distributed by mail and at the annual convention of the American Association of Community Colleges.

Information on the internship program can be obtained from Phi Theta Kappa International Honor Society, Mississippi Education and Research Center, 1625 Eastover drive, Jackson, MS 39211.

## **Community College Day at NSF**

In 1997 and 1999, NSF recognized Community College Month by hosting Community College Day. (In 1998, a special workshop, "Investing in Tomorrow's Teachers" [see the description later in this chapter], was held to examine the role that community colleges and their students play in the preparation of future teachers.) NSF staff, representatives from the American Association of Community Colleges (AACCC),

numerous community college faculty and administrators, and professional society representatives attended these events.

Community College Day highlights scientists and engineers who have begun their education in two-year colleges and have gone on to make significant contributions to society in SMET fields. In 1997, the featured speakers were Andrea White, an engineer who supervised the construction of the Redskins Stadium and attended Montgomery College in Maryland, and William Hanley, president of Galileo Corporation and a graduate of Corning Community College in New York. Both speakers talked about the importance of their two-year college experience in shaping their careers. In 1999, Walter Smith, a research geophysicist at the National Oceanic and Atmospheric Administration and a graduate of Cuesta College in California, spoke on "Mapping the Ocean Floor from Space."

## **Cooperative Efforts with the American Association of Community Colleges (AACC)**

### ***AACC Board Activities***

NSF's Official Liaison to Community Colleges regularly provides updates on NSF programs and activities to the AACC board as well as the board of the Council for Resource Development, an AACC affiliate. These sessions also provide an excellent opportunity for community college leaders drawn from across the nation to provide feedback and input to NSF.

NSF staff annually host a session for a group of approximately 20 community college presidents participating in AACC's "DC Experience," which provides an opportunity for the presidents to learn about public policy.

### ***AACC National Convention***

NSF has sponsored special activities each year at the AACC convention. In 1997, NSF organized a special "Shaping the Future" session that focused on the role that two-year colleges play in SMET activities. Other presentations highlighted the joint NSF-Phi Theta Kappa Mentors programs. In 1998, the vice president for student development of the Maricopa Community College District in Arizona organized a special session highlighting NSF's support of community colleges through the Maricopa Advanced Technology Education Center (MATEC), an ATE Center of Excellence for semiconductor manufacturing education. In 1999, seven of the ATE centers showcased their activities as a group in the AACC exhibit hall. For this meeting, MATEC produced and distributed a booklet entitled *An Overview and Profile of 11 National Centers*; and AACC mailed additional copies to other institutions after the meeting. NSF had a booth near the centers' exhibit area, which allowed interactions with people who wanted to see what NSF had supported as well as to discuss opportunities for their institutions. A special discussion session involving presidents and other administrators from two-year colleges having ATE centers and projects was organized by the Maricopa Community College District. Items discussed included securing industry support, leveraging resource (both financial and intellectual), working with the community, sustainability, accountability, and FastLane (NSF's Web-based system for conducting business electronically). NSF also led sessions on teacher preparation in two-year colleges and NSF initiatives for community colleges.

### ***Advanced Technological Education Principal Investigators Conferences***

The ATE program has supported outreach activities of AACC and has used annual meetings by this group as a convenient venue for meeting with ATE PIs. AACC has also organized, in cooperation with NSF, an annual conference, held in the DC area, for ATE PIs. These conferences feature keynote speakers, panel discussions on topics relevant to technological education, contributed-paper sessions, showcase and

poster sessions for ATE centers and projects, and special pre-conference workshops focusing on grant administration, project management, project evaluation, and other topics of interest to grantees. Attendees include members of ATE project teams, as well as business and industry partners, other leaders from community colleges and K-12 education, and representatives from professional societies and government agencies.

The fourth annual ATE PI conference was held in November 1997 and had nearly 300 participants. The theme, "Two-Year College and Secondary School Partnerships," stressed the importance of collaboration between community colleges and K-12 school systems for effective SMET education programs. Rep. David Price, who originated the legislation that led to the ATE program, and Vickie Schray, of the National School-to-Work Office, gave keynote addresses. Plenary sessions focused on programs at ATE centers, teacher enhancement activities at ATE centers, and ways to market technician education.

The fifth annual conference, "ATE at Five," was held in November 1998 and had 325 attendees. The keynote speakers were Mark Harkins, senior legislative aide to Rep. David Price, and Richard Judy, senior fellow at the Hudson Institute. Mr. Harkins spoke about the background and national view of ATE programs, and Dr. Judy presented a demographic analysis of "Employment Perspectives in Advanced Technologies." Centered around the theme "Partnerships, Students, and Accountability," six panel discussions focused on student development, faculty development, materials and product development, standards development and use, institutionalization and institutional support of ATE programs, and pedagogy.

The sixth annual conference was held in October 1999. Approximately 400 people attended. Following the theme "Broadening the Impact," conference activities examined ways of effectively disseminating exemplary educational materials and practices developed by ATE projects. The meeting included presentations and participation by publishers and representatives of news media. The keynote speakers were Linda Chaput, president and founder of Cogito Learning Media, Inc.; Curt Suplee, science reporter for the *Washington Post*; and Mary Beth Susman, CEO of the Kentucky Commonwealth Virtual University. Panel sessions examined effective industry-education partnerships, technology education for future teachers, the use of mentoring in disseminating best practices and materials, evaluating ATE projects, broadening the impact of the program to the K-12 community and to four-year colleges and universities, dissemination through publication and online courses, institutionalizing reforms in technological education, and working with the press.

## **Teacher Preparation in Two-Year Colleges**

In the spring of 1998, a workshop was held to develop recommendations for two-year colleges to help meet the critical need for teachers well-prepared in SMET. The conference focused on strategies to increase the awareness of two- and four-year college mathematics and science faculty and administrators, national leaders in education, and funding agencies of the key role that community colleges play in the science and mathematics preparation of teachers. Eleven exemplary two-year college programs in teacher preparation were chosen in a national competition to be highlighted at the conference. Participants developed recommendations on the recruitment of prospective teachers, strengthening SMET core courses, pre-teaching experiences, in-service activities, and liaisons of two-year colleges with other two-year colleges, four-year colleges and universities, business and industry, and professional societies. The report from the conference, *Investing in Tomorrow's Teachers: The Integral Role of Two-Year Colleges in the Science and Mathematics Preparation of Future Teachers* (NSF 99-49), has been used extensively by institutions and professional societies to highlight the role that two-year colleges play in the pre-service education of teachers and to develop new initiatives.

## Articles

NSF's activities in support of two-year colleges are increasingly highlighted in national publications. The AACC's *Community College Times* has regularly carried articles on activities at NSF. Articles have covered, for example, the annual ATE PI conferences, Community College Days at NSF, and the ATE program. Feature articles on NSF-supported projects have also been published, including cover stories on MATEC, BioLink (the ATE center for biotechnology education based at the City College of San Francisco), and the ATE Mentoring Program managed by AACC.

The American Society for Engineering Education's award-winning magazine, *PRISM*, featured community colleges in a 1997 issue and highlighted the Maricopa Community College District's efforts at engineering education reform through its partnership with the NSF Engineering Foundation Coalition.

"WANTED! Proposals from Two-Year College Chemistry Faculty!" by DUE program director Vicki Bragin, was published in *Chemistry Outlook*, a publication of 2YC3 (Two-Year College Chemistry Consortium).

"What's New at DUE?" is a column that appears three times a year in the *CHED Newsletter*, a publication of the American Chemical Society's Division of Chemical Education. Articles are written by chemistry program directors in DUE and always include funding opportunities for all undergraduate faculty, including two-year college faculty.

## Chapter 5

### FACTS AND FIGURES

#### A Note on Sources of Data and Estimates

The NSF award data provided in this chapter and in the Appendix comes from the NSF Main Database. Data for FY1997 was collected on June 17, 1998; data for FY1998, on June 23, 1999; data for FY1999, on June 16, 2000; and data for FY1994 and FY1995, on August 12 and 13, 2000.

The following categories are used to define NSF awards supporting two-year colleges:

- *Awards managed by the Advanced Technological Education (ATE) program.* The amount awarded by the ATE program and any other programs for a given fiscal year is counted as support for two-year colleges during that fiscal year.
- *Non-ATE awards for which the performing organization is a two-year college.* The total amount awarded for a given fiscal year is counted as support for two-year colleges during that fiscal year.
- *Awards which do not fall into one of the categories above, but for which the Principal Investigator (PI) is affiliated with a two-year college.* The total amount awarded for a given fiscal year is counted as support for two-year colleges during that fiscal year.
- *Awards which do not fall into one of the categories above but which received co-funding from the ATE program.* Only the ATE program's contribution to the award for a given fiscal year is counted as support for two-year colleges during that fiscal year.

The categories above exclude a number of awards that benefit two-year colleges to some extent—for example, those in which a co-PI is affiliated with a two-year college and those in which two-year colleges participate (and in many cases have subawards) as part of a consortium led by a university or other organization. These other categories of awards are excluded because NSF's databases do not offer a practical means of reliably identifying the awards or reliably estimating two-year colleges' involvement in them. Among the large awards that are, in general, excluded from this book's estimates of NSF support for two-year colleges are the Louis Stokes Alliances for Minority Participation (LSAMP), the Statewide Systemic Initiatives (SSI), the Urban Systemic Initiatives (USI), and the NSF Collaboratives for Excellence in Teacher Preparation (CETP). Although it is difficult to precisely determine the support that two-year colleges have received through these programs, the benefits are surely substantial. A conservative estimate is that 10% of the award budgets in these programs have directly benefited two-year colleges.

While extensive efforts have been made to identify and correct errors in the award data included here, some information may still be missing or incorrect. For example, in a few cases, two-year colleges are not coded as such in the NSF Main Database and thus do not show up when two-year college data is collected; and in a few other cases, institutions that were once two-year colleges but have changed their status are still coded as two-year colleges in the database and thus show up, erroneously, when two-year college data is collected. In addition, some PIs who were once affiliated with a two-year college but have moved to another type of institution are still coded as affiliated with the two-year college in the database, and thus show up, erroneously, when two-year college data is collected. A number of errors of these types have been caught and corrected, but others no doubt remain.

ATE awards, which account for much of NSF's support for two-year colleges, are financially managed, in all but a few cases, by the Division of Undergraduate Education (DUE). For this reason, DUE receives credit for these awards in this book's tabulation of awards by directorate and division. However, through

FY1999, the ATE program's budget was divided between DUE and the Division of Elementary, Secondary, and Informal Education (ESIE); DUE typically contributed 75% of an award's budget, and ESIE typically contributed 25%. (Most ATE awards involve activities at both the college and secondary school levels, and the program has been coordinated jointly by DUE and ESIE since its inception.) Therefore, ESIE's actual support for two-year colleges is underestimated in this book, and DUE's is overestimated.

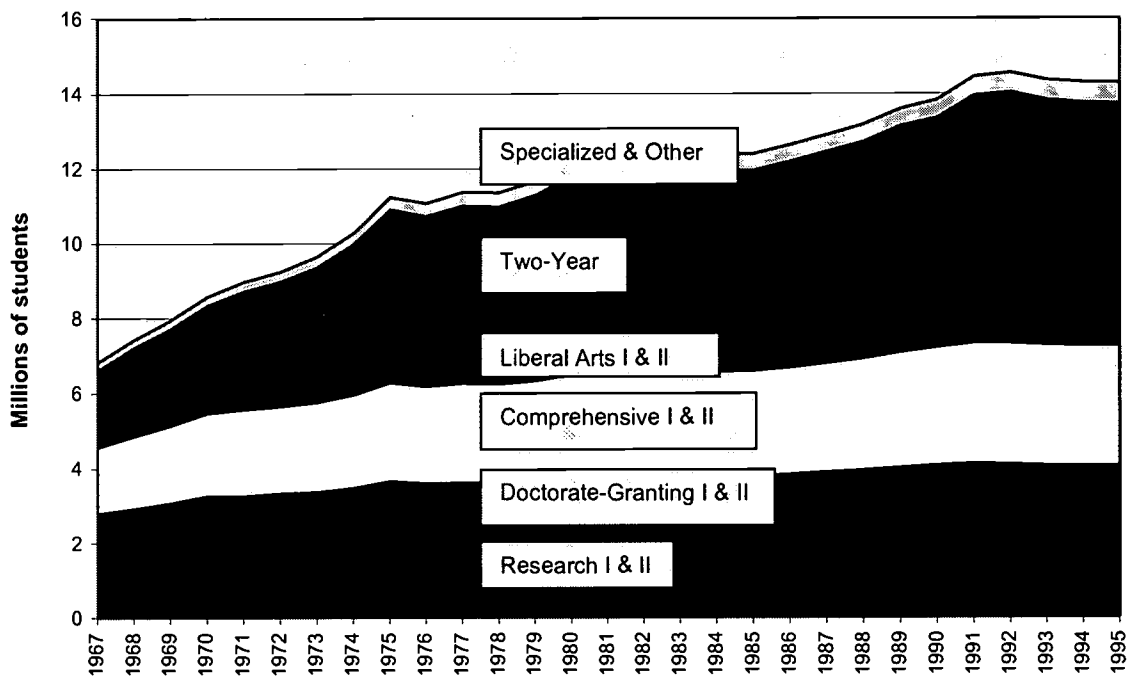
## Acronyms of NSF Directorates, Divisions, Offices, and Programs Cited in This Chapter and the Appendix

- BIO** Directorate for Biological Sciences
- DBI** Division of Biological Infrastructure
    - IID** Instrumentation and Instrument Development
    - REU** Research Experiences for Undergraduates Sites
  - MCB** Division of Molecular and Cellular Biosciences
    - MG** Microbial Genetics
- CISE** Directorate for Computer and Information Science and Engineering
- ANIR** Division of Networking Infrastructure and Research
    - NI** Network Infrastructure
  - EIA** Division of Experimental and Integrative Activities
    - RI** Research Infrastructure
  - IIS** Division of Information and Intelligent Systems
    - IDM** Information and Data Management
- EHR** Directorate for Education and Human Resources
- DGE** Division of Graduate Education
    - PFSMETE** NSF Postdoctoral Fellowships in Science, Mathematics, Engineering, and Technology Education
  - DUE** Division of Undergraduate Education
    - ATE** Advanced Technological Education
    - CCD** Course and Curriculum Development
    - CCLI-AA** Course, Curriculum, and Laboratory Improvement—Chemistry “Adapt and Adopt”
    - CCLI-A&I** Course, Curriculum, and Laboratory Improvement—Adaptation and Implementation
    - CCLI-EMD** Course, Curriculum, and Laboratory Improvement—Educational Materials Development
    - CETP** NSF Collaboratives for Excellence in Teacher Preparation
    - ILI** Instrumentation and Laboratory Improvement
    - UFE** Undergraduate Faculty Enhancement
  - ESIE** Division of Elementary, Secondary, and Informal Education
    - ATE** Advanced Technological Education
    - IMD** Instructional Materials Development
    - TE** Teacher Enhancement
    - YS** Young Scholars
  - ESR** Division of Educational System Reform
    - RSI** Rural Systemic Initiative



- HRD** Division of Human Resource Development
  - AWGSEM** Activities for Women and Girls in Science, Engineering, and Mathematics
  - LSAMP** Louis Stokes Alliances for Minority Participation
  - MIE** Model Institutes of Excellence
  - PAESMEM** Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring
- REC** Division of Research, Evaluation, and Communication
  - NIE** Networking Infrastructure for Education
  - PE** Program Evaluation
  - RA** Research Activities
- ENG** Directorate for Engineering
  - ECS** Division of Electrical and Communications Systems
    - IS** Integrative Systems
  - EEC** Division of Engineering Education and Centers
    - EE** Engineering Education
- GEO** Directorate for Geosciences
  - ATM** Division of Atmospheric Sciences
    - AC** Atmospheric Chemistry
  - EAR** Division of Earth Sciences
    - E&HR** Education and Human Resources
    - GC** Global Change
- MPS** Directorate for Mathematical and Physical Sciences
  - AST** Division of Astronomical Sciences
    - SPA** Special Programs in Astronomy
  - CHE** Division of Chemistry
    - BP** Bimolecular Processes
  - DMR** Division of Materials Research
    - Metals** Metals
    - MT** Materials Theory
- OD** Office of the Director
  - OIA** Office of Integrative Activities
    - ARF** Academic Research Facilities
  - OPP** Office of Polar Programs
    - AOCS** Antarctic Oceans and Climate Systems

Figure 1  
**ENROLLMENT IN U.S. HIGHER EDUCATION  
 BY INSTITUTION TYPE  
 1967 – 1995**



This figure is adapted from *Science and Engineering Indicators 2000* (NSB 00-1), vol. 1, Figure 4-3.



Table 2  
**NATIONAL SCIENCE FOUNDATION (NSF)**  
**SUPPORT FOR TWO-YEAR COLLEGES**  
**FY1995 – FY1999**

Directorate/Office	FY1995		FY1996		FY1997		FY1998		FY1999	
	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)
Office of the Director (OD)	0	0	0	0	1	119	1	55	1	33
Biological Sciences	3	150	5	376	2	303	2	74	1	69
Computer & Information Sciences & Engineering	4	817	16	1,345	21	2,933	5	481	1	50
Engineering	0	0	1	52	2	296	1	81	0	0
Geosciences	2	261	1	157	1	154	1	107	3	73
Mathematical & Physical Sciences	0	0	2	109	2	122	2	96	1	89
Social, Behavioral & Economic Sciences	0	0	0	0	0	0	0	0	0	0
<b>TOTAL, OD and Research Directorates</b>	<b>9</b>	<b>1,228</b>	<b>25</b>	<b>2,039</b>	<b>29</b>	<b>3,927</b>	<b>12</b>	<b>894</b>	<b>7</b>	<b>314</b>
Education & Human Resources (EHR)	90	24,144	168	33,540	172	36,603	160	38,363	115	34,824
<b>TOTAL, NSF</b>	<b>99</b>	<b>25,372</b>	<b>193</b>	<b>35,579</b>	<b>201</b>	<b>40,530</b>	<b>172</b>	<b>39,257</b>	<b>122</b>	<b>35,138</b>

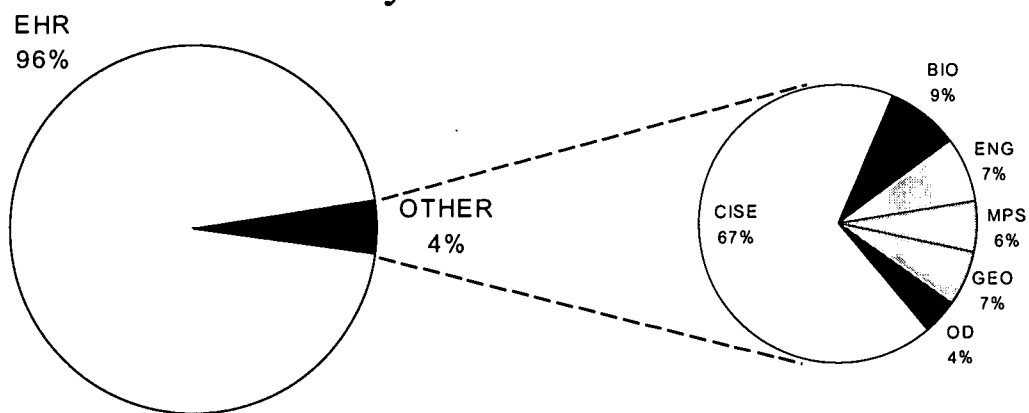
Table 3

**NSF DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES (EHR)  
SUPPORT FOR TWO-YEAR COLLEGES  
FY1995 – FY1999**

Division	FY1995		FY1996		FY1997		FY1998		FY1999	
	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)	No. of Awards	Dollars (1000s)
Educational System Reform	0	0	1	567	1	2,400	1	2,119	1	2,000
Elementary, Secondary & Informal Education	8	2,909	12	3,609	7	1,646	8	690	4	493
EPSCoR	0	0	0	0	0	0	0	0	0	0
Graduate Education	0	0	0	0	0	0	0	0	1	51
Human Resource Development	1	128	6	3,881	6	2,100	6	2,931	3	3,236
Research, Evaluation & Communication	0	0	2	555	2	554	1	218	1	220
Undergraduate Education	81	21,107	147	24,928	156	29,903	144	32,405	105	28,824
<b>TOTAL</b>	<b>90</b>	<b>24,144</b>	<b>168</b>	<b>33,540</b>	<b>172</b>	<b>36,603</b>	<b>160</b>	<b>38,363</b>	<b>115</b>	<b>34,824</b>

Figure 2  
**NSF Support for Two-Year Colleges**  
**FY1997 – FY1999**

By NSF Directorate



By EHR Division

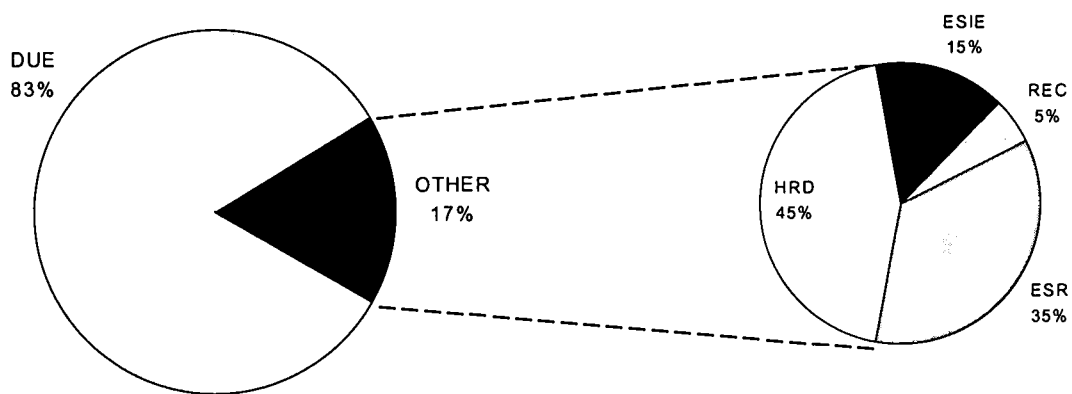


Figure 3  
**NSF Support for Two-Year Colleges**  
**FY1995 – FY1999**

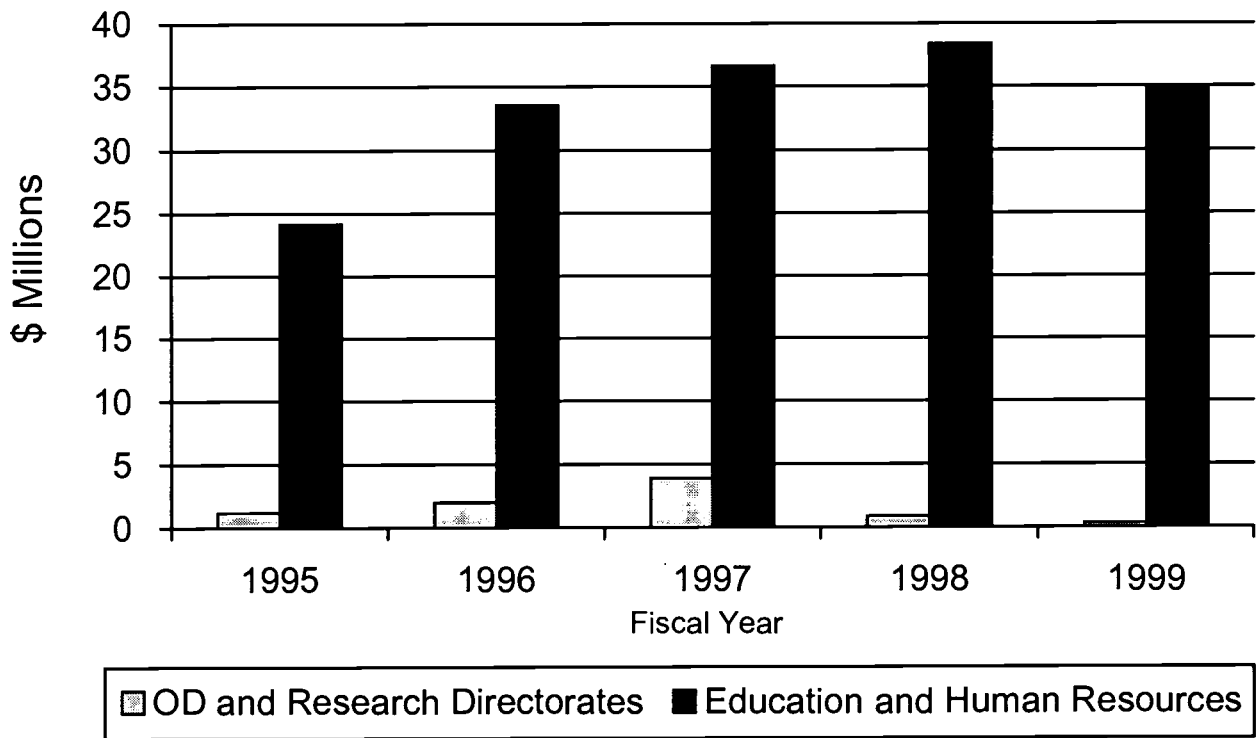
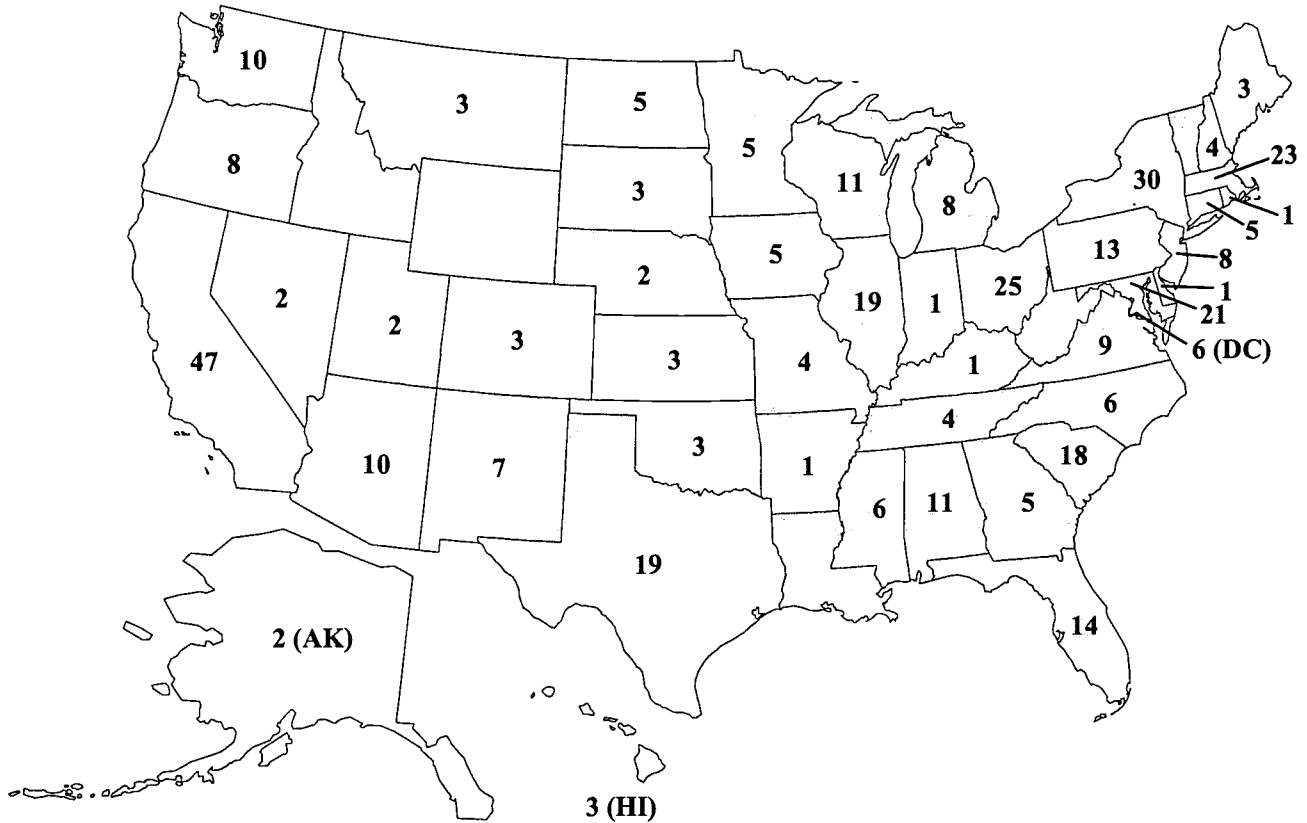


Figure 4  
**Distribution by State of NSF Awards Supporting  
 Two-Year Colleges  
 FY1997 – FY1999**

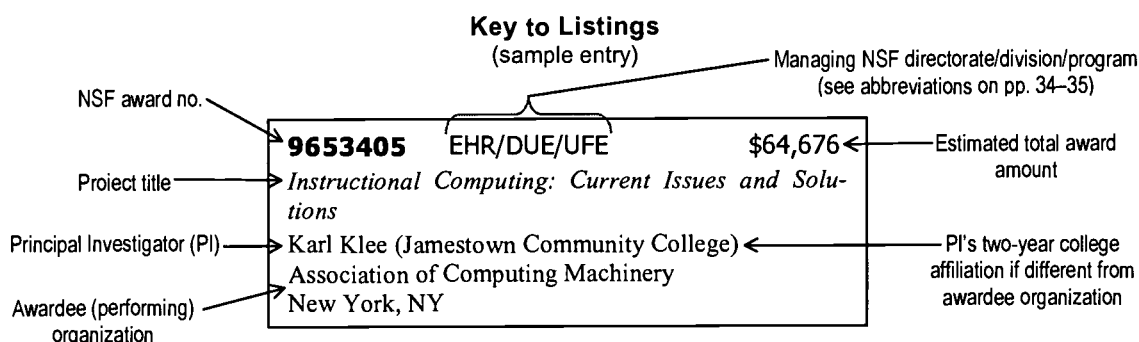
*Total number of awards: 400*



## Appendix

### NSF AWARDS SUPPORTING TWO-YEAR COLLEGES FY1997 – FY1999

The 392 awards listed below, which have a combined value of over \$202 million, form the basis of this book's estimates of NSF's support for two-year colleges during fiscal years 1997–1999. Also included in the estimates, but omitted from the list below, are five awards that supported NSF program officers working at the agency temporarily on Intergovernmental Personnel Act (IPA) assignments, and three awards to contractors that provided proposal-processing services for the ATE program. Awards are listed in order by increasing NSF award number. Additional information about the awards can be found in NSF's Online Award Abstracts at <http://www.fastlane.nsf.gov/a6/A6AwardSearch.htm>.



**9406826** CISE/ANIR/NI \$90,150  
*NSFNET Connection for the Overhill Ad hoc Consortium*  
 Paul Barker  
 Hiwassee College  
 Madisonville, TN

**9407612** BIO/MCB/MG \$119,904  
*Ty Insertional Mutagenesis in Yeast*  
 Molly Mastrangelo  
 Allegany Community College  
 Cumberland, MD

**9417390** CISE/EIA/RI \$1,380,523  
*A Cooperative Learning Environment That Fosters the Pursuit of Scientific Careers for American Indians*  
 Ted Wetherbee  
 Fond du Lac Tribal College  
 Cloquet, MN

**9420655** MPS/CHE/BP \$147,100  
*Chemical and Physical Properties of 2-Aminopyrroles*  
 Michael De Rosa  
 Penn State Delaware County  
 Media, PA

**9420850** CISE/ANIR/NI \$24,960  
*Enhancing Instruction Through the Use of the Internet*  
 James McAndrew  
 Luzerne County Community College  
 Nanticoke, PA

**9424103** BIO/DBI/REU \$176,388  
*REU Site for Biotechnology*  
 Bruce Jackson  
 Massachusetts Bay Community College  
 Wellesley, MA



**9450160** EHR/DUE/ATE \$1,185,405

*The Two-Year College in the Twenty-First Century:  
Breaking Down Barriers*

Mary Beth Monroe  
American Association of Physics Teachers  
College Park, MD

**9450369** EHR/HRD/LSAMP \$5,280,560

*All-Nations Alliance for American Indians*

Joseph McDonald  
Salish Kootenai College  
Pablo, MT

**9452790** EHR/ESIE/IMD \$475,000

*West Hawaii Explorations Academy: A Center for  
Integrative Secondary Curriculum Development*

William Woerner  
Hawaii Department of Education  
Honolulu, HI

**9453180** EHR/DUE/ATE \$385,680

*Physics Education in the Two-Year Colleges: A  
Neglected Resource*

Michael Neuschatz  
American Institute of Physics  
College Park, MD

**9454620** EHR/DUE/ATE \$146,738

*A Revision of Technical Physics*

Robert Eshelman  
Henry Ford Community College  
Dearborn, MI

**9454643** EHR/DUE/ATE \$1,766,637

*Southwest Center for Advanced Technological  
Education*

Robert Musgrove  
Texas State Technical College, Sweetwater  
Sweetwater, TX

**9455561** EHR/DUE/CCD \$1,780,000

*Activity Based Physics: Curricula, Computer Tools,  
and Apparatus for Introductory Physics Courses*

Priscilla Laws  
Dickinson College  
Carlisle, PA

**9455918** EHR/DUE/CCD \$2,715,000

*ChemLinks Coalition: Making Chemical Connections*

Brock Spencer  
Beloit College  
Beloit, WI

**9455920** EHR/DUE/CCD \$1,525,000

*A Workshop Chemistry Curriculum*

David Gosser  
CUNY City College  
New York, NY

**9455924** EHR/DUE/CCD \$2,865,000

*Sweeping Change in Manageable Units: A Modular  
Approach for Chemistry Curriculum Reform*

C. Bradley Moore  
University of California, Berkeley  
Berkeley, CA

**9455928** EHR/DUE/CCD \$3,749,591

*Establishing New Traditions: Revitalizing the  
Curriculum*

John Moore  
University of Wisconsin, Madison  
Madison, WI

**9550533** EHR/HRD/MIE \$10,960,977

*Woksape (Knowledge)*

Zofia Gagnon  
Oglala Lakota College  
Kyle, SD

**9552464** EHR/DUE/CCD \$2,196,693

*Middle Atlantic Consortium for Mathematics and Its  
Applications Throughout the Curriculum*

Dennis DeTurck  
University of Pennsylvania  
Philadelphia, PA

**9552465** EHR/DUE/CCD \$4,000,000

*Mathematics and Its Applications in Engineering and  
Science: Building the Links*

Mark Holmes  
Rensselaer Polytechnic Institute  
Troy, NY

**9552897** EHR/ESIE/YS \$166,978

*Young Investigators Summer Institute on Science and Agriculture*

Clyde Opliger (Ohio State University Agricultural Technical Institute)

Ohio State University Research Foundation  
Columbus, OH

**9553500** EHR/ESIE/YS \$100,806

*Young Scholars Field Research Institute*

Janet McMillen

Prince George's Community College

Largo, MD

**9553538** EHR/ESIE/YS \$104,672

*Science and Mathematics are Right Together (SMART)*

John Morrell

Atlanta Metropolitan College

Atlanta, GA

**9553662** EHR/DUE/ATE \$694,941

*NASA-CCITT Project in Remote Sensing, Image Processing, and Geographic Information Systems*

Patricia Cunniff

Prince George's Community College

Largo, MD

**9553664** EHR/DUE/ATE \$1,344,676

*Associate Degree for Manufacturing Technicians*

Arnold Packer

Johns Hopkins University

Baltimore, MD

**9553680** EHR/DUE/ATE \$600,000

*Rural Alaskan Environmental Education Program*

John Carnegie

University of Alaska Southeast, Sitka Campus

Sitka, AK

**9553696** EHR/DUE/ATE \$267,965

*Integrating New Visions in Environmental Sciences and Technology*

Catharine Almquist

Trident Technical College

Charleston, SC

**9553709** EHR/DUE/ATE \$139,450

*Collaborative Model for Technician Education Through Interactive Technology*

M. Carolyn Girardeau

North Carolina State Board of Community Colleges

Raleigh, NC

**9553716** EHR/DUE/ATE \$1,550,000

*Machine Tool Advanced Skills Technology Educational Resources (MASTER)*

Wallace Pelton

Texas State Technical College, Waco

Waco, TX

**9553727** EHR/DUE/ATE \$3,017,054

*NorthWest Center for Emerging Technologies*

Neil Evans

Bellevue Community College

Bellevue, WA

**9553740** EHR/DUE/ATE \$1,419,128

*South Carolina Advanced Technological Education Exemplary Faculty Project*

Lynn Mack

S.C. State Board for Technical and Comprehensive

Education

Columbia, SC

**9553749** EHR/ESIE/ATE \$2,966,472

*New Jersey Center for Advanced Technological Education*

Jack Waintraub

Middlesex County College

Edison, NJ

**9553760** EHR/DUE/ATE \$2,998,443

*Northwest Center for Sustainable Resources*

Wynn Cudmore

Chemeketa Community College

Salem, OR

**9553765** EHR/DUE/ATE \$234,194

*Development of an Advanced Applied Technological Mathematics Course via a Partnership*

Alfred Patrick

Adirondack Community College

Glens Falls, NY

**9553767** EHR/DUE/ATE \$548,260  
*Defining the Emerging Role of the Technologist in a Computer-Aided-Engineering Environment*  
Robert Simoneau  
Keene State College  
Keene, NH

**9553789** EHR/DUE/CETP \$3,460,050  
*Virginia Collaborative for Excellence in the Preparation of Teachers*  
Reuben Farley  
Virginia Commonwealth University  
Richmond, VA

**9554188** EHR/HRD/AWGSEM \$686,970  
*Learning Mathematics Through Transactional Writing*  
Suzanne Austin  
Miami-Dade Community College  
Miami, FL

**9554344** EHR/REC/NIE \$832,006  
*Navajo Learning Network*  
David Basham  
Diné College  
Tsaile, AZ

**9554467** EHR/ESR/RSI \$10,336,718  
*High Plains Rural Systemic Initiative*  
Gerald Monette  
Turtle Mountain Community College  
Belcourt, ND

**9554672** EHR/DUE/UFE \$119,954  
*Animations, Portfolios, and CD-ROM Technology in Science and Calculus*  
Patricia Wilkinson  
CUNY Borough of Manhattan Community College  
New York, NY

**9554683** EHR/DUE/UFE \$525,000  
*Two-Year College Physics Workshops*  
Curtis Hieggelke  
Joliet Junior College  
Joliet, IL

**9555401** EHR/DUE/CCD \$2,799,820  
*Long Island Consortium for Mathematical Sciences Throughout the Curriculum*  
Alan Tucker  
SUNY at Stony Brook  
Stony Brook, NY

**9555605** EHR/DUE/CCD \$2,425,000  
*Molecular Science*  
Orville Chapman  
University of California, Los Angeles  
Los Angeles, CA

**9555646** EHR/ESIE/TE \$1,273,484  
*Transition to the Workplace Through Manufacturing Experiences*  
Sandra Harpole  
Mississippi State University  
Mississippi State, MS

**9555733** EHR/HRD/AWGSEM \$508,981  
*Women's Images of Science and Engineering*  
Robin McCord  
Chandler-Gilbert Community College  
Chandler, AZ

**9602298** OD/OIA/ARF \$118,644  
*Consolidation and Renovation of Research Facilities at the Transmountain Campus of El Paso Community College*  
Adena Loston  
El Paso Community College  
El Paso, TX

**9602345** EHR/DUE/ATE \$500,000  
*Pac-Tec: Pacific Technological Education Project*  
Charlotte Behm  
Mission College  
Santa Clara, CA

**9602349** EHR/DUE/ATE \$421,318  
*Project TIE: Training for Industry Education*  
Mary Jane Willis  
Albuquerque Technical Vocational Institute  
Albuquerque, NM

**9602351** EHR/DUE/ATE \$450,000  
*A Partnership for Computer-Based Curriculum Development in Atmospheric Technology*  
Melanie Wetzel  
University of Nevada Desert Research Institute  
Reno, NV

**9602352** EHR/DUE/ATE \$399,972  
*Business Alliance for Advanced Technological Education*  
Peter Joyce  
National Alliance of Business  
Washington, DC

**9602355** EHR/DUE/ATE \$1,348,391  
*Midwest Consortium for Advanced Technology Education*  
Don Gentry  
Purdue University  
West Lafayette, IN

**9602360** EHR/DUE/ATE \$221,174  
*Materials Aspects of Manufacturing Technology Institute*  
Thomas Stoebe  
University of Washington  
Seattle, WA

**9602365** EHR/DUE/ATE \$600,000  
*Faculty Associates in Science and Technology Leadership Corps Project for Enhancing Environmental Technology Education*  
Paul Dickinson  
Partnership for Environmental Technology Education  
Pleasanton, CA

**9602369** EHR/DUE/ATE \$639,625  
*Technology Instruction for the 21st Century--Phase II*  
Bernard Mohr  
CUNY Queensborough Community College  
New York, NY

**9602370** EHR/DUE/ATE \$673,705  
*North Central Collaboration for Education in NDE/NDT*  
Lester Schmerr  
Iowa State University  
Ames, IA

**9602373** EHR/DUE/ATE \$2,713,446  
*Maricopa Advanced Technology Education Center*  
Alfredo de los Santos  
Maricopa Community College District Office  
Tempe, AZ

**9602386** EHR/DUE/ATE \$353,235  
*MMATE 2000: Maricopa Mathematics Advanced Technology Education 2000*  
Alan Jacobs  
Maricopa Community College District Office  
Tempe, AZ

**9602390** EHR/DUE/ATE \$600,000  
*An Innovative Approach for Advanced Technological Learning in Distinctive Manufacturing*  
Rick Allison  
Oklahoma State University, Okmulgee  
Okmulgee, OK

**9602397** EHR/DUE/ATE \$299,694  
*Faculty Enhancement and Curriculum Development Activities to Improve Advanced Technology Education--Phase II*  
John Tice  
Wytheville Community College  
Wytheville, VA

**9602401** EHR/DUE/ATE \$449,594  
*South East Advanced Technological Education Consortium for Communications Technology (SEATEC)*  
Sydney Rogers  
Nashville State Technical Institute  
Nashville, TN

**9602408** EHR/DUE/ATE \$614,684  
*Earth and Space Science Technological Education Project*  
Edward Geary  
Geological Society of America  
Boulder, CO

**9602431** EHR/DUE/ATE \$1,200,000  
*Toledo Technology Academy*  
Lionel Sully  
Edison Industrial Systems Center  
Toledo, OH

**9602433** EHR/DUE/ATE \$400,000  
*Telecommunications and Networking Engineering  
Technology Education*  
Gary Mullett  
Springfield Technical Community College  
Springfield, MA

**9602437** EHR/DUE/ATE \$1,098,276  
*Advanced Technological Education in Chemical  
Technology*  
Fritz Kryman  
University of Cincinnati  
Cincinnati, OH

**9602440** EHR/DUE/ATE \$2,100,000  
*South Carolina Advanced Technological Education  
Center*  
Elaine Craft  
S.C. State Board for Technical and Comprehensive  
Education  
Columbia, SC

**9602443** EHR/DUE/ATE \$210,081  
*Chicago Chemical Laboratory Technology Education  
Partnership*  
Donald Soucek  
City Colleges of Chicago Harry S Truman College  
Chicago, IL

**9602450** EHR/DUE/ATE \$450,000  
*LIGASE: Long Island Group About Science  
Education*  
R. David Bynum  
SUNY at Stony Brook  
Stony Brook, NY

**9602457** EHR/DUE/ATE \$608,756  
*Technological Education for Advanced  
Manufacturing*  
Frederick Schoenig  
Cleveland State University  
Cleveland, OH

**9602459** EHR/DUE/ATE \$239,912  
*Improving Science and Technology Education at  
Community Colleges*  
Rod Risley  
Phi Theta Kappa Headquarters  
Jackson, MS

**9604760** BIO/DBI/IID \$242,866  
*Biological Equipment to Improve Undergraduate  
Research at El Paso Community College*  
Maria Alvarez  
El Paso County Community College  
El Paso, TX

**9613949** CISE/ANIR/NI \$90,000  
*Native American Community College Multi-Location  
Internet Connection Project*  
Gregory Jackson  
Utah Valley State College  
Orem, UT

**9613955** CISE/ANIR/NI \$90,000  
*Utah Valley State College Network (UVNET) Wire-  
less Internet Connections*  
Gregory Jackson  
Utah Valley State College  
Orem, UT

**9616877** CISE/ANIR/NI \$20,000  
*Connections to the Internet*  
Ronnie Stephens  
Lawson State Community College  
Birmingham, AL

**9616884** CISE/ANIR/NI \$20,000  
*Connections to the Internet*  
David Frech  
Palm Beach Community College  
Lake Worth, FL

**9616906** CISE/ANIR/NI \$30,000  
*Connection of Passaic County Community College to  
the Internet*  
Robert Mondelli  
Passaic County Community College  
Paterson, NJ

**9616985** CISE/ANIR/NI \$22,735  
*Connection to OARnet and Internet*  
D. James Turner  
North Central Technical College  
Mansfield, OH

**9617019** CISE/ANIR/NI \$20,000  
*Internet Connection*  
Karl Smith  
Wallace Community College, Selma  
Selma, AL

**9617033** CISE/ANIR/NI \$20,000

*Internet Connection*

Judith Icklan  
Ocean County College  
Toms River, NJ

**9617130** CISE/ANIR/NI \$16,471

*Connecting to the Internet*

Tom Erwin  
Butler County Community College  
El Dorado, KS

**9617131** CISE/ANIR/NI \$19,600

*Campus-Wide Internet Access*

Bing Inocencio  
Los Angeles Pierce College  
Woodland Hills, CA

**9617133** CISE/ANIR/NI \$17,650

*Connection of Frederick Community College to IISNET and NSFNET*

Richard Yankosky  
Frederick Community College  
Frederick, MD

**9617136** CISE/ANIR/NI \$19,900

*Internet Connection*

Thomas Tacke  
Presentation College  
Aberdeen, SD

**9617958** CISE/ANIR/NI \$20,000

*Connecting White Pines College to the Internet*

Mary Scerra  
White Pines College  
Chester, NH

**9625557** ENG/ECS/IS \$229,267

*Interactive Learning in Noisy and Changing Environments*

Anthony Kuh (University of Hawaii Honolulu Community College)  
University of Hawaii, Manoa  
Honolulu, HI

**9626809** EHR/ESIE/IMD \$1,573,220

*Technology for All Americans--Phase II*

William Dugger  
International Technology Education Association  
Reston, VA

**9628036** EHR/REC/RA \$944,629

*Addressing National Needs for Skilled Technical Degree Graduates*

Jeanne Diesen  
Indian River Community College  
Fort Pierce, FL

**9634034** EHR/ESIE/TE \$1,071,475

*Changing the High School System: Implementing the Interactive Mathematics Program in Arizona*

Linda Jaslow  
Maricopa Community College District Office  
Tempe, AZ

**9634081** CISE/ANIR/NI \$20,000

*Connection to the Internet*

Kathie Munn  
Gogebic Community College  
Ironwood, MI

**9653224** EHR/DUE/CCD \$99,799

*Revitalizing Classroom Teaching and Learning: A Beginning for Two-Year College Mathematics*

Elizabeth Higgins  
Greenville Technical College  
Greenville, SC

**9653228** EHR/DUE/CCD \$66,360

*SPiRAL Physics Active Learning Workbooks*

Paul D'Alessandris  
Monroe Community College  
Rochester, NY

**9653272** EHR/DUE/CCD \$100,000

*A Cost-Effective Method for Production and Internet Distribution of Computer-Generated Multimedia for Chemistry and Biology Courses*

Harry Ungar  
Cabrillo College  
Aptos, CA

**9653367** EHR/DUE/UFE \$98,600

*New Mexico Initiative for Mathematics Reform*

George Pletsch  
Albuquerque Technical Vocational Institute  
Albuquerque, NM



**9653389** EHR/DUE/UFE \$84,500

*Instrumentation Workshop for Two-Year College Chemistry Faculty*

Richard Jones  
Sinclair Community College  
Dayton, OH

**9653405** EHR/DUE/UFE \$64,676

*Instructional Computing: Current Issues and Solutions*

Karl Klee (Jamestown Community College)  
Association of Computing Machinery  
New York, NY

**9653429** EHR/DUE/UFE \$100,000

*Industry-Education Conference on Workforce Development for the U.S. Semiconductor Industry*

David Hata  
Portland Community College  
Portland, OR

**9653441** EHR/DUE/UFE \$65,759

*Enhancing Undergraduate Psychology: A Program for Faculty from Two-Year and Small Four-Year Colleges*

Sherry Kinslow  
Prince George's Community College  
Largo, MD

**9653670** EHR/DUE/CCD \$200,000

*A Parallel College to Pilot Test Institution-Wide Reform in Science, Mathematics, and Engineering Technology Education*

Ned Sifferlen  
Sinclair Community College  
Dayton, OH

**9653672** EHR/DUE/CCD \$197,315

*Cross-Discipline Integration in Science, Mathematics, Engineering, and Technology*

Laura Precedo  
Broward Community College  
Fort Lauderdale, FL

**9653715** EHR/DUE/CCD \$199,352

*Reform in Science, Mathematics, and Engineering Technology Education*

Louise Squitieri  
CUNY New York City Technical College  
Brooklyn, NY

**9702044** EHR/DUE/ATE \$84,427

*Forging Connections Between Business, Education, and Government for Strengthening Technological Skills Among Urban Students*

Nancy DeSombre  
City Colleges of Chicago Harold Washington College  
Chicago, IL

**9710273** EHR/HRD/AWGSEM \$99,996

*Portfolios to Increase the Number of Women in Mathematics*

Patricia Wilkinson  
CUNY Borough of Manhattan Community College  
New York, NY

**9710287** CISE/ANIR/NI \$20,000

*Connection to OARnet and Internet*

Douglas Boyer  
Marion Technical College  
Marion, OH

**9710334** CISE/ANIR/NI \$16,950

*Connections to the Internet*

Howard Bocher  
Cambria County Area Community College  
Johnstown, PA

**9710962** CISE/ANIR/NI \$20,000

*Internet Connection*

Marcella Garus  
Villa Maria College of Buffalo  
Buffalo, NY

**9711504** EHR/HRD/LSAMP \$249,986

*Bridges to Computer and Information Science Careers*

Anthony Beckman  
Houston Community College  
Houston, TX

**9713867** EHR/DUE/ATE \$41,250

*Travel Support for U.S. Mathematicians Attending the AMS/LMS/SAMS International Meeting in Pretoria, South Africa*

Samuel Rankin  
American Mathematical Society  
Providence, RI

**9713868** EHR/DUE/ATE \$484,058

*Strengthening the Community College Network for Science, Mathematics, Engineering, and Technology Education*

Lynn Barnett  
American Association of Community Colleges  
Washington, DC

**9713869** EHR/DUE/ATE \$187,459

*Using Case Studies to Strengthen Mathematics in ATE Programs*

Susan Forman  
CUNY Bronx Community College  
Bronx, NY

**9714424** EHR/DUE/ATE \$2,000,000

*National Center of Excellence for Advanced Manufacturing Education*

David Harrison  
Sinclair Community College  
Dayton, OH

**9714425** EHR/DUE/ATE \$2,000,000

*Advanced Technology Environmental Education Center*

Ellen Kabat Lensch  
Hazardous Materials Training and Research Center  
Cedar Rapids, IA

**9714435** EHR/DUE/ATE \$1,253,697

*Southwest Center for Advanced Technological Education*

Frank Wright  
Texas State Technical College, Sweetwater  
Sweetwater, TX

**9714489** EHR/DGE/PFSMETE \$102,000

*NSF Postdoctoral Fellowship in Science, Mathematics, Engineering, and Technology Education*

Beth Hufnagel (Anne Arundel Community College)  
Arnold, MD

**9714637** EHR/HRD/AWGSEM \$475,789

*Gender Balanced Education: A Professional Development Program for Educators Counseling Girls in Virginia*

Mary Sandy (Southwest Virginia Community College)  
Virginia Space Grant Consortium  
Hampton, VA

**9714792** EHR/HRD/AWGSEM \$818,277

*Action-WISE Program for Encouraging Women and Girls in Science, Engineering, and Mathematics*

John Marks  
Muskingum Area Technical College  
Zanesville, OH

**9722799** MPS/DMR/MT \$129,528

*Symmetry Analysis of Domains: Magnetic and Non-Magnetic Subperiodic Groups*

Daniel Litvin  
Penn State Berks  
Reading, PA

**9725114** EHR/HRD/PAESMEM \$10,000

*Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring*

Phillip Huebner  
Oglala Lakota College  
Kyle, SD

**9727876** ENG/EEC/EE \$200,000

*Regional Center for Workforce Education*

Ann Diehl  
SUNY at Farmingdale  
Farmingdale, NY

**9727884** EHR/DUE/CCD \$15,792

*Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology*

Stephen Godomsky  
University of Maine at Farmington  
Farmington, ME

**9728983** GEO/ATM/AC \$270,428

*Mineral Dust and Radionuclides Over the North Atlantic*

Richard Arimoto (New Mexico State University at Carlsbad)  
New Mexico State University  
Las Cruces, NM

**9729620** CISE/ANIR/NI \$117,000

*Rural Access to High Bandwidth Internet Connectivity Utilizing RF Technology*

Larry Brown  
Andrew College  
Cuthbert, GA

**9729704** CISE/ANIR/NI \$13,580

*Connections to the Internet*

Mark Whigham  
J. F. Drake State Technical College  
Huntsville, AL

**9729753** CISE/ANIR/NI \$19,989

*Connection to the Internet*

Leigh Wilcox  
Mater Dei College  
Ogdensburg, NY

**9731991** BIO/DBI/REU \$206,799

*Research Opportunities for Minorities Program*

Bruce Jackson  
Massachusetts Bay Community College  
Wellesley, MA

**9750503** EHR/DUE/ILI \$22,752

*Implementing Microcomputer-Based Laboratory Exercises to Improve Instruction in Biology*

Drake Carter  
Bismarck State College  
Bismarck, ND

**9750557** EHR/DUE/ILI \$18,079

*Gas Chromatograph/Mass Spectrometer in a Community College Curriculum*

John Cullen  
Monroe Community College  
Rochester, NY

**9750585** EHR/DUE/ILI \$58,971

*GIS: New Skills for the Workforce*

Roberto Garza  
San Antonio College  
San Antonio, TX

**9750713** EHR/DUE/ILI \$57,814

*Managing Divergent Networks: Internet/Intranet and Internetworking Skills*

Jerry Mauldin  
Trident Technical College  
Charleston, SC

**9750730** EHR/DUE/ILI \$7,114

*Incorporation of Basic DNA Laboratory Techniques into Science Courses at the Two-Year College*

Donna Harrison  
Stark Technical College  
Canton, OH

**9750770** EHR/DUE/ILI \$19,964

*Cross-Curricular Addition of Molecular Biology/Biochemistry Lab Experiences for Undergraduate Students in Biology and Biochemistry*

William Thieman  
Ventura County Community College District Office  
Ventura, CA

**9750777** EHR/DUE/ILI \$62,650

*Integrating Computing Technology to Advance Mathematical Learning for Community College Students*

Robert Cappetta  
College of Du Page  
Glen Ellyn, IL

**9750798** EHR/DUE/ILI \$7,122

*Enhancing Student Learning with the Use of Computers in General Human Anatomy*

Debra Howell  
Chabot College  
Hayward, CA

**9750802** EHR/DUE/ILI \$30,326

*Cline Observatory Equipment*

Aaron Martin  
Guilford Technical Community College  
Jamestown, NC

**9750825** EHR/DUE/ILI \$26,204

*Portable CAS Laboratories*

Patricia Preston  
Pellissippi State Technical Community College  
Knoxville, TN

**9750853** EHR/DUE/ILI \$68,650

*Integrating Science and Mathematics: A Laboratory Approach*

Jane Gant  
Florida Community College at Jacksonville  
Jacksonville, FL

**9750890** EHR/DUE/ILI \$13,569

*Molecular Modeling and Creative Design in the Chemistry Curriculum*

Victoria Bragin  
Pasadena City College  
Pasadena, CA

**9750904** EHR/DUE/ILI \$16,120

*GIS System Lab for Navajo Undergraduates*

Douglas Isely  
Diné College  
Tsaile, AZ

**9750928** EHR/DUE/ILI \$11,672

*Exploring the Universe: Astronomical Investigations for Non-Science Majors*

Jon Saken  
Palm Beach Community College  
Lake Worth, FL

**9750974** EHR/DUE/ILI \$26,073

*A Project to Redesign the Undergraduate Physics Laboratory Curriculum to Increase Retention of Underrepresented Engineering Students*

Jerry Riley  
Grossmont-Cuyamaca Community College District  
El Cajon, CA

**9750988** EHR/DUE/ILI \$9,792

*A Model of Biology Laboratory Enhancement Through Acquisition of Calculator-Based Laboratory Systems*

Daniel Ward  
Waubonsee Community College  
Sugar Grove, IL

**9750999** EHR/DUE/ILI \$60,000

*Predictive Maintenance Certificate Program*

John Sprague-Williams  
College of Du Page  
Glen Ellyn, IL

**9751001** EHR/DUE/ILI \$5,718

*Virtual Laboratory Simulations as an Enhancement to General Biology Laboratory Exercises*

Susan Finazzo  
Broward Community College  
Fort Lauderdale, FL

**9751018** EHR/DUE/ILI \$17,473

*Louder Than Words*

Craig Smith  
Paul Smith's College of Arts and Sciences  
Paul Smiths, NY

**9751032** EHR/DUE/ILI \$49,708

*Technology in Developmental Mathematics and Laboratory Courses*

Sounny Slitine  
Palo Alto College  
San Antonio, TX

**9751054** EHR/DUE/ILI \$50,000

*Semiconductor Metrology*

Juergen Przyllas  
Northern New Mexico Community College  
Española, NM

**9751058** EHR/DUE/ILI \$35,959

*Implementing Distance Education Activities for Laboratory Sciences*

K. Dale Smoak  
Piedmont Technical College  
Greenwood, SC

**9751067** EHR/DUE/ILI \$44,721

*Introduction of Molecular Modeling into the Two-Year College Chemistry Curriculum*

Iraj Behbahani  
Mount San Antonio College  
Walnut, CA

**9751102** EHR/DUE/ILI \$39,252

*Using Computers to Engage Diverse Student Learners in Mathematics*

Mary Anthony  
Rancho Santiago Community College  
Santa Ana, CA

**9751108** EHR/DUE/ILI \$8,451

*Computerized Chemistry Laboratory as an Extension of the Hands-On Experience*

Laura Precedo  
Broward Community College  
Fort Lauderdale, FL

**9751117** EHR/DUE/ILI \$20,000

*Northern New Mexico Astronomy Laboratory*

Ron Black  
Northern New Mexico Community College  
Española, NM

**9751122** EHR/DUE/ILI \$40,000

*A Collaborative and Technological Environment for Teaching Mathematics*

Robert Sompolski  
Oakton Community College  
Des Plaines, IL

**9751124** EHR/DUE/ILI \$47,965

*A Mathematics Computer Laboratory for the Twenty-First Century*

Susan MacLeod  
Greenfield Community College  
Greenfield, MA

**9751185** EHR/DUE/ILI \$54,943

*A Model Dimensional Measurement Laboratory*

Bruce Whipple  
Trident Technical College  
Charleston, SC

**9751246** EHR/DUE/ILI \$40,265

*Improving Laboratory Instruction Through Computer-Integrated Machine Tool Technology*

Alan Yendall  
Florence-Darlington Technical College  
Florence, SC

**9751275** EHR/DUE/ILI \$51,177

*Iowa Lakes CADD/GIS Lab Improvement*

Roger Patocka  
Iowa Lakes Community College Central Office  
Estherville, IA

**9751333** EHR/DUE/ILI \$56,957

*Development of a Lightwave Communications Laboratory*

Nicholas Massa  
Springfield Technical Community College  
Springfield, MA

**9751338** EHR/DUE/ILI \$42,353

*Southeastern Massachusetts Environmental Technology Instrumentation Project*

Patrick Tatano  
Cape Cod Community College  
West Barnstable, MA

**9751351** EHR/DUE/ILI \$37,670

*Equipment Acquisition/Development of a Multi-Use Physical/Computer Science Laboratory*

Robert Dell  
Mohawk Valley Community College  
Utica, NY

**9751357** EHR/DUE/ILI \$9,574

*Laboratory Components of an Interdisciplinary First Course in Quantitative and Scientific Literacy*

Cathy Godbois  
Harrisburg Area Community College  
Harrisburg, PA

**9751360** EHR/DUE/ILI \$44,852

*Introductory Physics for the Twenty-First Century*

Curtis Hiegelke  
Joliet Junior College  
Joliet, IL

**9751438** EHR/DUE/ILI \$62,479

*Basic Technology Concepts Laboratory*

William Mason  
St. Louis Community College at Florissant Valley  
Saint Louis, MO

**9751476** EHR/DUE/ILI \$8,550

*Modern UV/Visible Spectroscopy for Improvement of Freshman and Sophomore Chemistry Instruction*

Kimberly Kostka (University of Wisconsin Center,  
Rock Campus)  
University of Wisconsin, Madison  
Madison, WI

**9751485** EHR/DUE/ILI \$50,000

*Computer Integration and Instrumentation Improvement in Psychology Courses on Two Campuses*

Irene Malmgren  
Rancho Santiago Community College  
Santa Ana, CA

**9751493** EHR/DUE/ILI \$5,000

*Applied Visual, Event-Driven, Distributed, Object-Oriented (VEDOC) Computing Using X-Window GUI and the Internet*

H. Paul Haiduk  
Amarillo College  
Amarillo, TX

**9751501** EHR/DUE/ILI \$43,436  
*Classroom Computer Laboratory for Interactive Instruction in Developmental Mathematics*  
Janice Dykacz  
Community College of Baltimore County, Essex Campus  
Essex, MD

**9751517** EHR/DUE/ILI \$24,190  
*Precision Machining and Measurement Laboratory*  
Wayne Kenner  
Corning Community College  
Corning, NY

**9751569** EHR/DUE/ILI \$45,945  
*Integrating Virtual Reality in a Computer-Based Laboratory*  
David Emigh  
Quinebaug Valley Community College  
Danielson, CT

**9751626** EHR/DUE/ILI \$29,555  
*Computer-Assisted Instrumentation for Improving Biology Laboratory Instruction*  
Debra Barnes  
Contra Costa Community College  
San Pablo, CA

**9751642** EHR/DUE/ILI \$100,000  
*Computer Numerical Control (CNC) Technology*  
Kenneth McGlothlin  
Virginia Highlands Community College  
Abingdon, VA

**9751657** EHR/DUE/ILI \$38,640  
*Laboratory Improvement in Biotechnology*  
Dan Trubovitz  
San Diego Miramar College  
San Diego, CA

**9751674** EHR/DUE/ILI \$82,714  
*Employing Remote Direct Digital Control of Live HVAC Systems to Increase Learning*  
Dolph Hayden (Oklahoma State University, Okmulgee)  
Oklahoma State University  
Stillwater, OK

**9751718** EHR/DUE/ILI \$46,000  
*Integrating Process Control into Electromechanical Technology*  
Terry Bartelt  
Fox Valley Technical College  
Appleton, WI

**9751983** EHR/DUE/ATE \$169,158  
*Integrated Natural Resources Technology Program*  
Andrew Jackman  
Mount Hood Community College  
Gresham, OR

**9751984** EHR/DUE/ATE \$600,735  
*Advanced Technological Education in Plastics Engineering Technology*  
Timothy Weston  
Pennsylvania College of Technology  
Williamsport, PA

**9751987** EHR/DUE/ATE \$66,900  
*An Alliance to Prepare Technicians for Careers in Advanced Manufacturing and Engineering Materials Technology*  
James Jacobs  
Norfolk State University  
Norfolk, VA

**9751988** EHR/DUE/ATE \$986,000  
*Preserving the Legacy: A Comprehensive Curriculum and Materials Development Project in Support of Advanced Environmental Technology Education*  
Sally Beaty  
Intelcom Intelligent Telecommunications  
Pasadena, CA

**9751990** EHR/DUE/ATE \$3,000,000  
*Northeast Center for Telecommunications Technologies*  
James Masi  
Springfield Technical Community College  
Springfield, MA

**9751993** EHR/DUE/ATE \$825,720  
*Chemical Technology Education Collaborative*  
Arlyne Sarquis  
Miami University Middletown  
Middletown, OH



**9751998** EHR/DUE/ATE \$398,479

*Assignment: Chemical Technology--II (ACT II)*

John Kenkel  
Southeast Community College  
Lincoln, NE

**9752004** EHR/DUE/ATE \$199,944

*Advanced Technology Education Program in Manufacturing Information Systems*

Nabil Ibrahim  
San Jose State University  
San Jose, CA

**9752014** EHR/DUE/ATE \$96,959

*Study of Present and Future Skill Levels of Visualization Technicians*

Sue Mitchell  
Calhoun Community College  
Decatur, AL

**9752015** EHR/DUE/ATE \$100,000

*Undergraduate Faculty Enhancement in Science, Mathematics, and Engineering Technology*

Shepherd Anderson  
Sinclair Community College  
Dayton, OH

**9752017** EHR/DUE/ATE \$656,576

*Water on the Web: Monitoring Minnesota's Lakes on the Internet*

Bruce Munson  
University of Minnesota, Duluth  
Duluth, MN

**9752021** EHR/DUE/ATE \$600,000

*Reinventing Computer-Aided Drafting and Design in a Total Modeling Environment While Increasing Student Diversity in Technologies*

G. Edward Pittman  
Piedmont Virginia Community College  
Charlottesville, VA

**9752024** EHR/DUE/ATE \$450,000

*Southeast Michigan Alliance for Reinvestment in Technological Education (SMARTE): Advanced Technologies in Product Design*

Mulchand Rathod  
Wayne State University  
Detroit, MI

**9752025** EHR/DUE/ATE \$205,224

*Engineering Prep: A Model School-to-Work Curriculum to Support ATE Programs in Semiconductor Manufacturing*

Alan Miller  
Hillsboro School District 1J  
Hillsboro, OR

**9752027** EHR/DUE/ATE \$360,000

*Biotechnology Technicians for the Future: Replacating the Wisconsin Model*

Joy McMillan  
Madison Area Technical College  
Madison, WI

**9752028** EHR/DUE/ATE \$3,086,970

*Marine Advanced Technology Education Center*

Nicole Crane  
Monterey Peninsula College  
Monterey, CA

**9752032** EHR/DUE/ATE \$299,900

*Measure Up! Dimensional Metrology and ISO 9001*

Barbara Anderegg  
Madison Area Technical College  
Madison, WI

**9752036** EHR/DUE/ATE \$399,913

*Developing Materials for Industry-Based Education*

E. Gareth Hoachlander  
MPR Associates  
Berkeley, CA

**9752037** EHR/DUE/ATE \$599,825

*A Partnership to Develop Advanced Technology Units on Genomic Biology*

David Micklos  
Cold Spring Harbor Laboratory  
Cold Spring Harbor, NY

**9752038** EHR/DUE/ATE \$119,999

*Integrated Mathematics and Physics for Technical Programs*

Robert Kimball  
Wake Technical Community College  
Raleigh, NC

**9752050** EHR/DUE/ATE \$449,975

*Teacher/Faculty Enhancement, Curriculum Development, and Laboratory Improvement for Aquaculture*

Lance Stewart  
New England Board of Higher Education  
Boston, MA

**9752051** EHR/DUE/ATE \$472,158

*Integrating Academic and Technical Education for Advanced Technological Careers*

Judith Leff  
Education Development Center  
Newton, MA

**9752053** EHR/DUE/ATE \$74,954

*National Agri-Science Technology Project*

Brian Giles  
University of New Hampshire  
Durham, NH

**9752054** EHR/DUE/ATE \$551,106

*Virtual Classroom Environment*

Bob Williams  
Daytona Beach Community College  
Daytona Beach, FL

**9752058** EHR/DUE/ATE \$262,800

*Computer Simulations of Industrial Statistical Application for Undergraduates and Technicians*

David Shellabarger  
Lane Community College  
Eugene, OR

**9752060** EHR/DUE/ATE \$1,082,122

*Network Training for Educators*

Catherine Cotten  
Jones County Junior College  
Ellisville, MS

**9752061** EHR/DUE/ATE \$600,000

*Distance Learning and Virtual Laboratories for Technician Training*

David Lieberman  
CUNY Queensborough Community College  
New York, NY

**9752062** EHR/DUE/ATE \$240,000

*Development of an Advanced Manufacturing Center: A Partnership with Industry to Prepare Technicians for Success in a Global Manufacturing Environment*

Bruce Whipple  
Trident Technical College  
Charleston, SC

**9752076** EHR/DUE/ATE \$775,049

*Native American Environmental Technology Program*

Dan Burns  
Northwest Indian College  
Bellingham, WA

**9752081** EHR/DUE/ATE \$700,000

*Validation and Implementation of a Coordinated Precision Agriculture Curriculum with K-12, Community Colleges, Universities, and Industry*

Terry Brase  
Hawkeye Community College  
Waterloo, IA

**9752082** EHR/DUE/ATE \$700,000

*Fulfilling Lifelong Learning Through Flexible Manufacturing Technical Curriculum*

William Timmer  
Waukesha County Technical College  
Pewaukee, WI

**9752083** EHR/DUE/ATE \$450,000

*Curriculum Development and Faculty Enhancement Synthesizing Technological and Business Management Skills*

Ronald Meier  
Illinois State University  
Normal, IL

**9752084** EHR/DUE/ATE \$445,961

*Minnesota LCI Program: Enhancing Scientific Conceptual Learning and Technological Literacy*

Aaron Wenger  
Itasca Community College  
Grand Rapids, MN

**9752086** EHR/DUE/ATE \$1,200,000

*A Work/Site Alliance: Community-Based GIS Education*

Stuart Waddell  
Henry Ford Community College  
Dearborn, MI

**9752090** EHR/DUE/ATE \$599,983

*Cases in Industry Practice in Biotechnology*

V. Celeste Carter  
Foothill College  
Los Altos Hills, CA

**9752092** EHR/DUE/ATE \$267,000

*Scientific and Technological Education in Photonics*

Chandra Roychoudhuri  
University of Connecticut  
Storrs, CT

**9752096** EHR/DUE/ATE \$380,000

*Academy for Creative Technologies: An Interdisciplinary Interactive Multimedia Studies Program*

Bruce Carter  
Pasadena City College  
Pasadena, CA

**9752101** EHR/DUE/ATE \$708,968

*Image Processing for Teaching in Advanced Technological Education: Faculty and Teacher Development and Curriculum Materials*

Melanie Magisos  
Center for Image Processing in Education  
Tucson, AZ

**9752102** EHR/DUE/ATE \$735,650

*Science Technology: Knowledge and Skills--Phase II*

Sylvia Ware  
American Chemical Society  
Washington, DC

**9752106** EHR/DUE/ATE \$49,433

*Mechanized Agriculture Technology Partnership*

David Clark  
Kings River Community College  
Reedley, CA

**9752192** EHR/DUE/CCD \$110,000

*The Rio Grande River Project: An Interdisciplinary Math/Science Curriculum for College Freshmen and Sophomores*

Pamela Vaughan  
Laredo Community College  
Laredo, TX

**9752241** EHR/DUE/CCD \$74,976

*Beyond Formulas: Utilizing Workplace Application Modules to Enhance Introductory Mathematics Courses*

John Khoury  
Brevard Community College  
Cocoa, FL

**9752318** EHR/DUE/CCD \$100,009

*General Mathematics Curriculum Project*

Catherine Cant  
Prince George's Community College  
Largo, MD

**9752568** EHR/DUE/CCD \$139,541

*Multimedia Science Lab Incorporating Ojibwa/Metis Culture*

Scott Hanson  
Turtle Mountain Community College  
Belcourt, ND

**9752577** EHR/DUE/CCD \$164,505

*Intersections: The Interface Between Chemistry and Biology*

Victoria Bragin  
Pasadena City College  
Pasadena, CA

**9752624** EHR/DUE/CCD \$150,000

*Project Inclusion*

Janan Hayes  
Merced College  
Merced, CA

**9752668** EHR/DUE/CCD \$49,870

*Transforming the Teaching and Learning of General Biology for Non-Majors: A Model for the 21st Century*

Gerald Button  
Portland Community College  
Portland, OR

**9752688** EHR/DUE/CCD \$126,000

*GIS Curriculum Development*

Jason Steinitz  
Erie Community College  
Buffalo, NY

**9752761** EHR/DUE/UFE \$157,653

*Tribal College Math-Science Teaching Project*

Peter Ryan  
Salish Kootenai College  
Pablo, MT

**9752778** EHR/DUE/UFE \$110,000

*Using Remote Sensing, Image Processing, and Geographic Information Systems in Faculty Enhancement and Curriculum Development*

Roxanne Mendrinos  
Foothill College  
Los Altos Hills, CA

**9752787** EHR/DUE/UFE \$185,000

*Instrumentation Workshop for Two-Year College Chemistry Faculty*

Richard Jones  
Sinclair Community College  
Dayton, OH

**9752795** EHR/DUE/UFE \$70,000

*Summer Workshops for Faculty, Doctoral Students, and Adjuncts: Calculus, Differential Equations, and Linear Algebra*

Patricia Wilkinson  
CUNY Borough of Manhattan Community College  
New York, NY

**9752885** EHR/DUE/CCD \$238,230

*Consortium to Improve Chemistry: Linking Nine Community Colleges with NSF's Undergraduate Chemistry Systemic Reform Initiative*

Mark Walter  
Oakton Community College  
Des Plaines, IL

**9802248** EHR/ESIE/IMD \$1,378,155

*Parents Involved, Pigeons Everywhere*

David Crippens  
KCET/Community Television of Southern California  
Los Angeles, CA

**9802918** MPS/AST/SPA \$86,343

*Resonance Rings Bars: Keys to Galaxy Disk/Halo Properties*

Tarsh Freeman  
Bevill State Community College  
Sumiton, AL

**9808972** GEO/EAR/GC \$92,040

*A 9,000 Year Diatom Record of Climate Fluctuations from Lake Victoria, East Africa, with Decade-Scale Resolution*

Jay Stager  
Paul Smith's College of Arts and Sciences  
Paul Smiths, NY

**9809164** OD/OPP/AOCS \$165,799

*Investigation of Sulfur Chemistry in the Antarctic Troposphere*

Richard Arimoto (New Mexico State University at Carlsbad)  
New Mexico State University  
Las Cruces, NM

**9811926** EHR/DUE/ATE \$307,847

*Improving Science and Technology Education at Community Colleges--Round II*

Rod Risley  
Phi Theta Kappa Headquarters  
Jackson, MS

**9812299** EHR/ESIE/IMD \$2,313,708

*Systems and Interactions: Constructing Ideas in Physical Science*

Fred Goldberg  
San Diego State University  
San Diego, CA

**9813444** EHR/DUE/ATE \$2,000,001

*New Jersey Center for Advanced Technological Education*

Jack Waintraub  
Middlesex County College  
Edison, NJ

**9813445** EHR/DUE/ATE \$1,996,949

*Northeast Center for Sustainable Resources*

Wynn Cudmore  
Chemeketa Community College  
Salem, OR

**9813446** EHR/DUE/ATE \$1,999,941

*NorthWest Center for Emerging Technologies*

Neil Evans  
Bellevue Community College  
Bellevue, WA

**9814135** EHR/ESIE/IMD \$600,000

*Making the Case for Technological Literacy*

William Wulf  
National Academy of Sciences  
Washington, DC

**9814210** EHR/DUE/ATE \$70,598

*Articulation of the Marine Advanced Technology Education Center with the Oceanographic Research Community*

Robert Winokur  
Consortium for Oceanographic Research and Education  
Washington, DC

**9816634** EHR/ESIE/TE \$329,565

*Learning That Works: A School-to-Career Video Collection*

Michele Korf  
WGBH Educational Foundation  
Boston, MA

**9816812** EHR/ESIE/IMD \$40,879

*PI Conference for NSF Projects in Technology Education*

Franzie Loepp  
Illinois State University  
Normal, IL

**9820699** GEO/EAR/E&HR \$10,665

*Atlanta Consortium for Research in the Earth Sciences: Research Experiences for Undergraduates and Science Teachers*

John Anderson  
Georgia Perimeter College  
Decatur, GA

**9850013** EHR/DUE/CCD \$199,980

*Critical Thinking and Information Literacy Across the Curriculum*

Michael Talbott  
Bellevue Community College  
Bellevue, WA

**9850015** EHR/DUE/CCD \$200,000

*Furthering Advances Toward Learner-Centered Education*

Michael Governanti  
Miami University Middletown  
Middletown, OH

**9850052** EHR/DUE/CCD \$200,000

*Technology-Based Problem Solving Method in Learning*

Vera Zdravkovich  
Prince George's Community College  
Largo, MD

**9850244** EHR/DUE/ATE \$125,000

*National Aeronautics and Space Administration-American Mathematical Association of Two-Year Colleges Project Coalition*

John Pazdar  
Capital Community College  
Hartford, CT

**9850247** EHR/DUE/ATE \$733,372

*Chemical Technology Contextual Learning Curriculum Development Project*

Carol White  
Athens Area Technical Institute  
Athens, GA

**9850249** EHR/DUE/ATE \$1,009,041

*Associate Degree for Manufacturing Technicians: Institutionalizing Change in Technician Education by Expanding a "Work in Progress"*

Arnold Packer  
Johns Hopkins University  
Baltimore, MD

**9850257** EHR/DUE/ATE \$86,724

*Sciences of the Environment and Advanced Technology Education Consortium*

Brian Brachio  
Bay Shore Union Free School District  
Bay Shore, NY

**9850258** EHR/DUE/ATE \$870,000

*A Model for Technical Training in the Pulp and Paper and Chemical Process Industries*

Christie Prout  
Alabama Southern Community College  
Monroeville, AL

**9850269** EHR/DUE/ATE \$500,000

*Alternative Transportation Energy Education System Technology*

Robert Kosak  
York Technical College  
Rock Hill, SC

**9850273** EHR/DUE/ATE \$574,699  
*Exploring Antarctic Technology Through Industrial Design, Engineering Mentorships, and Problem-Based Learning*  
Randall Landsberg  
University of Chicago  
Chicago, IL

**9850282** EHR/DUE/ATE \$500,000  
*Maintenance Engineering Technology Program*  
James Martini  
Henry Ford Community College  
Dearborn, MI

**9850283** EHR/DUE/ATE \$82,444  
*California Regional Consortium for Engineering Advances in Technological Excellence (CREATE)*  
Christopher Akelian  
Cuesta College  
San Luis Obispo, CA

**9850287** EHR/DUE/ATE \$420,000  
*Collaborative Training of Secondary, Postsecondary, and Returning Workers in Telemedical Technologies*  
Glen Skewes  
Western Wisconsin Technical College  
La Crosse, WI

**9850288** EHR/DUE/ATE \$206,026  
*Project TEAM: Technical Education for Advanced Manufacturing*  
Frederick Schoenig  
Cleveland State University  
Cleveland, OH

**9850289** EHR/DUE/ATE \$499,897  
*Consortium for Statewide Biotechnology Education*  
Diane Jones  
Community College of Baltimore County,  
Catonsville Campus  
Catonsville, MD

**9850291** EHR/DUE/ATE \$297,906  
*Interdisciplinary Live Rock Project*  
William Falls  
Hillsborough Community College  
Tampa, FL

**9850299** EHR/DUE/ATE \$274,667  
*Building a National Employer-Based Technical Education System*  
Monika Aring  
Education Development Center  
Newton, MA

**9850304** EHR/DUE/ATE \$700,000  
*Environmental Technology Program*  
James Fahey  
CUNY Bronx Community College  
Bronx, NY

**9850306** EHR/DUE/ATE \$799,906  
*GIS ACCESS: Geographic Information Sciences Curriculum Clearinghouse and Faculty Enhancement Project*  
Gail Hobbs  
Cypress College  
Cypress, CA

**9850307** EHR/DUE/ATE \$1,629,004  
*South East Advanced Technological Education Consortium for Communications Technology (SEATEC)*  
Sydney Rogers  
Nashville State Technical Institute  
Nashville, TN

**9850309** EHR/DUE/ATE \$550,000  
*BMCC-ATE Partnership in Multimedia Programming and Design*  
Alice Cohen  
CUNY Borough of Manhattan Community College  
New York, NY

**9850310** EHR/DUE/ATE \$900,000  
*Cross-Training Technicians and Engineers for Semiconductor Manufacturing*  
John Wood  
University of New Mexico  
Albuquerque, NM

**9850311** EHR/DUE/ATE \$695,924  
*Networking Communities*  
Lee Pulis  
TERC  
Cambridge, MA



**9850313** EHR/DUE/ATE \$849,995  
*A Network Systems Administration Program for Kentucky*  
Lillie Crowley  
Lexington Community College  
Lexington, KY

**9850317** EHR/DUE/ATE \$200,000  
*A Program to Educate Technicians for the Wood Products Industry*  
Nicholas Weidhaas  
Mount Wachusett Community College  
Gardner, MA

**9850318** EHR/DUE/ATE \$232,179  
*Southeastern Massachusetts Project in Environmental Technology Education*  
Mary Jane Curran  
Cape Cod Community College  
West Barnstable, MA

**9850319** EHR/DUE/ATE \$144,947  
*Foundation Skills--Phase II*  
Stephen Rodi  
Austin Community College  
Austin, TX

**9850324** EHR/DUE/ATE \$650,000  
*Preparing High-Performance Technicians in Distinctive Manufacturing*  
Rick Allison  
Oklahoma State University, Okmulgee  
Okmulgee, OK

**9850325** EHR/DUE/ATE \$2,999,995  
*Bio-Link: A National Advanced Technology Education Center for Biotechnology*  
Elaine Johnson  
City College of San Francisco  
San Francisco, CA

**9850326** EHR/DUE/ATE \$238,270  
*Project COMPACT: Career-Oriented Materials for Physics and Contemporary Technology*  
Doyle Davis  
New Hampshire Technical College, Berlin  
Berlin, NH

**9850327** EHR/DUE/ATE \$968,187  
*A Bridge to Advanced Technological Education*  
Davis Jenkins  
University of Illinois at Chicago  
Chicago, IL

**9850334** EHR/DUE/ATE \$314,278  
*Western Arkansas Advanced Manufacturing Project*  
Sidney Connor  
Westark College  
Fort Smith, AR

**9850337** EHR/DUE/ATE \$375,000  
*Advanced Information Technology Project*  
Henry Estrada  
Evergreen Valley College  
San Jose, CA

**9850341** EHR/DUE/ATE \$305,000  
*Los Angeles Bioscience Project*  
Carcy Chan  
East Los Angeles College  
Monterey Park, CA

**9850343** EHR/DUE/ATE \$137,893  
*Transporting Science, Computer, and Engineering Curricula to Rural Minority Students Through Telecourses and the Internet*  
G. Robert Converse  
University of Hawaii Maui Community College  
Kahului, HI

**9850344** EHR/DUE/ATE \$394,318  
*GIS/GPS Laboratory Exercises Using Workplace Data Sets*  
Osborne Nye  
Houston Community College  
Houston, TX

**9850350** EHR/DUE/ATE \$90,135  
*Teacher Empowerment for Success in Technology*  
Martha Kline  
Ohio University  
Athens, OH

**9850351** EHR/DUE/ATE \$284,800  
*Advanced Technological Education in Composite Manufacturing*  
Serge Abrate  
Southern Illinois University at Carbondale  
Carbondale, IL

**9850353** EHR/DUE/ATE \$819,994

*Information Engineering Technology Program*

Charles Coffey

Diné College

Tsaile, AZ

**9850355** EHR/DUE/ATE \$200,000

*Technical Sciences Academy: A Partnership Model*

Therese Jones

Amarillo College

Amarillo, TX

**9850425** EHR/DUE/ILI \$10,574

*Advanced Chromatographic Instrumental Techniques  
for Beginning Undergraduates*

Fred Safarowic

Passaic County Community College

Paterson, NJ

**9850526** EHR/DUE/ILI \$45,984

*Student Inquiry-Based Learning of Cellular Metabo-  
lism Using Computer-Generated Real-Time Data  
Acquisition*

Kimberly Maznicki

Seminole Community College

Sanford, FL

**9850588** EHR/DUE/ILI \$70,528

*Exploring New Frontiers in Spatial Information  
Management: A Rocky Mountain High in Applied  
Geoscience Education*

Monica Ramirez

Aims Community College

Greeley, CO

**9850605** EHR/DUE/ILI \$40,566

*Acquisition of Chromatographic Instrumentation*

David McGarvey

Prince George's Community College

Largo, MD

**9850635** EHR/DUE/ILI \$20,984

*A New Biology Lab Curriculum for Nursing Students  
Emphasizing Investigative Learning Through the Use  
of Computer Technology*

Walter Schlosser

Penn State Abington

Abington, PA

**9850661** EHR/DUE/ILI \$62,224

*Transforming a Mathematics Program*

Donna Foster

Piedmont Technical College

Greenwood, SC

**9850683** EHR/DUE/ILI \$12,873

*College-Level Amusement Park Physics*

David Chandler

Porterville College

Porterville, CA

**9850689** EHR/DUE/ILI \$15,541

*Laboratory Curricula to Support Biotechnology Edu-  
cation at a Community College*

Laura Blinderman

Mercer County Community College

Trenton, NJ

**9850696** EHR/DUE/ILI \$8,000

*UV Spectrophotometry in the Biochemistry and  
Molecular Biology Laboratory*

Ruth Wrightsman

Saddleback College

Mission Viejo, CA

**9850697** EHR/DUE/ILI \$44,915

*Introductory Computer Networking Laboratory*

Charles Smith

Horry-Georgetown Technical College

Conway, SC

**9850789** EHR/DUE/ILI \$10,990

*Improving the General Chemistry and Environmental  
Science Laboratory Curricula Through CBL and  
Computer Activities*

Scott Donnelly

Arizona Western College

Yuma, AZ

**9850832** EHR/DUE/ILI \$26,500

*Establishing a Precision Machining Measurement  
Center*

Robert Koster

Piedmont Technical College

Greenwood, SC

**9850876** EHR/DUE/ILI \$19,631  
*Instrumentation for Biotechnology Training and Undergraduate Biology*

Janice Toyoshima  
Bakersfield College  
Bakersfield, CA

**9850933** EHR/DUE/ILI \$43,391  
*Lab to Support Electronic Communications: Digital Data and Networking*

John Majkut  
Bristol Community College  
Fall River, MA

**9850951** EHR/DUE/ILI \$73,426  
*Instrumentation to Enhance the Chemistry Curriculum at Southwestern College*

David Brown  
Southwestern College  
Chula Vista, CA

**9850966** EHR/DUE/ILI \$50,000  
*Integrated Reform of Intermediate Algebra*

Brenda Chapman  
Trident Technical College  
Charleston, SC

**9851011** EHR/DUE/ILI \$50,000  
*Interactive, Interdisciplinary Instruction*

Jacquelyn White  
Brevard Community College  
Cocoa, FL

**9851024** EHR/DUE/ILI \$35,264  
*Interactive, Microcomputer-Based Undergraduate Physics Laboratory*

Karl Trout  
Penn State York  
York, PA

**9851025** EHR/DUE/ILI \$13,050  
*FTIR: A Tool for Changing College and High School Chemistry Curricula to a Discovery Mode*

Paul Martino  
Flathead Valley Community College  
Kalispell, MT

**9851065** EHR/DUE/ILI \$53,838  
*Instrumentation and Process Control Laboratory*

Alamgir Choudhury  
Cuyahoga Community College  
Cleveland, OH

**9851066** EHR/DUE/ILI \$26,078  
*Simulated Workplace Technical Physics Project*

Robert Tyndall  
Forsyth Technical Community College  
Winston-Salem, NC

**9851077** EHR/DUE/ILI \$80,480  
*Introduction of Advanced Instrumentation in Science Classes Primarily Serving Allied Health and Education Majors*

Roxanne Burns (Kent State University, East Liverpool Campus)  
Kent State University  
Kent, OH

**9851100** EHR/DUE/ILI \$55,000  
*Microcomputer Service Technician Program*

John Cothran  
Piedmont Technical College  
Greenwood, SC

**9851169** EHR/DUE/ILI \$54,435  
*Instrumentation to Enhance Learning in the Undergraduate Organic Chemistry Laboratory*

Brenda Ross  
Cottey College  
Nevada, MO

**9851173** EHR/DUE/ILI \$10,047  
*Enhancement of the Community College Chemistry Curriculum with Fourier Transform Infrared Spectroscopy*

Susan Roper  
Sacramento City College  
Sacramento, CA

**9851212** EHR/DUE/ILI \$78,164  
*Global Positioning Systems Laboratory*

Richard Kent  
Trident Technical College  
Charleston, SC

**9851220** EHR/DUE/ILI \$27,900  
*UV-Visible Spectrophotometers for the CPLP Network*

Julie Kuehn  
William Rainey Harper College  
Palatine, IL

**9851249** EHR/DUE/ILI \$13,632  
*Inquiry-Based Learning in Astronomy*

Chad Davies  
Cloud County Community College  
Concordia, KS

**9851251** EHR/DUE/ILI \$64,248  
*Improving Integrated Learning of the Sciences Using a Mobile Computer-Interfaced Instrumentation Laboratory*

Diane Jones  
Community College of Baltimore County,  
Catonsville Campus  
Catonsville, MD

**9851288** EHR/DUE/ILI \$26,760  
*Model and Build: An Integrated Engineering, Mathematics, and Machining Laboratory*

John Wadach  
Monroe Community College  
Rochester, NY

**9851314** EHR/DUE/ILI \$57,584  
*Rapid Prototyping Laboratory Improvement for Interdepartmental Access and Program Partner Education*

J. Malitzke  
Moraine Valley Community College  
Palos Hills, IL

**9851317** EHR/DUE/ILI \$40,578  
*Enhancement of the Community College Chemistry Curriculum Using Networked Computers*

Michael Solow  
City College of San Francisco  
San Francisco, CA

**9851385** EHR/DUE/ILI \$60,000  
*Bioscience Technology Laboratory Improvement*

Joseph Deak  
Lakeland Community College  
Mentor, OH

**9851432** EHR/DUE/ILI \$50,710  
*Development of a Laboratory for Lightwave Communications*

Judith Donnelly  
Three Rivers Community College  
Norwich, CT

**9851455** EHR/DUE/ILI \$38,470  
*Integration of Computers*

David Oliver  
Ventura College  
Ventura, CA

**9851506** EHR/DUE/ILI \$35,000  
*Digital Media Interactive Micro-Network Lab*

Kirk Smallman  
Springfield Technical Community College  
Springfield, MA

**9851507** EHR/DUE/ILI \$28,376  
*GPS/GIS/Image Analysis Technology for Field Research in Biology and Environmental Science*

Daniel Buckley  
University of Maine at Farmington  
Farmington, ME

**9851537** EHR/DUE/ILI \$26,240  
*Digital Video Analysis and Microcomputer-Based Laboratory for Mathematics Understanding*

Carolyn Haas  
Salem Community College  
Carneys Point, NJ

**9851540** EHR/DUE/ILI \$5,085  
*Cell Fractionation: Applications in the Freshman Biology Laboratory*

Michael Burchfield  
Holmes Community College  
Goodman, MS

**9851562** EHR/DUE/ILI \$14,306  
*Development of a Mathematical Modeling Course with Calculator-Based Laboratory*

Frances Kelly  
Andrew College  
Cuthbert, GA

**9851586** EHR/DUE/ILI \$67,500  
*Natural Resource Technician-GIS/GPS Integration Project*

Bruce Cecka  
Fox Valley Technical College  
Appleton, WI

**9851611** EHR/DUE/ILI \$27,168  
*Study of Chemistry by the Guided-Inquiry Method Using Microcomputer-Based Laboratories*

Mary Durick  
Bismarck State College  
Bismarck, ND

**9851642** EHR/DUE/ILI \$64,132  
*Scientific Computation for Interdisciplinary Data Analysis and Technological Application*

Keith Clay  
Green River Community College  
Auburn, WA

**9851668** EHR/DUE/ILI \$15,177  
*Inquiry-Based Physics Lab Using Pre-Service Teachers as Peer Instructors*

Paul Stancioff  
University of Maine at Farmington  
Farmington, ME

**9876589** EHR/DUE/CETP \$433,858  
*Project TEACH: Teacher Education Alliance of Colleges and High Schools*

Steve Kinholt  
Green River Community College  
Auburn, WA

**9896052** CISE/IIS/IDM \$156,272  
*Visual Query Languages for Database Systems*

Maria Cruz  
Worcester Junior College  
Worcester, MA

**9900698** EHR/REC/PE \$1,289,690  
*Assessing the Impact and Effectiveness of the Advanced Technological Education Program*

Arlen Gullickson  
Western Michigan University  
Kalamazoo, MI

**9907986** EHR/DUE/ATE \$300,000  
*Washington State Information Technology Workforce and Education Initiative*

Neil Evans  
Bellevue Community College  
Bellevue, WA

**9908191** EHR/DUE/ATE \$974,949  
*Advancing ATE in the Community College Field*

Lynn Barnett  
American Association of Community Colleges  
Washington, DC

**9908409** EHR/DUE/ATE \$2,000,000  
*South Carolina Advanced Technological Education Center*

Elaine Craft  
S.C. State Board for Technical and Comprehensive Education  
Columbia, SC

**9908419** EHR/DUE/ATE \$2,000,000  
*Maricopa Advanced Technology Education Center*

Michael Lesiecki  
Maricopa Community College District Office  
Tempe, AZ

**9909132** EHR/DUE/CCLI-A&I \$12,192  
*Co-Editor of "NSF Highlights" Column in the Journal of Chemical Education*

Richard Jones  
Sinclair Community College  
Dayton, OH

**9909552** EHR/DUE/CCLI-A&I \$45,633  
*A National Model for Curriculum Adaptation and Implementation*

Comfort Cover  
Pikes Peak Community College  
Colorado Springs, CO

**9910818** EHR/DUE/CCLI-A&I \$50,000  
*Cyber Careers for the Net-Generation: IT Awareness and Teaching Tools for Teachers*

Peter Saflund  
Bellevue Community College  
Bellevue, WA

**9950006** EHR/DUE/ATE \$705,616

*Two-Year College Quantum Optics Advanced Technological Education Program*

Robert Clark  
Texas Engineering Experiment Station  
College Station, TX

**9950011** EHR/DUE/ATE \$800,000

*Increasing the ImPACT*

Arlyne Sarquis  
Miami University Middletown  
Middletown, OH

**9950015** EHR/DUE/ATE \$494,916

*California Regional Consortium for Engineering Advances in Technological Excellence (CREATE)*

Christopher Akelian  
Cuesta College  
San Luis Obispo, CA

**9950019** EHR/DUE/ATE \$449,725

*Designing a Pre-Technology Program Using an Interdisciplinary Approach and Work Keys Assessment*

Ramesh Gaonkar  
Onondaga Community College  
Syracuse, NY

**9950025** EHR/DUE/ATE \$847,785

*Advancing Careers in Technology and Science*

John Baltzer  
Collin County Community College  
McKinney, TX

**9950028** EHR/DUE/ATE \$856,583

*Community College Information Technology Network*

David Harrison  
Sinclair Community College  
Dayton, OH

**9950029** EHR/DUE/ATE \$853,640

*An Evolving Program to Prepare Information Technologists in Southwest Ohio for the 21st Century*

Ashraf Saad  
University of Cincinnati  
Cincinnati, OH

**9950034** EHR/DUE/ATE \$611,969

*Energy Technology Education Project*

Rita DeHart  
Bismarck State College  
Bismarck, ND

**9950036** EHR/DUE/ATE \$674,677

*Developmental Mathematics and Its Applications*

Solomon Garfunkel  
Consortium for Mathematics and Its Applications  
Lexington, MA

**9950037** EHR/DUE/ATE \$315,792

*Applied Internet Technology: Curriculum and Careers*

John Sands  
Moraine Valley Community College  
Palos Hills, IL

**9950039** EHR/DUE/ATE \$248,616

*Wireless Industry and Education Collaboration*

Misty Baker  
Global Wireless Education Consortium  
St. Cloud, MN

**9950042** EHR/DUE/ATE \$375,000

*Assignment: Chemical Technology--III (ACT III)*

John Kenkel  
Southeast Community College  
Lincoln, NE

**9950046** EHR/DUE/ATE \$1,095,684

*Twenty-First Century Urban Technical Education Project: Construction Technology Systems for Grades 11-14*

William Hodgkinson  
Milwaukee Area Technical College  
Milwaukee, WI

**9950051** EHR/DUE/ATE \$600,328

*Faculty Associates in Science and Technology Leadership Corps Project for Enhancing Environmental Technology Education*

Kirk Laflin  
Partnership for Environmental Technology Education  
Pleasanton, CA



**9950052** EHR/DUE/ATE \$500,738

*Manufacturing Simulation Technology Project*

Thomas Crampton  
Mott Community College  
Flint, MI

**9950053** EHR/DUE/ATE \$71,873

*Advanced Technology Education for Merging Microtechnologies: The Microchip and the Biochip*

George Flowers  
J. Sargeant Reynolds Community College  
Richmond, VA

**9950056** EHR/DUE/ATE \$272,000

*Internet and Multimedia Technology: Curriculum, Faculty, and Workforce Development*

Sylvia Sorokin  
Community College of Baltimore County, Essex Campus  
Essex, MD

**9950057** EHR/DUE/ATE \$749,998

*Bioscience Education-to-Employment*

Audrey Trotter  
Peralta Community College District Office  
Oakland, CA

**9950059** EHR/DUE/ATE \$199,977

*Project DAWN: Developing Alabama's Workforce Now*

Bob Baker  
Gadsden State Community College  
Gadsden, AL

**9950062** EHR/DUE/ATE \$305,000

*Two-Year College Physics Workshops for the 21st Century*

Curtis Hiegelke  
Joliet Junior College  
Joliet, IL

**9950063** EHR/DUE/ATE \$47,682

*A Regional Center for Integrating Aquaculture Technologies in Secondary and Two-Year Schools*

John Simpson  
Gadsden State Community College  
Gadsden, AL

**9950067** EHR/DUE/ATE \$300,000

*Western Massachusetts Advanced Technology Training Consortium*

William Mulholland  
Berkshire Community College  
Pittsfield, MA

**9950069** EHR/DUE/ATE \$308,764

*The Technology Connection: Computer Training for Residents of Arctic Alaska*

Brooke Selmer  
Ilisagvik College  
Barrow, AK

**9950071** EHR/DUE/ATE \$898,493

*Consortium for the Advancement of Process Technology*

Joanna Kile  
College of the Mainland  
Texas City, TX

**9950072** EHR/DUE/ATE \$805,326

*Plastics Resources for Educators*

Timothy Weston  
Pennsylvania College of Technology  
Williamsport, PA

**9950073** EHR/DUE/ATE \$399,969

*North Carolina Consortium for Logistics Education*

Noel Greis  
University of North Carolina at Chapel Hill  
Chapel Hill, NC

**9950076** EHR/DUE/ATE \$725,292

*The Power of Partnerships: Integrating Academics into the Manufacturing World*

Carol Chambers  
Traverse Bay Area Intermediate School District  
Traverse City, MI

**9950078** EHR/DUE/ATE \$100,000

*Statewide College of Technology ATE Enhancement Project*

Karen Wosczyzna-Birch  
Tunxis Community College  
Farmington, CT

**9950080** EHR/DUE/ATE \$52,064

*Development of Job-based Problems for Technical Physics*

Ali Yazdi  
Jefferson State Community College  
Birmingham, AL

**9950084** EHR/DUE/ATE \$184,952

*Interdisciplinary Laboratory Science Technology Program*

Pascal Ricatto  
Bergen Community College  
Paramus, NJ

**9950085** EHR/DUE/ATE \$1,758,163

*Southeast Consortium for Advanced Network Technology Education*

Catherine Cotten  
Jones County Junior College  
Ellisville, MS

**9950088** EHR/DUE/ATE \$499,918

*Development and Field Test of a Multimedia Simulation System for Training Aviation Technicians via the Internet*

Charles Billman  
Rock Valley College  
Rockford, IL

**9950098** EHR/DUE/ATE \$40,000

*Cyber Careers for the Net-Generation: An Information Technology Career Education Video*

Peter Saflund  
Bellevue Community College  
Bellevue, WA

**9950099** EHR/DUE/ATE \$339,538

*Industrial Biotechnology Instruction: A Modular Approach*

Maureen Harrigan  
Moorpark College  
Moorpark, CA

**9950101** EHR/DUE/ATE \$231,043

*A Resource Package for Integrating Mathematics and Algebra-Based Physics*

Robert Kimball  
Wake Technical Community College  
Raleigh, NC

**9950105** EHR/DUE/ATE \$420,000

*Increasing the Flow: A Community College-Centered Model to Meet Rural Information Technology Needs*

Douglas Wilkins  
Greenfield Community College  
Greenfield, MA

**9950106** EHR/DUE/ATE \$1,100,000

*Tech-4 Electronic Workforce Development System*

Nasser Hedayat  
Valencia Community College  
Orlando, FL

**9950125** EHR/DUE/CCLI-A&I \$35,726

*Adapting GIS/GPS into the Forest Technology Curriculum Using Learner-Centered Instruction*

John Jastrzemski  
Allegany Community College  
Cumberland, MD

**9950258** EHR/DUE/CCLI-A&I \$19,602

*Using Molecular Biology Experiments to Enhance and Improve Students' Understanding and Retention of Biological Science*

Keith Hench  
Kirkwood Community College  
Cedar Rapids, IA

**9950320** EHR/DUE/CCLI-AA \$227,621

*Bringing Systemic Change to Community College Chemistry*

Carolyn Collins  
Community College of South Nevada  
North Las Vegas, NV

**9950353** EHR/DUE/CCLI-A&I \$120,000

*Comprehensive Curriculum Reform: Adapting and Implementing the Enhanced Education Experience for Engineers*

David Cattell  
Community College of Philadelphia  
Philadelphia, PA

**9950381** EHR/DUE/CCLI-EMD \$75,000

*College Mathematics from an Industry-Based, Multi-disciplinary Technological Perspective*

Ellen Velie  
Linn State Technical College  
Linn, MO

**9950434** EHR/DUE/CCLI-A&I \$21,138  
*Enhanced Instrumentation and Laboratory Improvement*

Chuen-Chuen Fang  
Shelton State Community College  
Tuscaloosa, AL

**9950466** EHR/DUE/CCLI-A&I \$25,775  
*Physics Laboratory Improvement Project*

John Fries  
Santa Ana College  
Santa Ana, CA

**9950469** EHR/DUE/CCLI-EMD \$37,250  
*Web-Based Laboratory Experiments for Manufacturing Engineering Technology Programs*

Gerald Frederick  
Texas State Technical College, Sweetwater  
Sweetwater, TX

**9950509** EHR/DUE/CCLI-A&I \$32,847  
*High-Tech, Project-Based Beginning Algebra and Statistics Course for Two-Year Colleges*

Sue Stokley  
Spartanburg Technical College  
Spartanburg, SC

**9950568** EHR/DUE/CCLI-EMD \$107,246  
*Interactive Software to Improve Student Success in Developmental Mathematics*

Joanne Manville  
Bunker Hill Community College  
Boston, MA

**9950585** EHR/DUE/CCLI-A&I \$29,450  
*Integration of Computers Across the Chemistry Curriculum*

Gee Krishnan  
St. Louis Community College at Meramec  
Kirkwood, MO

**9950616** EHR/DUE/CCLI-A&I \$11,747  
*Instrumentation for Environment Quality Assessment by Non-Science Majors*

William Tarutis  
Lackawanna Junior College  
Scranton, PA

**9950692** EHR/DUE/CCLI-A&I \$18,050  
*Computer-Assisted, Interactive Undergraduate Mathematics*

Shubhangi Stalder  
University of Wisconsin, Waukesha  
Waukesha, WI

**9950726** EHR/DUE/CCLI-A&I \$167,545  
*From Concept to Production: Reconceptualizing the Mechanical Engineering Technology Curricula*

Rupert Chandler  
Blue Ridge Community College  
Weyers Cave, VA

**9950732** EHR/DUE/CCLI-A&I \$75,000  
*Wireless Telecommunications Laboratory Project*

Gary Mullett  
Springfield Technical Community College  
Springfield, MA

**9950763** EHR/DUE/CCLI-A&I \$87,185  
*Improving Student Learning in Calculus Through Effective Implementation of Model Activities*

Mary Ann Misko  
Gadsden State Community College  
Gadsden, AL

**9950887** EHR/DUE/CCLI-A&I \$200,000  
*Interdisciplinary Curriculum and Laboratory Development for Chemical Process Operator Technology Education*

Helen Hauer  
Delaware Technical and Community College,  
Stanton-Newark Campus  
Newark, DE

**9950920** EHR/DUE/CCLI-A&I \$90,000  
*Integration of Multidisciplinary Computer-Based Problem Solving into the Undergraduate Science Curriculum: A Model for Cross-Curricular Technology Transfer*

Jean Whaleyman  
Kingwood College  
Humble, TX

**9951363** EHR/DUE/CCLI-A&I \$41,993  
*Microcomputer-Based Physics Laboratory for the Year 2000*

Susan Vallera  
Jefferson Technical College  
Steubenville, OH

**9951411** EHR/DUE/CCLI-A&I \$8,955

*Enhancement of Undergraduate Chemistry Curriculum by the Incorporation of a Fourier Transform Infrared Spectrometer*

David Klein  
Kansas City Kansas Community College  
Kansas City, KS

**9970881** EHR/DUE/ATE \$128,070

*Hands on Physics: Evaluation and Dissemination*

Robert Tinker  
Concord Consortium  
Concord, MA

**9972052** MPS/DMR/Metals \$178,823

*Unique Solidification Cracking Mechanism in Ultra-Low Interstitial Iron and Iron Alloy Weld Metal*

Jack Devletian (Portland Community College)  
Oregon Graduate Institute of Science and  
Technology  
Beaverton, OR

**9996128** EHR/DUE/ATE \$64,584

*Machine Tool Advanced Skills Technology Educational Resources (MASTER)*

Joan Stepsis  
San Diego City College  
San Diego, CA

**STATE INDEX**  
**OF AWARDS LISTED IN THE APPENDIX**

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
<b>Alabama</b>				
Alabama Southern Community College	Prout	9850258	\$870,000	EHR/DUE/ATE
Bevill State Community College	Freeman	9802918	\$86,343	MPS/AST/SPA
Calhoun Community College	Mitchell	9752014	\$96,959	EHR/DUE/ATE
Gadsden State Community College	Baker	9950059	\$199,977	EHR/DUE/ATE
Gadsden State Community College	Misko	9950763	\$87,185	EHR/DUE/CCLI-A&I
Gadsden State Community College	Simpson	9950063	\$47,682	EHR/DUE/ATE
J. F. Drake State Technical College	Whigham	9729704	\$13,580	CISE/ANIR/NI
Jefferson State Community College	Yazdi	9950080	\$52,064	EHR/DUE/ATE
Lawson State Community College	Stephens	9616877	\$20,000	CISE/ANIR/NI
Shelton State Community College	Fang	9950434	\$21,138	EHR/DUE/CCLI-A&I
Wallace Community College, Selma	Smith	9617019	\$20,000	CISE/ANIR/NI
<b>Alaska</b>				
Ilisagvik College	Selmer	9950069	\$308,764	EHR/DUE/ATE
University of Alaska Southeast, Sitka Campus	Carnegie	9553680	\$600,000	EHR/DUE/ATE
<b>Arizona</b>				
Arizona Western College	Donnelly	9850789	\$10,990	EHR/DUE/ILI
Center for Image Processing in Education	Magisos	9752101	\$708,968	EHR/DUE/ATE
Chandler-Gilbert Community College	McCord	9555733	\$508,981	EHR/HRD/AWGSEM
Diné College	Basham	9554344	\$832,006	EHR/REC/NIE
Diné College	Coffey	9850353	\$819,994	EHR/DUE/ATE
Diné College	Isely	9750904	\$16,120	EHR/DUE/ILI
Maricopa Community College District Office	de los Santos	9602373	\$2,713,446	EHR/DUE/ATE
Maricopa Community College District Office	Jacobs	9602386	\$353,235	EHR/DUE/ATE
Maricopa Community College District Office	Jaslow	9634034	\$1,071,475	EHR/ESIE/TE
Maricopa Community College District Office	Lesiecki	9908419	\$2,000,000	EHR/DUE/ATE
<b>Arkansas</b>				
Westark College	Connor	9850334	\$314,278	EHR/DUE/ATE
<b>California</b>				
Bakersfield College	Toyoshima	9850876	\$19,631	EHR/DUE/ILI
Cabrillo College	Ungar	9653272	\$100,000	EHR/DUE/CCD
Chabot College	Howell	9750798	\$7,122	EHR/DUE/ILI
City College of San Francisco	Johnson	9850325	\$2,999,995	EHR/DUE/ATE
City College of San Francisco	Solow	9851317	\$40,578	EHR/DUE/ILI
Contra Costa Community College	Barnes	9751626	\$29,555	EHR/DUE/ILI
Cuesta College	Akelian	9850283	\$82,444	EHR/DUE/ATE
Cuesta College	Akelian	9950015	\$494,916	EHR/DUE/ATE
Cypress College	Hobbs	9850306	\$799,906	EHR/DUE/ATE
East Los Angeles College	Chan	9850341	\$305,000	EHR/DUE/ATE
Evergreen Valley College	Estrada	9850337	\$375,000	EHR/DUE/ATE
Foothill College	Carter	9752090	\$599,983	EHR/DUE/ATE
Foothill College	Mendrinios	9752778	\$110,000	EHR/DUE/UF
Grossmont-Cuyamaca Community College District	Riley	9750974	\$26,073	EHR/DUE/ILI

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
Intelecom Intelligent Telecommunications	Beaty	9751988	\$986,000	EHR/DUE/ATE
KCET/Community Television of Southern California	Crippens	9802248	\$1,378,155	EHR/ESIE/IMD
Kings River Community College	Clark	9752106	\$49,433	EHR/DUE/ATE
Los Angeles Pierce College	Inocencio	9617131	\$19,600	CISE/ANIR/NI
Merced College	Hayes	9752624	\$150,000	EHR/DUE/CCD
Mission College	Behm	9602345	\$500,000	EHR/DUE/ATE
Monterey Peninsula College	Crane	9752028	\$3,086,970	EHR/DUE/ATE
Moorpark College	Harrigan	9950099	\$339,538	EHR/DUE/ATE
Mount San Antonio College	Behbahani	9751067	\$44,721	EHR/DUE/ILI
MPR Associates	Hoachlander	9752036	\$399,913	EHR/DUE/ATE
Partnership for Environmental Technology Ed.	Dickinson	9602365	\$600,000	EHR/DUE/ATE
Partnership for Environmental Technology Ed.	Laffin	9950051	\$600,328	EHR/DUE/ATE
Pasadena City College	Bragin	9750890	\$13,569	EHR/DUE/ILI
Pasadena City College	Bragin	9752577	\$164,505	EHR/DUE/CCD
Pasadena City College	Carter	9752096	\$380,000	EHR/DUE/ATE
Peralta Community College District Office	Trotter	9950057	\$749,998	EHR/DUE/ATE
Porterville College	Chandler	9850683	\$12,873	EHR/DUE/ILI
Rancho Santiago Community College	Anthony	9751102	\$39,252	EHR/DUE/ILI
Rancho Santiago Community College	Malmgren	9751485	\$50,000	EHR/DUE/ILI
Sacramento City College	Roper	9851173	\$10,047	EHR/DUE/ILI
Saddleback College	Wrightsmen	9850696	\$8,000	EHR/DUE/ILI
San Diego City College	Stepsis	9996128	\$64,584	EHR/DUE/ATE
San Diego Miramar College	Trubovitz	9751657	\$38,640	EHR/DUE/ILI
San Diego State University	Goldberg	9812299	\$2,313,708	EHR/ESIE/IMD
San Jose State University	Ibrahim	9752004	\$199,944	EHR/DUE/ATE
Santa Ana College	Fries	9950466	\$25,775	EHR/DUE/CCLI-A&I
Southwestern College	Brown	9850951	\$73,426	EHR/DUE/ILI
University of California, Berkeley	Moore	9455924	\$2,865,000	EHR/DUE/CCD
University of California, Los Angeles	Chapman	9555605	\$2,425,000	EHR/DUE/CCD
Ventura College	Oliver	9851455	\$38,470	EHR/DUE/ILI
Ventura County Community College District Office	Thieman	9750770	\$19,964	EHR/DUE/ILI

### Colorado

Aims Community College	Ramirez	9850588	\$70,528	EHR/DUE/ILI
Geological Society of America	Geary	9602408	\$614,684	EHR/DUE/ATE
Pikes Peak Community College	Cover	9909552	\$45,633	EHR/DUE/CCLI-A&I

### Connecticut

Capital Community College	Pazdar	9850244	\$125,000	EHR/DUE/ATE
Quinebaug Valley Community College	Emigh	9751569	\$45,945	EHR/DUE/ILI
Three Rivers Community College	Donnelly	9851432	\$50,710	EHR/DUE/ILI
Tunxis Community College	Wosczyzna-Birch	9950078	\$100,000	EHR/DUE/ATE
University of Connecticut	Roychoudhuri	9752092	\$267,000	EHR/DUE/ATE

### Delaware

Delaware Tech. and Comm. Coll., Stanton-Newark	Hauer	9950887	\$200,000	EHR/DUE/CCLI-A&I
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### District of Columbia

American Association of Community Colleges	Barnett	9713868	\$484,058	EHR/DUE/ATE
American Association of Community Colleges	Barnett	9908191	\$974,949	EHR/DUE/ATE
American Chemical Society	Ware	9752102	\$735,650	EHR/DUE/ATE
Consortium for Oceanographic Research and Ed.	Winokur	9814210	\$70,598	EHR/DUE/ATE



Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
National Academy of Sciences	Wulf	9814135	\$600,000	EHR/ESIE/IMD
National Alliance of Business	Joyce	9602352	\$399,972	EHR/DUE/ATE
<b>Florida</b>				
Brevard Community College	Khoury	9752241	\$74,976	EHR/DUE/CCD
Brevard Community College	White	9851011	\$50,000	EHR/DUE/ILI
Broward Community College	Finazzo	9751001	\$5,718	EHR/DUE/ILI
Broward Community College	Precedo	9653672	\$197,315	EHR/DUE/CCD
Broward Community College	Precedo	9751108	\$8,451	EHR/DUE/ILI
Daytona Beach Community College	Williams	9752054	\$551,106	EHR/DUE/ATE
Florida Community College at Jacksonville	Gant	9750853	\$68,650	EHR/DUE/ILI
Hillsborough Community College	Falls	9850291	\$297,906	EHR/DUE/ATE
Indian River Community College	Diesen	9628036	\$944,629	EHR/REC/RA
Miami-Dade Community College	Austin	9554188	\$686,970	EHR/HRD/AWGSEM
Palm Beach Community College	Frech	9616884	\$20,000	CISE/ANIR/NI
Palm Beach Community College	Saken	9750928	\$11,672	EHR/DUE/ILI
Seminole Community College	Maznicki	9850526	\$45,984	EHR/DUE/ILI
Valencia Community College	Hedayat	9950106	\$1,100,000	EHR/DUE/ATE
<b>Georgia</b>				
Andrew College	Brown	9729620	\$117,000	CISE/ANIR/NI
Andrew College	Kelly	9851562	\$14,306	EHR/DUE/ILI
Athens Area Technical Institute	White	9850247	\$733,372	EHR/DUE/ATE
Atlanta Metropolitan College	Morrell	9553538	\$104,672	EHR/ESIE/YS
Georgia Perimeter College	Anderson	9820699	\$10,665	GEO/EAR/E&HR
<b>Hawaii</b>				
Hawaii Department of Education	Woerner	9452790	\$475,000	EHR/ESIE/IMD
University of Hawaii Maui Community College	Converse	9850343	\$137,893	EHR/DUE/ATE
University of Hawaii, Manoa	Kuh	9625557	\$229,267	ENG/ECS/IS
<b>Illinois</b>				
City Colleges of Chicago Harold Washington College	DeSombre	9702044	\$84,427	EHR/DUE/ATE
City Colleges of Chicago Harry S Truman College	Soucek	9602443	\$210,081	EHR/DUE/ATE
College of Du Page	Cappetta	9750777	\$62,650	EHR/DUE/ILI
College of Du Page	Sprague-Williams	9750999	\$60,000	EHR/DUE/ILI
Illinois State University	Loepp	9816812	\$40,879	EHR/ESIE/IMD
Illinois State University	Meier	9752083	\$450,000	EHR/DUE/ATE
Joliet Junior College	Hieggelke	9554683	\$525,000	EHR/DUE/UFE
Joliet Junior College	Hieggelke	9751360	\$44,852	EHR/DUE/ILI
Joliet Junior College	Hieggelke	9950062	\$305,000	EHR/DUE/ATE
Moraine Valley Community College	Malitzke	9851314	\$57,584	EHR/DUE/ILI
Moraine Valley Community College	Sands	9950037	\$315,792	EHR/DUE/ATE
Oakton Community College	Sompolski	9751122	\$40,000	EHR/DUE/ILI
Oakton Community College	Walter	9752885	\$238,230	EHR/DUE/CCD
Rock Valley College	Billman	9950088	\$499,918	EHR/DUE/ATE
Southern Illinois University at Carbondale	Abrate	9850351	\$284,800	EHR/DUE/ATE
University of Chicago	Landsberg	9850273	\$574,699	EHR/DUE/ATE
University of Illinois at Chicago	Jenkins	9850327	\$968,187	EHR/DUE/ATE
Waubonsee Community College	Ward	9750988	\$9,792	EHR/DUE/ILI
William Rainey Harper College	Kuehn	9851220	\$27,900	EHR/DUE/ILI

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
<b>Indiana</b>				
Purdue University	Gentry	9602355	\$1,348,391	EHR/DUE/ATE
<b>Iowa</b>				
Hawkeye Community College	Brase	9752081	\$700,000	EHR/DUE/ATE
Hazardous Materials Training and Research Center	Kabat Lensch	9714425	\$2,000,000	EHR/DUE/ATE
Iowa Lakes Community College Central Office	Patocka	9751275	\$51,177	EHR/DUE/ILI
Iowa State University	Schmerr	9602370	\$673,705	EHR/DUE/ATE
Kirkwood Community College	Hench	9950258	\$19,602	EHR/DUE/CCLI-A&I
<b>Kansas</b>				
Butler County Community College	Erwin	9617130	\$16,471	CISE/ANIR/NI
Cloud County Community College	Davies	9851249	\$13,632	EHR/DUE/ILI
Kansas City Kansas Community College	Klein	9951411	\$8,955	EHR/DUE/CCLI-A&I
<b>Kentucky</b>				
Lexington Community College	Crowley	9850313	\$849,995	EHR/DUE/ATE
<b>Maine</b>				
University of Maine at Farmington	Buckley	9851507	\$28,376	EHR/DUE/ILI
University of Maine at Farmington	Godomsky	9727884	\$15,792	EHR/DUE/CCD
University of Maine at Farmington	Stancioff	9851668	\$15,177	EHR/DUE/ILI
<b>Maryland</b>				
Allegany Community College	Jastrzembki	9950125	\$35,726	EHR/DUE/CCLI-A&I
Allegany Community College	Mastrangelo	9407612	\$119,904	BIO/MCB/MG
American Association of Physics Teachers	Monroe	9450160	\$1,185,405	EHR/DUE/ATE
American Institute of Physics	Neuschatz	9453180	\$385,680	EHR/DUE/ATE
Beth Hufnagel	Hufnagel	9714489	\$102,000	EHR/DGE/PFSMETS
Comm. Coll. of Baltimore County, Catonsville	Jones	9850289	\$499,897	EHR/DUE/ATE
Comm. Coll. of Baltimore County, Catonsville	Jones	9851251	\$64,248	EHR/DUE/ILI
Comm. Coll. of Baltimore County, Essex	Dyacz	9751501	\$43,436	EHR/DUE/ILI
Comm. Coll. of Baltimore County, Essex	Sorkin	9950056	\$272,000	EHR/DUE/ATE
Frederick Community College	Yankosky	9617133	\$17,650	CISE/ANIR/NI
Johns Hopkins University	Packer	9553664	\$1,344,676	EHR/DUE/ATE
Johns Hopkins University	Packer	9850249	\$1,009,041	EHR/DUE/ATE
Prince George's Community College	Cant	9752318	\$100,009	EHR/DUE/CCD
Prince George's Community College	Cunniff	9553662	\$694,941	EHR/DUE/ATE
Prince George's Community College	Kinslow	9653441	\$65,759	EHR/DUE/UFE
Prince George's Community College	McGarvey	9850605	\$40,566	EHR/DUE/ILI
Prince George's Community College	McMillen	9553500	\$100,806	EHR/ESIE/YS
Prince George's Community College	Zdravkovich	9850052	\$200,000	EHR/DUE/CCD
<b>Massachusetts</b>				
Berkshire Community College	Mulholland	9950067	\$300,000	EHR/DUE/ATE
Bristol Community College	Majkut	9850933	\$43,391	EHR/DUE/ILI
Bunker Hill Community College	Manville	9950568	\$107,246	EHR/DUE/CCLI-EMD
Cape Cod Community College	Curran	9850318	\$232,179	EHR/DUE/ATE
Cape Cod Community College	Tatano	9751338	\$42,353	EHR/DUE/ILI
Concord Consortium	Tinker	9970881	\$128,070	EHR/DUE/ATE
Consortium for Mathematics and Its Applications	Garfunkel	9950036	\$674,677	EHR/DUE/ATE

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
Education Development Center	Aring	9850299	\$274,667	EHR/DUE/ATE
Education Development Center	Leff	9752051	\$472,158	EHR/DUE/ATE
Greenfield Community College	MacLeod	9751124	\$47,965	EHR/DUE/ILI
Greenfield Community College	Wilkins	9950105	\$420,000	EHR/DUE/ATE
Massachusetts Bay Community College	Jackson	9424103	\$176,388	BIO/DBI/REU
Massachusetts Bay Community College	Jackson	9731991	\$206,799	BIO/DBI/REU
Mount Wachusett Community College	Weidhaas	9850317	\$200,000	EHR/DUE/ATE
New England Board of Higher Education	Stewart	9752050	\$449,975	EHR/DUE/ATE
Springfield Technical Community College	Masi	9751990	\$3,000,000	EHR/DUE/ATE
Springfield Technical Community College	Massa	9751333	\$56,957	EHR/DUE/ILI
Springfield Technical Community College	Mullett	9602433	\$400,000	EHR/DUE/ATE
Springfield Technical Community College	Mullett	9950732	\$75,000	EHR/DUE/CCLI-A&I
Springfield Technical Community College	Smallman	9851506	\$35,000	EHR/DUE/ILI
TERC	Pulis	9850311	\$695,924	EHR/DUE/ATE
WGBH Educational Foundation	Korf	9816634	\$329,565	EHR/ESIE/TE
Worcester Junior College	Cruz	9896052	\$156,272	CISE/IIS/IDM

### Michigan

Gogebic Community College	Munn	9634081	\$20,000	CISE/ANIR/NI
Henry Ford Community College	Eshelman	9454620	\$146,738	EHR/DUE/ATE
Henry Ford Community College	Martini	9850282	\$500,000	EHR/DUE/ATE
Henry Ford Community College	Waddell	9752086	\$1,200,000	EHR/DUE/ATE
Mott Community College	Crampton	9950052	\$500,738	EHR/DUE/ATE
Traverse Bay Area Intermediate School District	Chambers	9950076	\$725,292	EHR/DUE/ATE
Wayne State University	Rathod	9752024	\$450,000	EHR/DUE/ATE
Western Michigan University	Gullickson	9900698	\$1,289,690	EHR/REC/PE

### Minnesota

Fond du Lac Tribal College	Wetherbee	9417390	\$1,380,523	CISE/EIA/RI
Global Wireless Education Consortium	Baker	9950039	\$248,616	EHR/DUE/ATE
Itasca Community College	Wenger	9752084	\$445,961	EHR/DUE/ATE
University of Minnesota, Duluth	Munson	9752017	\$656,576	EHR/DUE/ATE

### Mississippi

Holmes Community College	Burchfield	9851540	\$5,085	EHR/DUE/ILI
Jones County Junior College	Cotten	9752060	\$1,082,122	EHR/DUE/ATE
Jones County Junior College	Cotten	9950085	\$1,758,163	EHR/DUE/ATE
Mississippi State University	Harpole	9555646	\$1,273,484	EHR/ESIE/TE
Phi Theta Kappa Headquarters	Risley	9602459	\$239,912	EHR/DUE/ATE
Phi Theta Kappa Headquarters	Risley	9811926	\$307,847	EHR/DUE/ATE

### Missouri

Cotley College	Ross	9851169	\$54,435	EHR/DUE/ILI
Linn State Technical College	Velie	9950381	\$75,000	EHR/DUE/CCLI-EMD
St. Louis Community College at Florissant Valley	Mason	9751438	\$62,479	EHR/DUE/ILI
St. Louis Community College at Meramec	Krishnan	9950585	\$29,450	EHR/DUE/CCLI-A&I

### Montana

Flathead Valley Community College	Martino	9851025	\$13,050	EHR/DUE/ILI
Salish Kootenai College	McDonald	9450369	\$5,280,560	EHR/HRD/LSAMP
Salish Kootenai College	Ryan	9752761	\$157,653	EHR/DUE/UFU

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
<b>Nebraska</b>				
Southeast Community College	Kenkel	9751998	\$398,479	EHR/DUE/ATE
Southeast Community College	Kenkel	9950042	\$375,000	EHR/DUE/ATE
<b>Nevada</b>				
Community College of South Nevada	Collins	9950320	\$227,621	EHR/DUE/CCLI-AA
University of Nevada Desert Research Institute	Wetzel	9602351	\$450,000	EHR/DUE/ATE
<b>New Hampshire</b>				
Keene State College	Simoneau	9553767	\$548,260	EHR/DUE/ATE
New Hampshire Technical College, Berlin	Davis	9850326	\$238,270	EHR/DUE/ATE
University of New Hampshire	Giles	9752053	\$74,954	EHR/DUE/ATE
White Pines College	Scerra	9617958	\$20,000	CISE/ANIR/NI
<b>New Jersey</b>				
Bergen Community College	Ricatto	9950084	\$184,952	EHR/DUE/ATE
Mercer County Community College	Blinderman	9850689	\$15,541	EHR/DUE/ILI
Middlesex County College	Waintraub	9553749	\$2,966,472	EHR/ESIE/ATE
Middlesex County College	Waintraub	9813444	\$2,000,001	EHR/DUE/ATE
Ocean County College	Icklan	9617033	\$20,000	CISE/ANIR/NI
Passaic County Community College	Mondelli	9616906	\$30,000	CISE/ANIR/NI
Passaic County Community College	Safarowic	9850425	\$10,574	EHR/DUE/ILI
Salem Community College	Haas	9851537	\$26,240	EHR/DUE/ILI
<b>New Mexico</b>				
Albuquerque Technical Vocational Institute	Pletsch	9653367	\$98,600	EHR/DUE/UFE
Albuquerque Technical Vocational Institute	Willis	9602349	\$421,318	EHR/DUE/ATE
New Mexico State University	Arimoto	9728983	\$270,428	GEO/ATM/AC
New Mexico State University	Arimoto	9809164	\$165,799	OD/OPP/AOCS
Northern New Mexico Community College	Black	9751117	\$20,000	EHR/DUE/ILI
Northern New Mexico Community College	Przyllas	9751054	\$50,000	EHR/DUE/ILI
University of New Mexico	Wood	9850310	\$900,000	EHR/DUE/ATE
<b>New York</b>				
Adirondack Community College	Patrick	9553765	\$234,194	EHR/DUE/ATE
Association of Computing Machinery	Klee	9653405	\$64,676	EHR/DUE/UFE
Bay Shore Union Free School District	Brachio	9850257	\$86,724	EHR/DUE/ATE
Cold Spring Harbor Laboratory	Micklos	9752037	\$599,825	EHR/DUE/ATE
Corning Community College	Kenner	9751517	\$24,190	EHR/DUE/ILI
CUNY Borough of Manhattan Community College	Cohen	9850309	\$550,000	EHR/DUE/ATE
CUNY Borough of Manhattan Community College	Wilkinson	9554672	\$119,954	EHR/DUE/UFE
CUNY Borough of Manhattan Community College	Wilkinson	9710273	\$99,996	EHR/HRD/AWGSEM
CUNY Borough of Manhattan Community College	Wilkinson	9752795	\$70,000	EHR/DUE/UFE
CUNY Bronx Community College	Fahey	9850304	\$700,000	EHR/DUE/ATE
CUNY Bronx Community College	Forman	9713869	\$187,459	EHR/DUE/ATE
CUNY City College	Gosser	9455920	\$1,525,000	EHR/DUE/CCD
CUNY New York City Technical College	Squitieri	9653715	\$199,352	EHR/DUE/CCD
CUNY Queensborough Community College	Lieberman	9752061	\$600,000	EHR/DUE/ATE
CUNY Queensborough Community College	Mohr	9602369	\$639,625	EHR/DUE/ATE
Erie Community College	Steinitz	9752688	\$126,000	EHR/DUE/CCD
Mater Dei College	Wilcox	9729753	\$19,989	CISE/ANIR/NI

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
Mohawk Valley Community College	Dell	9751351	\$37,670	EHR/DUE/ILI
Monroe Community College	Cullen	9750557	\$18,079	EHR/DUE/ILI
Monroe Community College	D'Alessandris	9653228	\$66,360	EHR/DUE/CCD
Monroe Community College	Wadach	9851288	\$26,760	EHR/DUE/ILI
Onondaga Community College	Gaonkar	9950019	\$449,725	EHR/DUE/ATE
Paul Smith's College of Arts and Sciences	Smith	9751018	\$17,473	EHR/DUE/ILI
Paul Smith's College of Arts and Sciences	Stager	9808972	\$92,040	GEO/EAR/GC
Rensselaer Polytechnic Institute	Holmes	9552465	\$4,000,000	EHR/DUE/CCD
SUNY at Farmingdale	Diehl	9727876	\$200,000	ENG/EEC/EE
SUNY at Stony Brook	Bynum	9602450	\$450,000	EHR/DUE/ATE
SUNY at Stony Brook	Tucker	9555401	\$2,799,820	EHR/DUE/CCD
Villa Maria College of Buffalo	Garus	9710962	\$20,000	CISE/ANIR/NI

### North Carolina

Forsyth Technical Community College	Tyndall	9851066	\$26,078	EHR/DUE/ILI
Guilford Technical Community College	Martin	9750802	\$30,326	EHR/DUE/ILI
North Carolina State Board of Community Colleges	Girardeau	9553709	\$139,450	EHR/DUE/ATE
University of North Carolina at Chapel Hill	Greis	9950073	\$399,969	EHR/DUE/ATE
Wake Technical Community College	Kimball	9752038	\$119,999	EHR/DUE/ATE
Wake Technical Community College	Kimball	9950101	\$231,043	EHR/DUE/ATE

### North Dakota

Bismarck State College	Carter	9750503	\$22,752	EHR/DUE/ILI
Bismarck State College	DeHart	9950034	\$611,969	EHR/DUE/ATE
Bismarck State College	Durick	9851611	\$27,168	EHR/DUE/ILI
Turtle Mountain Community College	Hanson	9752568	\$139,541	EHR/DUE/CCD
Turtle Mountain Community College	Monette	9554467	\$10,336,718	EHR/ESR/RSI

### Ohio

Cleveland State University	Schoenig	9602457	\$608,756	EHR/DUE/ATE
Cleveland State University	Schoenig	9850288	\$206,026	EHR/DUE/ATE
Cuyahoga Community College	Choudhury	9851065	\$53,838	EHR/DUE/ILI
Edison Industrial Systems Center	Sully	9602431	\$1,200,000	EHR/DUE/ATE
Jefferson Technical College	Vallera	9951363	\$41,993	EHR/DUE/CCLI-A&I
Kent State University	Burns	9851077	\$80,480	EHR/DUE/ILI
Lakeland Community College	Deak	9851385	\$60,000	EHR/DUE/ILI
Marion Technical College	Boyer	9710287	\$20,000	CISE/ANIR/NI
Miami University Middletown	Governanti	9850015	\$200,000	EHR/DUE/CCD
Miami University Middletown	Sarquis	9751993	\$825,720	EHR/DUE/ATE
Miami University Middletown	Sarquis	9950011	\$800,000	EHR/DUE/ATE
Muskingum Area Technical College	Marks	9714792	\$818,277	EHR/HRD/AWGSEM
North Central Technical College	Turner	9616985	\$22,735	CISE/ANIR/NI
Ohio State University Research Foundation	Opliger	9552897	\$166,978	EHR/ESIE/YS
Ohio University	Kline	9850350	\$90,135	EHR/DUE/ATE
Sinclair Community College	Anderson	9752015	\$100,000	EHR/DUE/ATE
Sinclair Community College	Harrison	9714424	\$2,000,000	EHR/DUE/ATE
Sinclair Community College	Harrison	9950028	\$856,583	EHR/DUE/ATE
Sinclair Community College	Jones	9653389	\$84,500	EHR/DUE/UFE
Sinclair Community College	Jones	9752787	\$185,000	EHR/DUE/UFE
Sinclair Community College	Jones	9909132	\$12,192	EHR/DUE/CCLI-A&I
Sinclair Community College	Sifferlen	9653670	\$200,000	EHR/DUE/CCD
Stark Technical College	Harrison	9750730	\$7,114	EHR/DUE/ILI

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
University of Cincinnati	Kryman	9602437	\$1,098,276	EHR/DUE/ATE
University of Cincinnati	Saad	9950029	\$853,640	EHR/DUE/ATE
<b>Oklahoma</b>				
Oklahoma State University	Hayden	9751674	\$82,714	EHR/DUE/ILI
Oklahoma State University, Okmulgee	Allison	9602390	\$600,000	EHR/DUE/ATE
Oklahoma State University, Okmulgee	Allison	9850324	\$650,000	EHR/DUE/ATE
<b>Oregon</b>				
Chemeketa Community College	Cudmore	9553760	\$2,998,443	EHR/DUE/ATE
Chemeketa Community College	Cudmore	9813445	\$1,996,949	EHR/DUE/ATE
Hillsboro School District 1J	Miller	9752025	\$205,224	EHR/DUE/ATE
Lane Community College	Shellabarger	9752058	\$262,800	EHR/DUE/ATE
Mount Hood Community College	Jackman	9751983	\$169,158	EHR/DUE/ATE
Oregon Graduate Institute of Sci. and Tech.	Devletian	9972052	\$178,823	MPS/DMMR/Metals
Portland Community College	Button	9752668	\$49,870	EHR/DUE/CCD
Portland Community College	Hata	9653429	\$100,000	EHR/DUE/UF
<b>Pennsylvania</b>				
Cambria County Area Community College	Bocher	9710334	\$16,950	CISE/ANIR/NI
Community College of Philadelphia	Cattell	9950353	\$120,000	EHR/DUE/CCLI-A&I
Dickinson College	Laws	9455561	\$1,780,000	EHR/DUE/CCD
Harrisburg Area Community College	Godbois	9751357	\$9,574	EHR/DUE/ILI
Lackawanna Junior College	Tarutis	9950616	\$11,747	EHR/DUE/CCLI-A&I
Luzerne County Community College	McAndrew	9420850	\$24,960	CISE/ANIR/NI
Penn State Abington	Schlosser	9850635	\$20,984	EHR/DUE/ILI
Penn State Berks	Litvin	9722799	\$129,528	MPS/DMMR/MT
Penn State Delaware County	De Rosa	9420655	\$147,100	MPS/CHE/BP
Penn State York	Trout	9851024	\$35,264	EHR/DUE/ILI
Pennsylvania College of Technology	Weston	9751984	\$600,735	EHR/DUE/ATE
Pennsylvania College of Technology	Weston	9950072	\$805,326	EHR/DUE/ATE
University of Pennsylvania	DeTurck	9552464	\$2,196,693	EHR/DUE/CCD
<b>Rhode Island</b>				
American Mathematical Society	Rankin	9713867	\$41,250	EHR/DUE/ATE
<b>South Carolina</b>				
Florence-Darlington Technical College	Yendall	9751246	\$40,265	EHR/DUE/ILI
Greenville Technical College	Higgins	9653224	\$99,799	EHR/DUE/CCD
Horry-Georgetown Technical College	Smith	9850697	\$44,915	EHR/DUE/ILI
Piedmont Technical College	Cothran	9851100	\$55,000	EHR/DUE/ILI
Piedmont Technical College	Foster	9850661	\$62,224	EHR/DUE/ILI
Piedmont Technical College	Koster	9850832	\$26,500	EHR/DUE/ILI
Piedmont Technical College	Smoak	9751058	\$35,959	EHR/DUE/ILI
S.C. State Board for Tech. and Comprehensive Ed.	Craft	9602440	\$2,100,000	EHR/DUE/ATE
S.C. State Board for Tech. and Comprehensive Ed.	Craft	9908409	\$2,000,000	EHR/DUE/ATE
S.C. State Board for Tech. and Comprehensive Ed.	Mack	9553740	\$1,419,128	EHR/DUE/ATE
Spartanburg Technical College	Stokley	9950509	\$32,847	EHR/DUE/CCLI-A&I
Trident Technical College	Almquist	9553696	\$267,965	EHR/DUE/ATE
Trident Technical College	Chapman	9850966	\$50,000	EHR/DUE/ILI
Trident Technical College	Kent	9851212	\$78,164	EHR/DUE/ILI
Trident Technical College	Mauldin	9750713	\$57,814	EHR/DUE/ILI



Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
Trident Technical College	Whipple	9751185	\$54,943	EHR/DUE/ILI
Trident Technical College	Whipple	9752062	\$240,000	EHR/DUE/ATE
York Technical College	Kosak	9850269	\$500,000	EHR/DUE/ATE
<b>South Dakota</b>				
Oglala Lakota College	Gagnon	9550533	\$10,960,977	EHR/HRD/MIE
Oglala Lakota College	Huebner	9725114	\$10,000	EHR/HRD/PAEMEM
Presentation College	Tacke	9617136	\$19,900	CISE/ANIR/NI
<b>Tennessee</b>				
Hiwassee College	Barker	9406826	\$90,150	CISE/ANIR/NI
Nashville State Technical Institute	Rogers	9602401	\$449,594	EHR/DUE/ATE
Nashville State Technical Institute	Rogers	9850307	\$1,629,004	EHR/DUE/ATE
Pellissippi State Technical Community College	Preston	9750825	\$26,204	EHR/DUE/ILI
<b>Texas</b>				
Amarillo College	Haiduk	9751493	\$5,000	EHR/DUE/ILI
Amarillo College	Jones	9850355	\$200,000	EHR/DUE/ATE
Austin Community College	Rodi	9850319	\$144,947	EHR/DUE/ATE
College of the Mainland	Kile	9950071	\$898,493	EHR/DUE/ATE
Collin County Community College	Baltzer	9950025	\$847,785	EHR/DUE/ATE
El Paso Community College	Loston	9602298	\$118,644	OD/OIA/ARF
El Paso County Community College	Alvarez	9604760	\$242,866	BIO/DBI/IID
Houston Community College	Beckman	9711504	\$249,986	EHR/HRD/LSAMP
Houston Community College	Nye	9850344	\$394,318	EHR/DUE/ATE
Kingwood College	Whileyman	9950920	\$90,000	EHR/DUE/CCLI-A&I
Laredo Community College	Vaughan	9752192	\$110,000	EHR/DUE/CCD
Palo Alto College	Slitine	9751032	\$49,708	EHR/DUE/ILI
San Antonio College	Garza	9750585	\$58,971	EHR/DUE/ILI
Texas Engineering Experiment Station	Clark	9950006	\$705,616	EHR/DUE/ATE
Texas State Technical College, Sweetwater	Frederick	9950469	\$37,250	EHR/DUE/CCLI-EMD
Texas State Technical College, Sweetwater	Musgrove	9454643	\$1,766,637	EHR/DUE/ATE
Texas State Technical College, Sweetwater	Wright	9714435	\$1,253,697	EHR/DUE/ATE
Texas State Technical College, Waco	Pelton	9553716	\$1,550,000	EHR/DUE/ATE
<b>Utah</b>				
Utah Valley State College	Jackson	9613949	\$90,000	CISE/ANIR/NI
Utah Valley State College	Jackson	9613955	\$90,000	CISE/ANIR/NI
<b>Virginia</b>				
Blue Ridge Community College	Chandler	9950726	\$167,545	EHR/DUE/CCLI-A&I
International Technology Education Association	Dugger	9626809	\$1,573,220	EHR/ESIE/IMD
J. Sargeant Reynolds Community College	Flowers	9950053	\$71,873	EHR/DUE/ATE
Norfolk State University	Jacobs	9751987	\$66,900	EHR/DUE/ATE
Piedmont Virginia Community College	Pittman	9752021	\$600,000	EHR/DUE/ATE
Virginia Commonwealth University	Farley	9553789	\$3,460,050	EHR/DUE/CETP
Virginia Highlands Community College	McGlothlin	9751642	\$100,000	EHR/DUE/ILI
Virginia Space Grant Consortium	Sandy	9714637	\$475,789	EHR/HRD/AWGSEM
Wytheville Community College	Tice	9602397	\$299,694	EHR/DUE/ATE

Institution	PI	Awd. No.	Est. Total	Managing NSF Org.
<b>Washington</b>				
Bellevue Community College	Evans	9553727	\$3,017,054	EHR/DUE/ATE
Bellevue Community College	Evans	9813446	\$1,999,941	EHR/DUE/ATE
Bellevue Community College	Evans	9907986	\$300,000	EHR/DUE/ATE
Bellevue Community College	Saflund	9910818	\$50,000	EHR/DUE/CCLI-A&I
Bellevue Community College	Saflund	9950098	\$40,000	EHR/DUE/ATE
Bellevue Community College	Talbott	9850013	\$199,980	EHR/DUE/CCD
Green River Community College	Clay	9851642	\$64,132	EHR/DUE/ILI
Green River Community College	Kinholt	9876589	\$433,858	EHR/DUE/CETP
Northwest Indian College	Burns	9752076	\$775,049	EHR/DUE/ATE
University of Washington	Stoebe	9602360	\$221,174	EHR/DUE/ATE
<b>Wisconsin</b>				
Beloit College	Spencer	9455918	\$2,715,000	EHR/DUE/CCD
Fox Valley Technical College	Bartelt	9751718	\$46,000	EHR/DUE/ILI
Fox Valley Technical College	Cecka	9851586	\$67,500	EHR/DUE/ILI
Madison Area Technical College	Anderegg	9752032	\$299,900	EHR/DUE/ATE
Madison Area Technical College	McMillan	9752027	\$360,000	EHR/DUE/ATE
Milwaukee Area Technical College	Hodgkinson	9950046	\$1,095,684	EHR/DUE/ATE
University of Wisconsin, Madison	Kostka	9751476	\$8,550	EHR/DUE/ILI
University of Wisconsin, Madison	Moore	9455928	\$3,749,591	EHR/DUE/CCD
University of Wisconsin, Waukesha	Stalder	9950692	\$18,050	EHR/DUE/CCLI-A&I
Waukesha County Technical College	Timmer	9752082	\$700,000	EHR/DUE/ATE
Western Wisconsin Technical College	Skewes	9850287	\$420,000	EHR/DUE/ATE

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