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).

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