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ABSTRACT

This report presents a summary of the results and tabulated data obtained from the 1975 Survey of Graduate Science Student Support and Postdoctorals conducted annually by the National Science Foundation. Data from 7,664 science and engineering departments of 248 graduate schools and 104 medical schools are included. Highlights include: graduate science and engineering enrollment increased by 24,600 in fall 1975; full-time, self-supported student enrollment increased 22%, or 12,228, over 1974; 290,700 total students were enrolled; social science enrollment increased 16%; life science enrollment increased 9%; engineering enrollment increased 8%; percent of students receiving federal assistance was down 2%; female graduate enrollment increased 13%; and foreign student enrollment increased 4%. Statistical tables and charts are included. (SL)

nsf SCIENCE RESOURCES STUDIES HIGHLIGHTS

NATIONAL SCIENCE FOUNDATION • WASHINGTON, D. C. 20550 • September 30, 1976 • NSF 76-320

Self-Supported Graduate Science Students Increased by 22 Percent in 1975

This report presents some of the final results from the fall 1975 Survey of Graduate Science Student Support and Postdoctorals conducted annually by NSF's Division of Science Resources Studies. Responses to the fall 1975 survey were tabulated from 7,664 graduate science and engineering departments in 248 science Ph.D.-granting graduate schools and 105 medical schools and were compared with responses for 1974. Percent changes from 1974 to 1975 were calculated based on 7,501 departments in the 1974 survey universe. Both Ph.D. and master's students enrolled in these institutions were included. The term "science" as used here is understood to include engineering.

• Enrollment of graduate students in science and engineering (S/E) programs at Ph.D.-granting institutions increased by more than 24,600 in the fall semester of 1975, paralleling a general rise in total enrollment in the country's colleges and universities for the same period.[1] This increase represented the second consecutive rise in graduate enrollment in the sciences and engineering following four years of successive decreases. The most significant aspect of this growth in 1975 is the change in support patterns: Full-time graduate science students relying on self- or family-support increased 22 percent, or 12,228, over the 1974 figure.

• By 1975, 290,700 graduate students were enrolled in S/E courses at these institutions. Full-time enrollment totaled 210,600, an increase of 7 percent, while part-timers increased 14 percent to over 80,000.

• Every area of science was affected by the increase, with the largest jump in the social sciences, up 16 percent; other large-rate increases occurred in the life sciences (9 percent) and engineering (8 percent). These three areas together accounted for 86 percent of the increase in graduate enrollment.

• Students enrolled in their first year in science programs of graduate school increased by 8 percent, while those beyond their first year increased 10 percent.

• The 22-percent rise in self-supported full-time graduate science students represented the largest increase in any support category. In 1975, more than 32 percent were self-supported, compared to 29 percent the previous year. The number receiving support from all other sources also increased slightly. Institutions and State and local government supported nearly 3 percent more students and were the primary sources of support for 37 percent of the full-time total, compared with 39 percent in 1974.

• The 1-percent increase in federally supported students occurred because $60 million in impounded funds were released in fiscal year 1974 to the Department of Health, Education, and Welfare (HEW) for fellowships, traineeships, and training grants. Students receiving Federal assistance represented 23 percent of the total enrolled full time in 1975, down from their 25-percent share in 1974.

• Full-time students holding fellowships and traineeships showed a slight gain—less than 1 percent—between fall 1974 and fall 1975, and both teaching and research assistantship holders rose, by 3 percent and 1 percent, respectively.

• The number of female graduate science students enrolled full time rose 13 percent, more than twice the rate of increase in male students. Still, the 158,100 male graduate science students studying full time represented over three times the number of female students.

• Full-time graduate science students with U.S. citizenship increased 8 percent in the 1974-75 period, while the number of foreign students increased 4 percent, representing a reversal of the declines in foreign enrollment reported since 1971.

• The number of postdoctorals in graduate science departments increased almost 3 percent, a turnaround from two successive annual declines. The primary source of support for 71 percent of the postdoctorals was the Federal Government, as in prior years.

[1] See U.S. Bureau of the Census, *Current Population Reports*, "School Enrollment—Social and Economic Characteristics of Students: October 1975," Series P-20, No. 294 (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office, June 1976).

(Prepared in the Universities and Nonprofit Institutions Studies Group, Division of Science Resources Studies)

Graduate Science Enrollment

Graduate science enrollment increased more than 9 percent between fall 1974 and fall 1975, after almost a 6-percent rise in the preceding year (table 1). These two yearly advances reversed a downward trend that resulted from declining Federal support, as well as a diminishing student interest in science careers. Among the factors contributing to the upward movement were limited employment opportunities among college-age persons; added emphasis on enrollment on a part-time basis by both institutions and graduate students; increasing desire for graduate education among women; and, in a reversal of recent trends, a greater influx of foreign students. Also notable was the fact that Federal support of graduate students went up slightly for the first time since the beginning of the survey series. This may, however, represent only a single-year change resulting from the release of impounded funds to one agency, HEW.

Although the enrollment increase was spread over all areas of science, three of them, the social and life sciences and engineering, accounted for 86 percent of the upsurge in the total. The concentration of enrollment in these broad fields reflects increasing student interest in certain professions, especially those relating to public policy and biomedical fields. All other areas of science showed lower rates of growth, ranging from 8 percent in psychology to 2 percent in the physical and environmental sciences.

One of the most significant characteristics of recent graduate science education patterns is that more and more students are enrolling on a part-time basis (chart 1). Also the proportion of graduate science students who enroll part time has been slowly increasing, so that by 1975 almost 28 percent of the total were on part-time status, compared to 23 percent in 1971. In many cases, students must depend on employment income to support their educational aspirations, and universities are beginning to emphasize career development courses designed for part-time students to upgrade their skills in the job market. Part-time enrollment patterns among areas of science resembled those of the national totals,

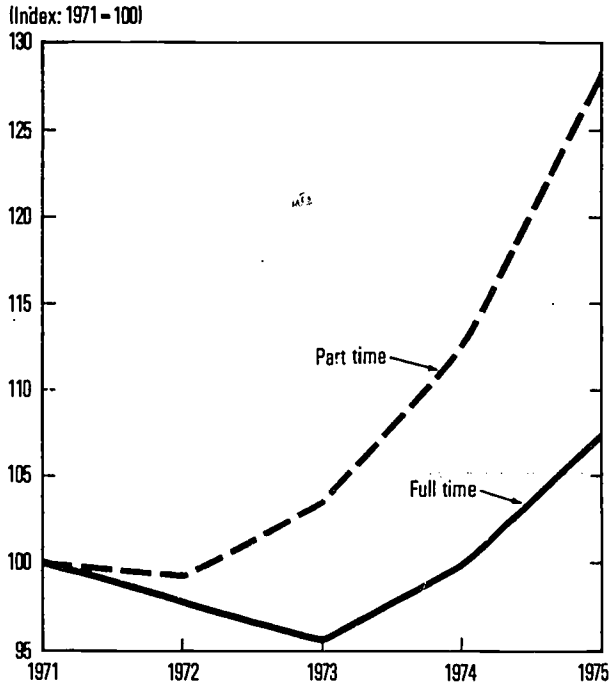
Table 1. Graduate science enrollment by field: 1974-75[1]

Area and field of science	1974	1975	Percent change
Total	265,982	290,662	9.3
Engineering	58,082	62,580	7.7
Chemical	4,559	4,920	7.9
Civil	9,954	11,113	11.6
Electrical	15,105	15,229	.8
Industrial	7,981	9,176	15.0
Mechanical	7,789	7,839	.6
All other	12,694	14,303	12.7
Physical and environmental sciences	34,233	34,977	2.2
Physical sciences, total	24,534	24,549	.1
Astronomy	602	606	.7
Chemistry	13,605	13,917	2.3
Physics	10,327	10,026	−2.9
Environmental sciences, total	9,699	10,428	7.5
Atmospheric	1,008	988	−2.0
Geosciences	6,708	7,394	10.2
Oceanography	1,983	2,046	3.2
Mathematical sciences	19,652	20,337	3.5
Applied mathematics	6,089	6,760	11.0
Mathematics	11,744	11,522	−1.9
Statistics	1,819	2,055	13.0
Life sciences	62,980	68,886	9.4
Agriculture	10,316	11,435	10.8
Biochemistry	3,678	3,653	−.7
Biology	10,004	11,783	17.8
Botany	2,642	2,730	3.3
Microbiology	3,849	3,953	2.7
Nutrition	2,651	2,697	1.7
Physiology	2,320	2,338	.8
Zoology	3,574	3,574	.0
Other biosciences	9,111	10,342	13.5
Clinical medical	14,835	16,381	10.4
Psychology	25,052	27,123	8.3
Social sciences	65,983	76,759	16.3
Anthropology	5,675	6,086	7.2
Economics	10,550	11,528	9.3
Linguistics	7,227	8,464	17.1
Political science	15,228	19,657	29.1
Sociology	13,224	14,191	15.0
All other	14,079	16,833	19.6

[1]Based on full- and part-time enrollment in 7,664 graduate departments.

SOURCE: National Science Foundation.

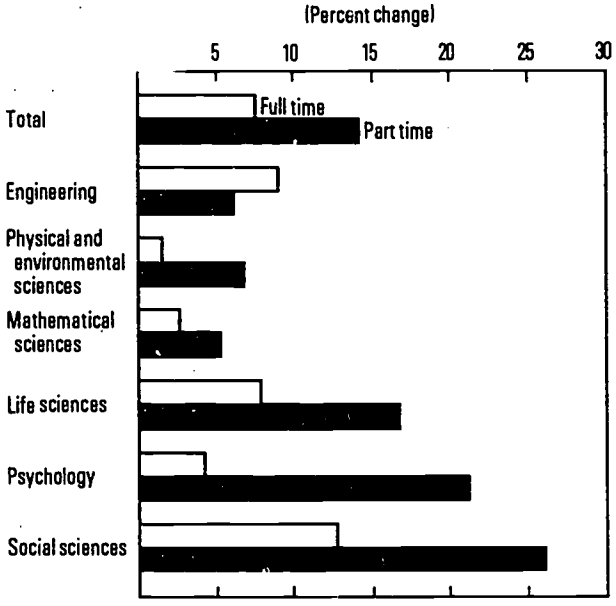
Chart 1. Graduate science enrollment by status: 1971-75



SOURCE: National Science Foundation.

with the largest absolute increases occurring in the social and life sciences (chart 2).

Chart 2. Graduate science enrollment, by area and status: 1974-75



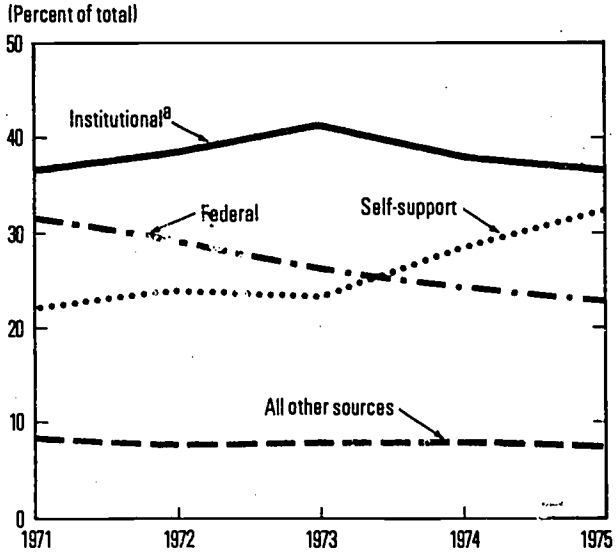
SOURCE: National Science Foundation.

Sources and Types of Major Support of Full-time Students

Of the 210,600 full-time graduate science students, 37 percent received support from their institutions and State and local governments as the principal sources for funding their education. Another 32 percent were self-supporting, while 23 percent received Federal support. Other sources of outside support, such as private foundations, industry, and foreign governments, accounted for the remaining 8 percent. Self-support was the largest single source for students enrolled in engineering, psychology, and social science programs. Institutions and State and local governments were the major sources in the physical and environmental sciences, mathematics, and the life sciences. The Federal Government did not assume a major role in the support of students in any area of science.

The increase in full-time graduate science enrollment was highest among students who supported themselves (chart 3). Between 1974 and 1975, the number of full-time students who were self-supporting increased almost 22 percent, or about three times greater than the national average. This rate was particularly high in the social sciences and engineering, up 29 percent in each area. Students receiving institutional, State, and local government funds as their major sources of support

Chart 3. Sources of major support of full-time graduate science students: 1971-75



[a]Includes support from State and local governments.

SOURCE: National Science Foundation.

Table 2. Full-time graduate science enrollment, by source of major support and area: 1974-75

[Percent change]

Source of major support	Total	Engineering	Physical and environmental sciences	Mathematical sciences	Life sciences	Psychology	Social sciences
Total	7.5	8.9	1.4	2.7	7.9	4.1	12.7
U.S. Government	.8	.8	1.3	−8.5	5.7	−1.5	−7.8
HEW	4.8	12.6	13.2	21.8	8.3	−4.1	−4.5
NSF	−.4	2.9	−.1	−9.9	5.6	−2.6	−14.7
All other	−.5	−2.5	4.0	−12.4	.9	18.9	−8.1
Institutional support[1]	2.6	2.5	.5	.8	4.5	1.1	3.7
Other outside support	1.3	.9	−4.2	21.4	3.2	−3.3	.5
Self-support	21.8	28.8	8.3	8.5	17.0	12.2	29.4

[1]Includes support from State and local governments.

SOURCE: National Science Foundation.

were up almost 3 percent, with the largest rate of increase in the life sciences (5 percent). Other outside sources, such as private foundations, industry, and foreign governments, among others, increased slightly, with the largest rate, by far, centered in the mathematical sciences.

The year 1975 marked the first increase in many years in the number of graduate science students supported by the Federal Government (table 2). The increase was centered in one agency, HEW, and resulted from the release in 1974 of impounded funds. Without the $60 million in impounded funds, the HEW budget would have decreased, but their release resulted in increased obligations for fellowships, traineeships, and training grants from about $257 million in 1973 to $302 million (table 3). Since there is roughly a one-year lag between Federal awards and university spending, this release of Federal funds for students did not affect the institutions until 1975. It is anticipated that the number of federally supported graduate science students will be down again by fall 1976, in view of reduced levels of agency fellowship, traineeship, and training grant support in 1975.

There were only minor increases in students who received formal teaching and research assistantship positions. While "other" types of support, mainly self-support, increased almost 18 percent, teaching assistantships were up 3 percent, compared with only slight increases in both research assistantships and fellowships and traineeships. A cutback of 13 percent was reported in the number of teaching assistantships supported by Federal agencies, while the number of federally sponsored research assistantships rose 3 percent, and fellowships and traineeships remained at about the same level as 1974.

Table 3. Obligations of selected Federal agencies to universities and colleges for fellowships, traineeships, and training grants in the sciences: FY 1973-75

[Dollars in thousands]

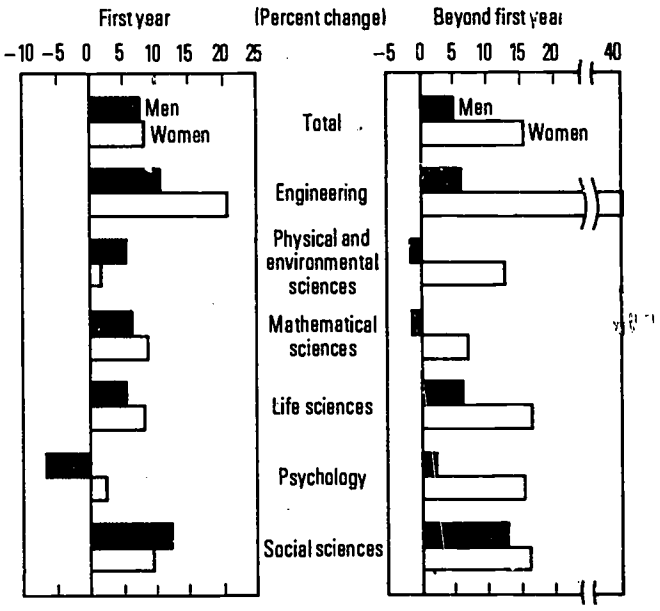
Federal agency	1973	1974	1975
Total	$287,219	$326,600	$201,273
HEW	256,788	301,541	181,740
NSF	16,404	14,444	9,701
All other agencies	14,018	10,615	9,832

SOURCE: National Science Foundation.

Sex of Graduate Students

In 1975 there were 52,600 women enrolled full time in graduate science departments, an increase of 13 percent over the 1974 total. This was more than double the 6-percent increase in male full-time graduate science students. In most instances, the rates of increase of women in the various fields of science exceeded those of men; the only exceptions being first-year entrants in the physical and environmental sciences and psychology (chart 4). The high rate of increase of women students was particularly notable in engineering, up 30 percent, even though enrollment of women in that field comprised only 5 percent of the total in 1975 and 4 percent in 1974.

Chart 4. Full-time graduate science enrollment, by sex, level of study, and area: 1974-75



SOURCE: National Science Foundation.

The number of women enrolled full time who were primarily supported by the Federal Government increased 10 percent in 1975, while the number of men receiving such support declined by 2 percent. An equal proportion of men and women received Federal support (23 percent). The number of women supported by institutional, State, and local government funds rose by 9 percent, compared with only 1 percent for men. Similarly, the support of women from other outside sources increased by 12 percent, while the number of men dropped by 1 percent. Self-support was the only source of funds where the rise in the number of men enrolled (23 percent) exceeded that for women (19 percent).

Citizenship

The 33,000 foreign students enrolled full time in graduate science programs in 1975 represented a 4-percent increase over the 1974 figure (table 4). The proportion of foreign students enrolled in 1975 (16 percent) still fell slightly below 1974 because enrollment of U.S. citizens increased at a greater rate (8 percent). The increase in full-time foreign student enrollment in 1975 was significant, however, since it marked a reversal of the continuous downward trend that began in 1971. Increases of about 7 percent each were reported in foreign students enrolled in the social sciences and engineering. Enrollment of students from abroad rose by almost 6 percent in the fields of psychology and mathematics, while there were small declines in the physical, environmental, and life sciences.

Table 4. Full-time graduate science enrollment, by area and citizenship: 1974-75

[Percent change]

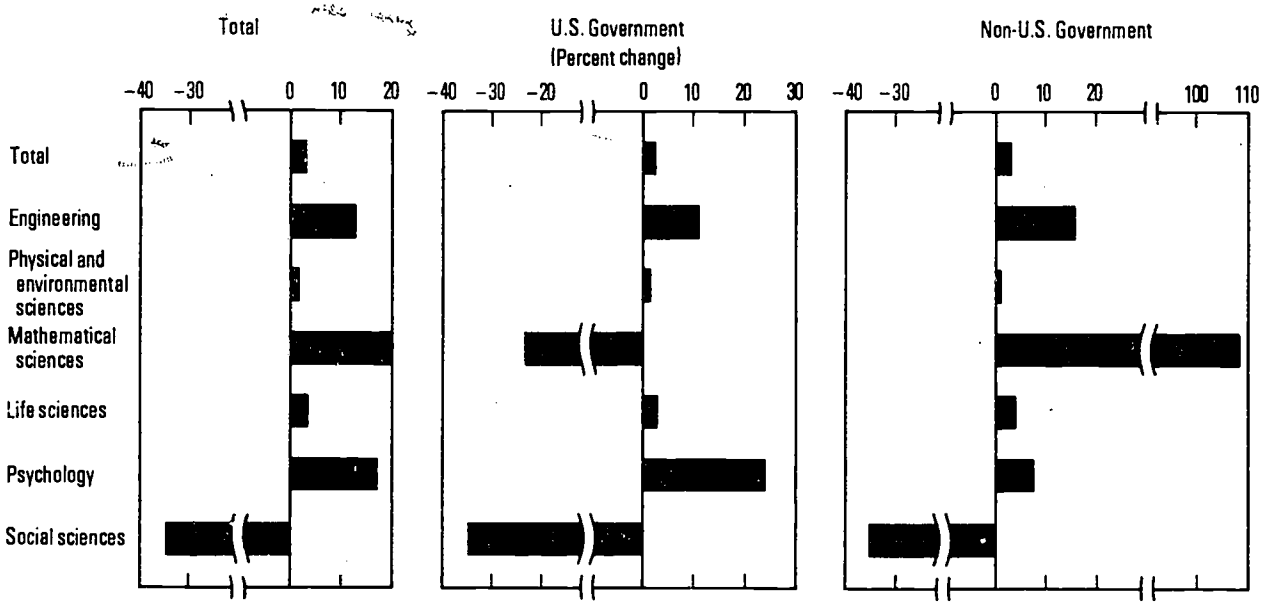
Area of science	Total	U.S. citizens	Foreign students
Total, all areas	7.5	8.3	3.9
Engineering	8.9	10.1	6.5
Physical and environmental sciences	1.4	1.8	−.3
Mathematical sciences	2.7	2.0	5.7
Life sciences	7.9	9.2	−1.0
Psychology	4.1	4.1	5.8
Social sciences	12.7	13.5	7.1

SOURCE: National Science Foundation.

Postdoctorals

The number of postdoctorals appointed by graduate science departments was 3 percent larger in 1975 than in 1974. By 1975 there were 17,100 postdoctorals employed in these departments. Almost three-fourths of the net increase in the number of postdoctorals occurred in the life sciences, where nearly two-thirds were employed. Increases ranged from 20 percent in the mathematical sciences to a decline of 35 percent in the social sciences (chart 5). Postdoctoral appointees supported by non-Federal sources rose slightly more (3 percent) than those with U.S. Government funds (2 percent). The number of "recent" postdoctorals who received their doctorate within the last five years rose 8 percent, a much higher rate than the national average.

Chart 5. Postdoctorals, by area of science and source of support: 1974-75



SOURCE: National Science Foundation.

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Detailed Statistical Tables (NSF 76-318) are available upon request from the National Science Foundation.