

AIP SURVEY FINDS RECESSION-RELATED INCREASE IN GRADUATE ENROLLMENTS

Each year the education and employment statistics division of the American Institute of Physics conducts a survey of all US physics departments to compile information on students enrolled and degrees granted during the preceding academic year. The latest such survey, which covers 1990-91, found an increase of 7.2% in first-year graduate physics enrollments (see table at right). This was the biggest rise since 1983-84 and was particularly notable because US citizens accounted for a growing rather than a falling proportion of the newly enrolling students: The number of US students in the entering graduate class increased by nearly 10% from 1989-90 to 1990-91.

Susanne D. Ellis, the principal author of the survey report, points out that the increase in graduate enrollments appears to be symptomatic of the economic recession and is not necessarily a harbinger of any fundamental new trends. The previous large jump in graduate enrollments—an increase of 8.5% in 1983-84—also took place during a period of economic contraction, and the current increases have been occurring in the context of a very general and very large swelling of graduate student ranks. Because of the difficulties graduating college students have had finding satisfactory jobs during the past two years, many have opted for graduate study. According to the Council of Graduate Schools in Washington, DC, graduate applications seem to have increased by between 10% and 15% in both 1989-90 and 1990-91.

Partly because of chronically trying conditions in the job market, undergraduate physics majors have been tending to extend their college education for an additional year, the AIP survey report notes. An added year permits students to gather experience working part time in the job market before encountering its rigors full blast. In 1990-91 more than 1100 physics majors were taking a fifth

Graduate physics enrollments* and degrees, 1979 to 1991

Academic year	Doctoral degrees granted	Graduate physics enrollments		
		Total	First year	Percentage of first year foreign
1979-80	912	9 647	2439	30.3
1980-81	927	9 934	2564	32.9
1981-82	912	10 173	2637	37.3
1982-83	921	10 429	2630	40.1
1983-84	971	10 922	2855	38.2
1984-85	972	11 337	2863	39.0
1985-86	1051	12 011	2981	42.3
1986-87	1105	12 616	3162	43.1
1987-88	1150	13 143	3274	40.6
1988-89	1112	13 361	3132	41.7
1989-90	1183	13 708	3059	43.6
1990-91	—	14 065	3278	42.3

*Includes part-time students.

year, double the number in the early 1980s. A similar trend is found among astronomy majors.

The survey report cautiously projects that the number of doctoral degrees granted in physics will edge up toward 1300 in 1994-95 from about 1200 currently. However, the report says "the increasingly diversified backgrounds of physics doctoral candidates make it more difficult to project the number of degree recipients for future years." Traditionally there has been a strong correlation between the number of first-year graduate students at PhD-granting institutions and the number of doctorates granted five years later, but "this formula makes no allowance for foreign students who enter doctoral programs with advanced standing either from a master's-granting institution or from a foreign university," the report states.

While foreign students have accounted for a smaller proportion of students at master's-granting institutions than at doctoral institutions, the foreign population at master's institutions has grown at a higher rate during the last decade. The survey report suggests that this may be

partly because demand for positions at US doctoral institutions, especially by mainland Chinese and other Asians, has continued to outstrip available openings.

Yet not all master's institutions are in a position to help accommodate the overflow. "For example," the report says, "one group of institutions offers only late afternoon or evening classes to part-time students who are full-time employees of industrial companies, and they have little or no financial support for their graduate students."

Foreign students continue to be more likely to take teaching assistantships, with US students snapping up the more desirable research positions. Foreign students accounted for 49% of TAs at doctoral institutions and 47% at master's institutions in 1990-91, while their respective shares in each student population were 42% and 36%.

With many undergraduate institutions trying to make introductory physics offerings more attractive and more accessible to non-science majors, the latest AIP survey distinguished for the first time among three types of college courses: calculus based, alge-

bra based and nonmathematical. (Previous surveys only distinguished between calculus-based and algebra-based courses.) Combined enrollment in the three types in 1990-91 was 325 000, with just over 70 000 in the nonmathematical courses. Engineering majors accounted for about 60% of the enrollment in the calculus-based courses, potential physical science majors for about a 25% of the enrollment—roughly 35 000 students, as in previous years.

The survey report contains detailed information on attrition in undergrad-

uate physics. Overall, of those registering as physics majors in their freshmen years, about two-thirds wind up getting their bachelor's degrees in physics. PhD-granting institutions have the highest retention rates and four-year colleges the lowest.

For copies of the full report on enrollments and degrees, which includes 13 tables and covers astronomy as well as physics, write to the AIP Division of Education and Employment Statistics, 335 East 45 Street, New York NY 10017.

—WILLIAM SWEET

more the importance of refocusing and repositioning technology periodically so that work remains "in the mainstream of technology."

—WILLIAM SWEET

EUROPEAN OPTICAL SOCIETY IS ESTABLISHED

Consistent with the general trend toward building and strengthening European institutions in physics (as, indeed, in all areas), a European Optical Society has been established. It represents a merger of the optics division of the European Physical Society and the European Federation of Applied Optics (EUROPTICA).

In 1987 EUROPTICA and the European Physical Society's optics division agreed with the International Society for Optical Engineering (SPIE) to organize a series of European optics conferences. The new society was formally founded at the fourth and most recent of those conferences, held in March in The Hague.

The founding members of the European Optical Society are 22 individuals representing the boards of 14 national optics societies in 13 countries. The society's program is to include sponsorship of meetings, publication of a journal and establishment of relations with other organizations serving similar objectives.

Concurrently with its foundation, the society concluded a "joint venture agreement" with SPIE, calling for SPIE to provide logistical support for a series of European Optical Society conferences, seminars and exhibits. SPIE assumes all financial risk for the first two years of the agreement, and after that profits will be divided between the two organizations.

The first meeting jointly sponsored by EOS and SPIE will be an international symposium on environmental sensing, which is to take place in late June next year in Berlin. The joint venture board also has announced three other events for 1992: a holographics meeting to take place at Imperial College in London in July, a conference on interconnects and packaging in Salzburg in late June, and a symposium on optical system design in late October in Berlin, cosponsored by the Optical Society of America.

Next year EOS will inaugurate a two-part optics journal. Part A, *Pure and Applied Optics*, will be published bimonthly by Britain's Institute of Physics. The editor is Mario Bertolotti of the University of Rome.

The Optical Society of America has

MAYO SUCCEEDS ROSS AS PRESIDENT OF AT&T BELL LABS

John S. Mayo, previously the senior vice president for network systems and network services at AT&T Bell Labs, has been named president of Bell Labs. He succeeds Ian Ross, who has been given the assignment as president emeritus of helping build AT&T's position in global markets. According to a press release issued by the company, Ross will work closely with AT&T Vice Chairman Randall Tobias, who has been "charged with accelerating all aspects of AT&T's globalization initiatives and plans."

Traditionally AT&T executives have retired rather punctually at age 65, and a retiring executive has customarily served for a transitional year or two as a kind of chairman overseeing his successor's work. What makes Ross's new assignment a little different, Mayo told PHYSICS TODAY in a telephone interview, is that Ross has the special mission of assisting in the company's globalization drive rather than the general task of overseeing his successor.

Mayo said that in addition to supplying equipment and providing long-distance communications overseas, the company needs to make "a more integrated thrust" in national and regional markets. What he seemed to be talking about was the design and construction of whole communications systems in regions such as Eastern Europe or in less developed countries.

Mayo has spent his whole career at Bell Labs, in a series of increasingly responsible positions. After earning his bachelor's, master's and doctoral degrees in electrical engineering at North Carolina State University in the early 1950s, he joined the lab in 1955 as a member of the technical team that built the first transistorized digital computer. Subsequently he

participated in the work that established the feasibility of digital transmission in local telephone networks, and he helped develop high-speed pulse-code modulation systems. He also worked on the Telstar satellite program, sonar, the development of the first long-distance digital switching systems, and a wide range of microelectronics technologies.

Mayo said he hopes, in the four years he expects to serve as president, to help the lab continue adapting to the imperatives of the competitive world, building on its position as the world's premier laboratory in electronics and communications. To that end, he said, it will be necessary to speed up both the rate of innovation and the rate of bringing innovations into the marketplace. He said he would do that by finding ways "to augment or outright replace the serial handoff processes of the past," so that many or all phases of the research and development process are done in parallel rather than sequentially.

We asked Mayo whether parallel R&D would require the company to be absolutely certain a line of work was actually going to reach the marketplace before it committed broad resources to supporting the work. He said not necessarily. Rather, the company would have to be willing to take a little more risk out front, do a lot of field testing and prototyping all along, and stop unsuccessful endeavors early, using the marketplace "to filter out what's good and what's no good."

Commenting on our recent report about Bell Labs (June, page 97), which discussed the implications for basic research of the shift at Bell Labs toward software and applications, Mayo said he would have emphasized