



by Mark C. Regets

# HAS THE USE OF POSTDOCS CHANGED?

Division of Science Resources Studies

# ISSUE BRIEF

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Both the percentage of S&E Ph.D.s ever in a postdoc and the median length of time spent in postdocs have risen over time.

## Electronic Dissemination

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A postdoctoral appointment, or "postdoc," has traditionally been defined as a temporary position, after completion of a doctorate, taken primarily for additional training—a period of advanced professional apprenticeship. More recently, however, there are reports that new Ph.D.s are turning to postdocs not primarily for training, but as a form of low-pay<sup>1</sup> employment while waiting for a more permanent professional position. This issue brief examines the self-reported postdoc histories of holders of science and engineering Ph.D.s from U.S. schools to address the question whether the use of postdocs has changed.

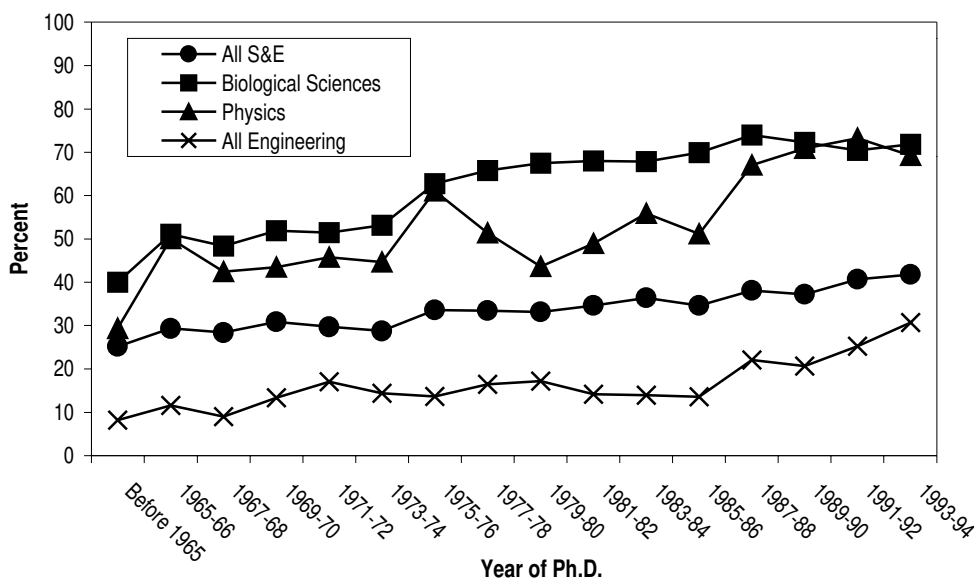
## Postdocs Are an Increasingly Common Experience

About 42 percent of all U.S. science and engineering (S&E) Ph.D.s who received their degrees in 1993-94 reported having a current or former postdoctoral appointment by April

1995. The percentage of all S&E Ph.D.s who ever had a postdoc position has risen across graduation cohorts for at least three decades, from 25 percent for the 1965-66 graduation cohort to 42 percent for the 1993-94 cohort (figure 1).

Also shown in figure 1 are the postdoc rates for Ph.D. cohorts in the two fields with the highest rate of postdoc use, biological sciences and physics, as well as the aggregate for all engineering fields. Both the biological sciences and physics showed robust increases of postdoc use since the 1965-66 Ph.D. cohort: biological sciences from 51-72 percent, physics from 50-69 percent. Postdocs are notably gaining in importance for Ph.D.s in engineering fields. Postdoc use for engineering Ph.D.s went from 12 percent of 1965-66 Ph.D.s to 31 percent of the 1993-94 cohort. Seven fields, which together ac-

Figure 1. Percentage of science and engineering Ph.D. cohort ever in a postdoctoral position



SOURCE: National Science Foundation, Division of Science Resources Studies, Survey of Doctorate Recipients, 1995

<sup>1</sup>Across all S&E fields, the median postdoc salary for recent Ph.D.s was \$28,000, exactly half the median salary of recent S&E Ph.D.s in industry and almost one-third less than for those in tenure track positions.

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counted for over 90 percent of all S&E postdoctorates in 1995, all showed a similar pattern of increasing postdoc use (table 1).

### Is Increased Use of Postdocs Due to Labor Market Conditions?

In general, the growth of postdoc use has been too steady over the last thirty years to attribute this development to short-term changes in labor market conditions. Physics may represent a pos-

sible exception: increases in postdoc use followed the end of the Vietnam War (1975-76 cohort) and the Cold War (1987-88 cohort).

These two events may well have had particular employment effects in physics. In the biological sciences, postdoc use peaked at 74 percent for the 1987-88 cohort, but since a few postdocs are taken in mid-career, the later graduation cohorts may eventually exceed this rate.

**Table 1. Postdoc experience of selected graduation cohorts in high-postdoc fields**

S&E Fields	Postdoc Characteristics	Year of Ph.D.					
		Before 1965	1965-74	1975-84	1985-88	1989-91	1992-94
All S&E Fields.....	% Ever in Postdoc	25.0	29.2	34.0	36.3	37.9	41.3
	Median Months, All Postdoc Positions	20	23	26	29	29	18
	% Because Other Employment Not Available	3.8	11.7	12.8	12.6	15.4	17.3
Agricultural Science....	% Ever in Postdoc	14.0	19.2	27.6	35.0	43.9	43.9
	Median Months, All Postdoc Positions	ns	25	25	22	20	20
	% Because Other Employment Not Available	ns	23.4	46.0	34.9	30.8	26.7
Biological Sciences....	% Ever in Postdoc	39.9	51.2	66.3	71.8	71.5	71.0
	Median Months, All Postdoc Positions	24	28	38	45	46	23
	% Because Other Employment Not Available	2.6	6.3	8.9	10.2	8.8	8.8
Chemistry.....	% Ever in Postdoc	30.5	50.6	46.1	55.2	57.7	63.0
	Median Months, All Postdoc Positions	16	23	22	24	22	19
	% Because Other Employment Not Available	6.5	16.9	15.8	13.7	13.9	21.5
Earth, Atmospheric, and Ocean Sciences...	% Ever in Postdoc	15.3	21.4	37.3	40.0	52.3	48.5
	Median Months, All Postdoc Positions	ns	12	16	19	23	17
	% Because Other Employment Not Available	ns	14.9	24.6	18.9	17.1	18.0
Engineering (All Fields).....	% Ever in Postdoc	8.2	13.5	15.1	18.4	22.6	28.3
	Median Months, All Postdoc Positions	ns	12	12	17	15	14
	% Because Other Employment Not Available	ns	25.7	17.4	20.4	26.8	35.0
Physics.....	% Ever in Postdoc	29.3	44.4	52.7	59.0	68.1	72.9
	Median Months, All Postdoc Positions	23	24	25	32	34	23
	% Because Other Employment Not Available	3.4	15.2	15.8	9.5	27.9	24.0
Psychology.....	% Ever in Postdoc	22.5	21.3	25.3	27.3	23.6	31.8
	Median Months, All Postdoc Positions	19	13	20	16	15	12
	% Because Other Employment Not Available	3.9	3.7	9.0	7.3	4.0	7.4

**SOURCE:** National Science Foundation, Division of Science Resources Studies, Survey of Doctorate Recipients, 1995

**NOTE:** Median months in postdocs is the sum of the lengths of all reported postdoc experiences for those with one or more postdocs. Thus data on more recent cohorts, and 1992-94 data in particular, are not strictly comparable to earlier years because of incomplete accounting of ongoing and future postdoc experiences. These seven fields account for over 90 percent of 1995 postdocs with Ph.D.s from U.S. institutions. ns: sample size < 50

*Only 17 percent of 1995 postdocs reported that they were in postdocs because other employment was not available.*

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**More Time is Spent in Postdoctoral Appointments**

The length of time S&E Ph.D.s spent in postdocs has also increased over time. Half of the postdocs whose doctorates were earned before 1965 spent 20 or fewer months in that type of appointment. For those in the 1989-91 graduation cohort, this figure (the median) had risen to 29 months, and 6 percent of them were still in postdoc positions by April, 1995. Although additional time could be spent in a postdoc at any point in an individual's career, estimates for members of the 1992-94 graduating cohort (18 months in postdocs) are noticeably lower because 25 percent were still in postdoc positions. This median number for all S&E fields combined will inevitably rise, as some of these appointments continue (table 1).

The increase in median length of postdoc experience was greatest in the biological sciences—rising from 24 months for the pre-1965 cohort to 46 months for the 1989-91 cohort. However, for some fields—agricultural sciences, chemistry, and psychology—median postdoc length stayed roughly the same or even declined somewhat for Ph.D.s graduating after 1965. Postdocs in engineering fields remain relatively short, reaching only 17 months for the 1985-88 cohort.

**Postdoc Positions For Want of More Desirable Employment?**

Those with postdoctoral appointments are asked to report their reasons for accepting this position; one choice is “other employment not available.” The share who selected this choice as the reason for their final postdoc appointment peaked at 20 percent for the 1971-72 graduation cohort, declined in the 1970's, and has been rising again slowly for those graduating since the early 1980's<sup>2</sup> (table 1 and figure 2).

<sup>2</sup> Estimated standard errors on the percentage of total postdocs reporting “other employment not available” ranged from 0.6 to 1.3 percentage points for the various graduation cohorts. For biological sciences the standard error ranged from 0.7 to 1.4 percentage points, and for physics, from 3.0 to 4.4 percentage points.

Trends in the use of postdocs as employment-of-last-resort differ greatly by field. In physics, it has varied greatly over time with approximate peaks for the 1971-73 (25 percent) and 1989-91 (29 percent) graduation cohorts. But in the biological sciences, “other employment not available” was reported by only around 10 percent of each graduation cohort over the last 20 years. In the other major postdoc fields (agricultural science; earth, atmospheric and ocean sciences; and in psychology) the highest reported rates occurred in the late 1970's or early 1980's.

Most respondents report reasons for accepting postdoctoral appointment that are consistent with the more explicit purposes of the position, such as advanced training in their field, training outside their field, or working with a specific person. On the other hand, reporting that no other job was available may be a difficult step for some respondents. The data reported here suggest, however, that the rise in the number of postdoctoral appointments is not mainly due to insufficient other employment opportunities.

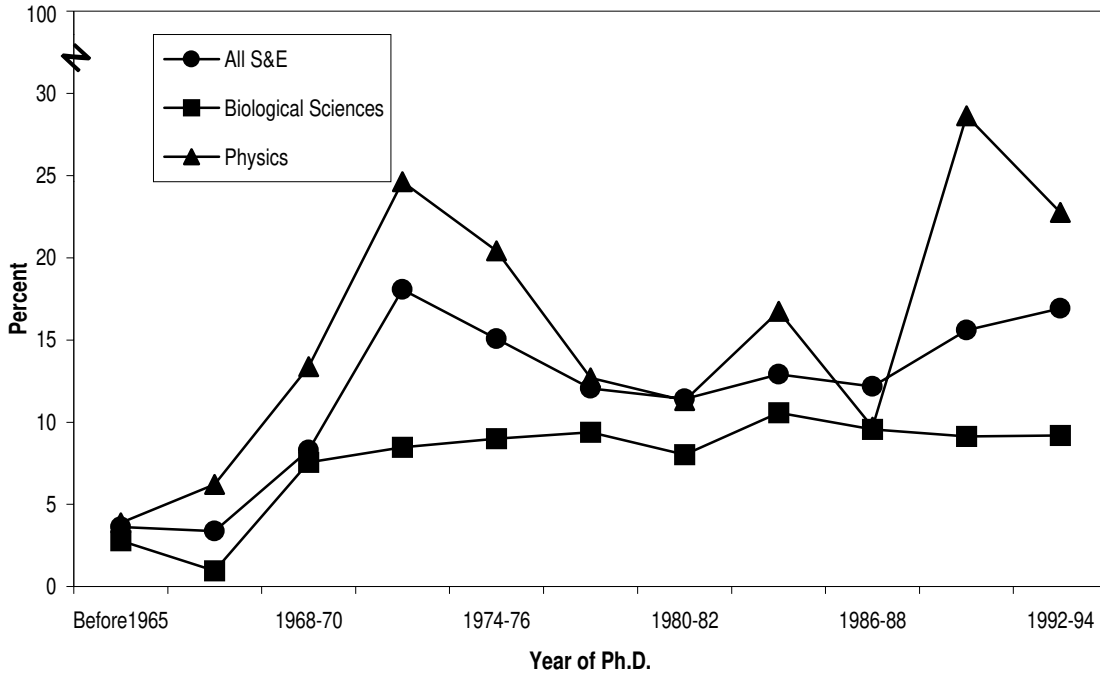
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**Figure 2. Percentage of those with any postdoc experience who took last postdoc for lack of other employment opportunity**



SOURCE: National Science Foundation, Division of Science Resources Studies, Survey of Doctorate Recipients, 1995

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