

Scientists' Earnings

BY JOHN K. STEINMEYER AND KENNETH J. HOFFMANN

Background

National career information on scientists in fields such as agriculture, biology, chemistry, geology, astronomy, and computer science is published in the Bureau's *Occupational Outlook Handbook*. Yet, until recently there has been little statistical information published on the earnings of scientists by localities.

The Bureau's Occupational Compensation Survey (OCS) program began publishing earnings information for professional occupations by locality in 1991 to support the implementation of the Federal Employees Pay Comparability Act of 1990. At that time, the survey included chemists and engineers, but not the overall occupation of scientist. (See box.) The chemist job, which had been surveyed on a national basis, was dropped almost immediately from the OCS because there were not enough data to publish by level of work and locality, as required by the President's Pay Agent¹ for setting Federal salaries.

The Bureau began exploring ways to survey additional professional jobs. Although the survey included computer programmers, analysts, supervisors, nurses, and engineers, it did not survey many of the jobs for which Federal salaries were being set.

Previously collected data showed that many employers were classifying professional workers in broad generic jobs rather than in specialties. For example, a company might group physicists, chemists, and engineers under a broad title such as scientist. In an effort to survey more professional jobs, BLS re-instituted research on scientists as a job classification.

In 1994, new job descriptions for scientists were tested. They were designed to:

- Include jobs in specific scientific disciplines which had been traditionally part of a more general occupational classification by employers;

John K. Steinmeyer and Kenneth J. Hoffmann are economists in the Division of Compensation Data Analysis and Planning, Bureau of Labor Statistics. Telephone (202) 606-6201.

Chemists and Engineers: A Look at Past Data

The Bureau began surveying chemists and engineers nationally in the first Professional, Administrative, and Technical survey conducted in the winter of 1959-60. At that time, the survey of all metropolitan areas combined (excluding Alaska and Hawaii) reported about 29,000 chemists and more than 275,000 engineers. Six levels of chemists and engineers were studied in the initial survey; among these levels chemists' earnings ranged from 3 to 13 percent less than engineers'.

When chemists were last surveyed in 1991, the number of chemists had increased by about 50 percent while the number of engineers had more than doubled. Chemists' earnings however, were 5 percent higher than engineers in the upper levels of responsibility. At the lower levels, they remained 1 to 16 percent below the averages of engineers.

Occupational Compensation Surveys

Survey area	Reference month	Bulletin number
Alaska	July, 1996	3085-32
Anchorage, AK	July, 1996	3085-30
Boston-Worcester-Lawrence, MA-NH-ME-CT	June, 1996	3085-29
Charlotte-Gastonia-Rock Hill, NC-SC	October, 1995	3080-47
Chicago-Gary-Kenosha, IL-IN-WI	June, 1996	3085-33
Columbus, OH	January, 1996	3085-2
Dallas-Fort Worth, TX	March, 1996	3085-9
Denver-Boulder-Greeley, CO	January, 1996	3085-1
Hartford, CT	March, 1996	3085-5
Hawaii	August, 1996	3085-37
Honolulu, HI	August, 1996	3085-34
Huntsville, AL	March, 1996	3085-6
Miami-Fort Lauderdale, FL	November, 1996	3085-47
Nashville, TN	May, 1996	3085-15
Omaha, NE-IA	March, 1996	3085-14
Orlando, FL	April, 1996	3085-20
Portland-Salem, OR-WA	July, 1996	3085-28
Sacramento-Yolo, CA	March, 1996	3085-17
San Francisco-Oakland-San Jose, CA	March, 1996	3085-18
San Juan-Caguas-Arecibo, PR	October, 1996	3085-44
Scranton-Wilkes-Barre-Hazleton, PA	March, 1996	3085-11
Seattle-Tacoma-Bremerton, WA	November, 1996	3085-48
St. Louis, MO-IL	March, 1996	3085-19

- Provide a sub-classification for workers in physical and biological disciplines; and
- Provide a separate sub-classification for workers specializing in the computer and engineering fields while retaining separate job definitions for engineers, who can be identified as such, computer programmers, computer systems analysts, and computer systems analyst supervisor/managers.

To meet the needs of the Pay Agent, the scientist job description was divided into eight levels of difficulty, each level corresponding to a pay grade in the Federal General Schedule, the system used to classify Federal white-collar workers. Like the engineer's job, the scope and complexity of the work distinguished the levels of difficulty. In general, levels 1 and 2 represented the entry levels, levels 3 and 4 the journey levels, and levels 7-8 the authorities in the field. (These generalizations do not apply in every type of business.)

At the request of the Pay Agent, certain science-related jobs were excluded. Among these were science technicians, physicians, university researchers and teaching staff, and scientists primarily supervising operating or maintenance functions.

This article briefly compares the OCS wage data that were collected in 23 survey areas in 1995-96.² The data were weighted to represent over 103,000 scientists in establishments employing 50 workers or more in all industries excluding agriculture, the Federal Government, and private households.³

Data overview

Overall average weekly pay for the scientist occupation was available in 17 of the 23 areas surveyed. Pay rates varied widely across areas. (See table 1.) Survey areas in

Table 1. Scientists' average weekly pay and overall ranking, selected areas, 1996

Area	Average weekly pay	Ranking
San Francisco-Oakland-San Jose	\$1,291	1
Anchorage	1,289	2
Alaska	1,181	3
Denver-Boulder-Greeley	1,123	4
Boston-Worcester-Lawrence	1,085	5
Chicago-Gary-Kenosha	1,049	6
Seattle-Tacoma-Bremerton	1,036	7
Sacramento-Yolo	1,006	8
Hartford	1,002	9
Columbus	980	10
Scranton-Wilkes-Barre-Hazleton	915	11
Miami-Fort Lauderdale	834	12
Dallas-Fort Worth	832	13
Hawaii	824	14
Honolulu	804	15
Nashville	795	16
Orlando	771	17

the western region of the United States generally ranked relatively high in overall weekly pay, while areas in the southern region generally ranked low. Survey areas outside the contiguous United States showed averages at the extremes. In Anchorage and the State of Alaska, scientists' average weekly pay was higher than all other localities except the San Francisco area, while Hawaii and Honolulu ranked fourteenth and fifteenth out of the 17 localities.

In eight of the survey areas, private industry data and State and local government data were available for direct comparison. The private sector overall average was higher than government in all areas, ranging from 11 percent in Denver to 61 percent in Hawaii. However, in San Francisco, even though the overall average for scientists in the private sector was 18 percent greater than for scientists in the government sector, the physical/biological scientists in the public sector averaged 6 percent above their counterparts in the private sector.

Data by work level

Information by work level is often preferred to overall averages because it specifies pay for differing complexities of work. For example, the overall average for scientists in the San Francisco area was about 28 percent higher than the overall average in nearby Sacramento. Yet the differences between the published individual levels for the two areas only ranged from 10 to 23 percent. The overall average was higher for San Francisco because, on average, workers there performed work at higher levels of pay and complexity.

In the 23 survey areas, data were collected for 8 levels of scientists but were insufficient for publication at levels 6 and 7 in all except the large metropolitan areas of Boston, Chicago, Denver, San Francisco, and St. Louis. Although data were collected at level-8, they did not meet the Bureau's standards for publication in any area.

Average pay differed considerably by level, with workers at the highest published levels typically earning average salaries that were double those of workers classified at the entry levels. For example, level-7 scientists in San Francisco averaged \$2,107 per week, compared to \$831 for their level-2 counterparts. Similarly, in Columbus, Ohio level-5 scientists averaged \$1,264 per week, versus \$661 for their level-1 counterparts.

Data by occupation

Computer/engineering scientists. Among computer/engineering scientists, western areas also showed relatively higher wages. Eight areas had overall data published for this sub-group. (See table 2.) San Francisco's overall average weekly pay was not only 16 percent higher than the second highest average, Denver, but it was 71 percent higher than the lowest average, Nashville.

Physical/biological scientists. There were 16 survey areas

Table 2. Computer/engineering scientists' average weekly pay and overall ranking, selected areas, 1996

Area	Average weekly pay	Ranking
San Francisco-Oakland-San Jose	\$1,381	1
Denver-Boulder-Greeley	1,193	2
Portland-Salem	1,120	3
Seattle-Tacoma-Bremerton	1,119	4
Chicago-Gary-Kenosha	1,049	5
Hartford	1,027	6
St. Louis	999	7
Nashville	807	8

Table 3. Physical/biological scientists' average weekly pay and overall ranking, selected areas, 1995-96

Area	Average weekly pay	Ranking
Anchorage	\$1,289	1
Alaska	1,178	2
Denver-Boulder-Greeley	1,057	3
San Francisco-Oakland-San Jose	1,044	4
Boston-Worcester-Lawrence	1,031	5
Columbus	1,018	6
Sacramento-Yolo	1,006	7
Huntsville	952	8
Charlotte-Gastonia-Rock Hill	939	9
Seattle-Tacoma-Bremerton	932	10
Scranton-Wilkes-Barre-Hazleton	854	11
Dallas-Fort Worth	832	12
Portland-Salem	790	13
Miami-Fort Lauderdale	738	14
Hawaii	729	15
Honolulu	710	16

for which average overall pay data were published for physical/biological scientists. The four top paying areas were the same as for scientists, but with the order changed. (See table 3.) The average weekly pay for Anchorage physical/biological scientists exceeded the average weekly pay for the same group in Honolulu by 82 percent.

Computer/engineering and physical/biological scientists. There are four survey areas (all in the West) where overall average pay was published for both scientist sub-groups. In all four areas, the computer/engineering scientists showed higher average pay than did the physical/biological scientists to this extent: Denver, 13 percent; Seattle, 20 percent; San Francisco, 32 percent; and Portland, 42 percent.

—ENDNOTES—

¹ The Pay Agent is a group designated by the President to advise on locality pay disparities and make recommendations for appropriate comparability payments for Federal General Schedule (white-collar) workers.

² One survey area, Seattle-Tacoma-Bremerton, was surveyed twice, both in 1995 and 1996. Individual surveys had average payroll periods varying from October 1995 to November 1996. Data were not adjusted for differences in timing of surveys. Some rankings of areas may have been different if adjustments had been made. Pay comparisons may be affected by sample error. In most cases where sample error was computed, standard errors for survey jobs were between 1 and 3 percent of the published average salary, and

Average pay comparison of scientists and engineers

The professional occupation in the Occupational Compensation Survey most similar to the scientist occupation was engineer. Both professions require similar backgrounds, are recruited nationwide (as seen in advertisements in the national media), and are studied with the same number of levels distinguished in the same way.

There are 16 survey areas where overall average wages were available for both groups. In these areas, pay data were collected and weighted to represent more than 182,000 engineers. Of the 16 areas, 15 (all but Scranton) had higher average wages for engineers. The greatest disparity was in Dallas, where the premium paid to engineers was 43 percent. Dallas engineer's average wage ranked fourth highest among engineers, although Dallas scientists ranked twelfth among scientists. Two survey areas, Denver and Scranton, showed little difference in average pay. Engineers in Denver averaged \$6 per week more than scientists, while scientists in Scranton averaged \$4 per week more than engineers. In all remaining areas, the pay of engineers was appreciably higher than that of scientists.

Comparing surveys

With the coming of the National Compensation Survey (NCS), initiated by BLS in 1996, came major differences in the way occupational wage data are collected. Under OCS, the occupations surveyed were limited to a preselected list, which represented a small subset of all occupations in the economy. Under NCS, occupations are selected using probability techniques from a list of all occupations present in each establishment. In the NCS surveys completed for the San Francisco-Oakland-San Jose and the Washington, DC-Baltimore, MD CMSA's, only mathematical and computer scientists and natural scientists were surveyed.

There is also a different way of determining job levels. Under OCS, job levels were based on narrowly defined descriptions that were not comparable across occupations. In NCS, job levels are based on generic standards that apply to all occupational groups.

Average earnings were published for natural scientists in 7 of the first 16 NCS publications. Hourly earnings ranged from \$18.36 in the Washington-Baltimore CMSA to \$29.76 in the New York-Northern New Jersey-Long Island CMSA.

less than 5 percent in all cases. Thus, differences of a few percentage points between average salaries are probably not statistically significant. The rankings presented here are of the published data, without regard to sampling error.

³ Pay tables showing average pay for scientists in the 1996 surveys (except Anchorage and Honolulu) also appeared in the Fall, 1997 issue of *Compensation and Working Conditions*, pp. 101-103. Complete survey results for each of the areas along with job and level descriptions and survey methodology are available from BLS Publication Sales Center, PO Box 2145, Chicago, IL 60690; telephone (312) 353-1880; or on the BLS Internet site at: <http://www.bls.gov/ocshome.htm>