



SALARY SURVEY

Joblessness among chemists, especially those in industry, surges while salary gains for those with jobs remain strong and across the board

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THE MEDIAN SALARY FOR AMERICAN CHEMICAL SOCIETY members who are chemists and have a full-time job in the U.S. has posted a sixth consecutive year of solid growth. The increase this year is almost four times the unusually low rate of inflation.

Meanwhile, unemployment among chemist members has reversed a substantial year-earlier decline and spiraled to its highest level since ACS started measuring it annually and on a reasonably consistent basis 30 years ago.

These are the bifurcated major findings from the 2002 edition of ACS's survey of the salary and employment status of its domestic members.

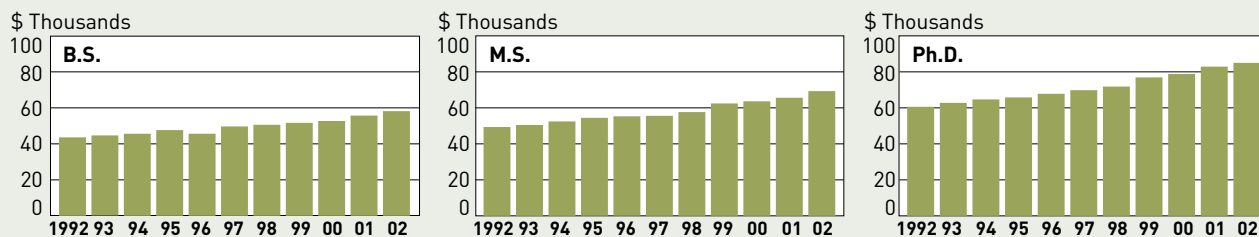
The median salary of all chemists with full-time jobs responding this year is \$76,500. This is 4.8% higher than the \$73,000 median from the 2001 survey. Both surveys gathered data as of March 1. Over the same March-to-March period, the Consumer Price Index increased by about 1.3%.

For those with a bachelor's degree as their highest degree, the gain was 5.5%, from \$55,000 to \$58,000 this year. For those with a master's, it was 5.4%, from \$65,000 to \$68,500. Ph.D. salaries posted a 3.6% increase, from \$82,200 to \$85,200.

Respondents to this year's survey who reported their salaries as of both March 1, 2001, and March 1, 2002; who worked for the same employer over the period; and who received a raise posted a mean increase of 6.7%. If those who met these employment criteria but did not get a raise are included, the increase is a lower 5.7%.

SALARIES FOR THE DECADE

Upward trend since the mid-1990s continues in 2002



NOTE: Median base annual salary for chemists employed full time as of March 1 each year. See table on page 40.

On the darker side, 3.3% of the chemists responding to this year's survey indicated that they were unemployed but seeking employment. This tops the previous high of 3.2% set in 1972.

Many factors doubtless contribute to this apparent record level of unemployment for chemists. One is the higher turnover rate

inherent in today's job market. Although job opportunities in chemical manufacturing have declined, expanding career choices for chemists in a widening range of scientific endeavors—including health-related fields, biotech, and materials sciences—have rendered the chemistry job market increasingly more lively and volatile.

But the employment situation for chemists is not yet as bad as it was in the late 1960s and early '70s. At that time, it was extremely depressed: Anecdotally, Ph.D. chemists were driving cabs. The situation triggered the establishment or expansion of a number of career-related ACS services, including the annual salary surveys.

The National Employment Clearing House at the spring ACS national meeting in Orlando, Fla., this April was active with an adequate number of job openings. An important indicator will be how strong this premier job fair for chemists will be at the society's fall meeting in Boston later this month.

Be that as it may, the job status for chemists has unquestionably weakened substantially and suddenly since early last year, when it was the strongest it had been in a decade with essentially full employment. The more than doubling of the unemployment rate among chemists from the 1.5% of those responding to the 2001 survey to this year's 3.3% is unprecedented. For industrial chemists, the upsurge is from 1.7% to 4.1%.

This jarring deterioration is confirmed by the 6.2% of respondents to this year's survey indicating that they were unemployed at some time during 2001. This number is up from 4.9% unemployed at some time during 2000, and the rate will certainly be even higher for all of this year. For chemists with bachelor's degrees, the 2000–01 increase was from 6.0% to 8.9%.

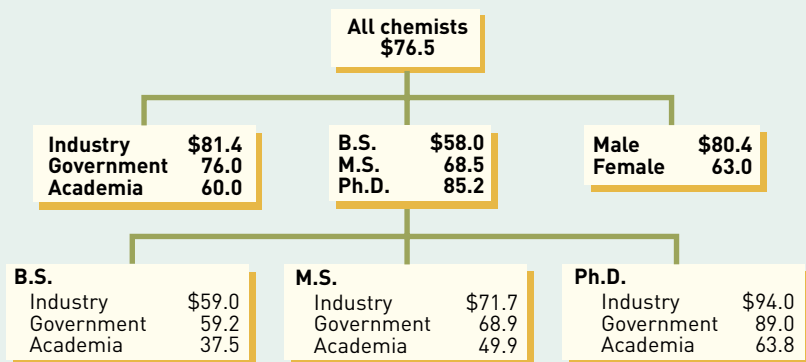
Also, the volume of employment advertising in C&EN—traditionally a reliable qualitative indicator of the state of the job market—has declined significantly from the very high levels of 2000 and 2001.

An unemployment rate of 3% or even 4% is very low by national standards. So why all the concern when the rate for the chemistry profession moves up into this range?

Very likely, the jobless rates for chemists

MEDIAN SALARIES

Ph.D. chemists earn about 50% more than those with bachelor's degrees



NOTE: Median base annual salary in thousands of dollars for chemists employed full time as of March 1, 2002.

SALARY GAINS FOR INDIVIDUALS

Biggest percentage gains come in the early years

	MEDIAN SALARY INCREASES				MEAN SALARY INCREASES			
	B.S.	M.S.	PH.D.	TOTAL	B.S.	M.S.	PH.D.	TOTAL
ALL CHEMISTS	4.9%	4.8%	4.8%	4.8%	6.7%	6.3%	6.7%	6.7%
BY EMPLOYMENT								
Industry	4.9	4.8	5.0	5.0	6.8	6.5	7.0	6.9
Government	5.0	4.9	4.9	4.9	6.6	6.4	6.8	6.7
Academia	5.2	4.0	4.2	4.2	6.1	4.8	6.0	5.9
BY AGE								
20–29	7.7	7.0	8.0	7.5	9.6	8.3	11.5	9.7
30–39	5.3	5.8	6.0	5.8	7.1	7.9	8.0	7.8
40–49	4.2	4.6	4.8	4.6	5.6	6.0	6.7	6.4
50–59	4.0	4.0	4.3	4.2	5.8	5.0	5.8	5.6
60–69	3.5	3.8	3.9	3.8	4.4	5.7	5.1	5.1

NOTE: Salary increase between March 1, 2001, and March 1, 2002, for individual chemists employed full time by the same employer over the period. Includes only those who received a salary raise.

EMPLOYMENT STATUS

Unemployment among chemists more than doubled in past year

EMPLOYMENT STATUS ^a	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Employed full time	93.4%	92.8%	91.9%	91.1%	91.5%	93.5%	92.9%	92.9%	92.9%	94.6%	92.2%
Employed part time	2.2	2.2	2.5	2.7	2.7	2.1	2.5	2.7	3.0	2.5	3.0
Postdoctoral or fellowship	2.4	3.0	2.9	3.6	2.8	2.3	2.3	2.1	2.1	1.4	1.5
Unemployed	1.9	2.0	2.7	2.6	3.0	2.0	2.3	2.3	2.0	1.5	3.3

^a As of March 1 each year. Based on population that excludes those fully retired or otherwise unemployed but not seeking employment. See graph on page 43.

determined by ACS are consistently somewhat low in absolute terms because of greater reluctance by those unemployed to respond to the survey. However, the rates measured by ACS have always served as a very reliable—if not totally quantitative—barometer of the employment situation for chemists.

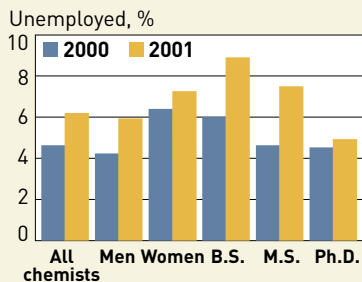
Over the years, 1% unemployment has indicated full employment, and 3% or more has signaled actual or potential serious problems. The data suggest that, in bad times, about three times as many chemists are unemployed as in good times. It may be that the true unemployment rate for chemists lies somewhere between the 1 to 3% range and the 2 to 6% range.

The employment status of chemists has been following an uncertain and not-easy-to-explain path for the past decade or more. According to ACS, unemployment held at 1.0 or 1.1% from 1987 to 1990. This level was close to the all-time low of 0.9% set in 1980. It then rose fairly steadily for six years to reach 3.0% in 1996.

The chemical job market then began to respond to the economic boom that had started three years earlier. Joblessness was at 2.0 to 2.3% from 1997 through 2000. Then, in 2001, just as the longest and biggest economic expansion in U.S. history was petering out, it dipped to the more healthy 1.5%.

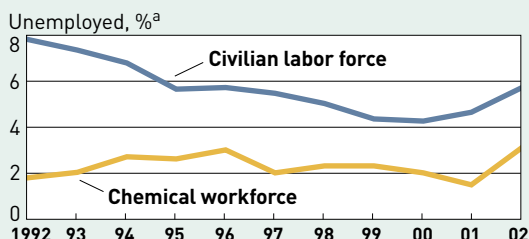
JOBLESSNESS

More chemists were unemployed at some time in 2001 than in 2000



UNEMPLOYMENT

Chemists are caught in general turmoil



^a Unemployment rates as of March 1 each year.
SOURCES: ACS survey and Bureau of Labor Statistics

The belatedness of this response to the boom raised questions about the prognosis for the job market for chemists, especially if the economy remains sluggish (C&EN, Aug. 20, 2001, page 51).

The ACS survey last October of the salaries and employment status of 2000–01 chemistry and chemical engineering graduates indicated that they did reasonably well with pay and with finding jobs (C&EN, March 18, page 51). However, they did not do as

CHEMICAL ENGINEERS

They're Better Paid Than Chemists And More Likely To Be Working In Industry

Only 368, or 4%, of responses to this year's salary survey were from society members working as chemical engineers. This puts severe limits on the amount of analysis that can be done on the returns.

However, the sample is big enough to confirm the traditional pattern for chemical engineers, compared with chemists, of fewer women, fewer jobs in academia, and substantially better salaries at all degree levels.

Only 17% of chemical engineers, compared with 25% of chemists, are women. The breakdowns by race for both disciplines are very similar, with 2% being black; less than 1%, American Indian; and almost 12%, Asian.

By type of employer, 77% of chemical engineers, compared with 66% of chemists, work for industry. A lower 14% of chemical engineers, compared with 25% of chemists, are in academia. Government claims 6% of chemical engineers and 8% of chemists.

The biggest difference between the two disciplines is in median full-time salaries. The medians for all chemical engineers who have bachelor's and master's de-

grees—\$70,500 and \$85,600, respectively—compare with the \$58,000 and \$68,500, respectively, for chemists. These differences reflect the wider acceptance of the chemical engineering B.S./B.A. and M.S. as terminal, professional degrees.

At the Ph.D. level, the median for all chemical engineers—\$98,400—comfortably exceeds the \$85,200 for all chemists. For those with Ph.D.s in academia, the difference is seemingly especially large—\$100,500 for chemical engineers and \$63,800 for chemists.

This difference indicates that the relatively few academic chemical engineers who are ACS members are considerably more likely to be full professors than are the academic chemists who are members. The median salary for chemists is lowered by the relatively larger percentage of younger and generally less well paid academics who are members.

Within the noise level of the small sample, the employment status of chemical engineers this year is very similar to that of chemists: 93% are employed full time, 3% have part-time jobs, 1% are postdocs, and 3% are unemployed but looking for employment.

well as the 1999–2000 class had done. This survey hinted that incipient weaknesses were already developing last fall in the overall job situation for chemists.

Recent data from the National Association of Colleges & Employers also indicate weakness. The average salary offer to 2001–02 bachelor's-level chemists who have already graduated—\$35,900—is down 8% from the year-earlier level.

The depressing trend for employment prospects indicated by the ACS surveys came at a time when the total number of unemployed in the U.S. rose from a seasonally adjusted 6.06 million in March 2001 to 8.11 million one year later. This pushed the overall unemployment rate up from 4.3% to 5.7%.

THE SURVEY. This year's survey is based on 9,499 responses to 22,172 questionnaires sent to a random sample of approximately 20% of ACS members residing in the U.S.; less than 70 years old; and not in the emeritus, retired, or student member categories. This is a 43% response rate.

Of the responses, about 700 were from members who turned out to be fully retired or otherwise unemployed and not seeking employment. This left just over 8,400 responses from working chemists and just under 400 from working chemical engineers.

ACS defines the workforce as those with full- or part-time jobs, on postdocs or fellowships, or unemployed but seeking employment. The fully retired and others not seeking employment are excluded.

ACS defines chemists as those who fall into either of two categories. One is those who identify any one of 15 chemical sub-disciplines or specialties spelled out in the questionnaire as the most closely related to their current or most recent job. The oth-

DEMOGRAPHICS OF WORKING CHEMISTS

Women are now one-quarter of all chemists and more than one-third of those with bachelor's and master's

	B.S.	M.S.	PH.D.	TOTAL
BY GENDER				
Male	65.8%	66.3%	80.6%	75.0%
Female	34.2	33.7	19.4	25.0
BY ETHNICITY				
Hispanic	3.0	2.1	2.2	2.3
BY RACE				
American Indian	0.4	0.3	0.3	0.3
Asian	5.7	10.6	14.1	11.7
Black	2.7	2.2	1.3	1.7
White	88.9	84.2	82.4	84.1
Other	2.2	2.7	2.0	2.2
BY EMPLOYER				
Business/industry	85.1	73.3	57.3	66.0
Government	8.4	9.4	6.8	7.6
Self-employed	1.4	2.1	1.2	1.4
Academia	5.0	15.2	34.6	25.0

er is those who have their highest degree in chemistry and identify administration, computer science, law, or "other non-chemistry activities" as their specialty.

Chemical engineers are those who identify chemical engineering as their specialty, even if their highest degree is in chemistry. By the same logic, those with chemical engineering degrees who meet the definition of a chemist are counted as chemists.

Since 1996, both of ACS's annual salary and employment surveys—of members in the domestic workforce and of new graduates—have been conducted by Mary W. Jordan, senior manager, workforce programs, of the society's Department of

AGE

Chemists as a group continue to get older

	MEAN AGE				MEDIAN AGE			
	1990	2000	2001	2002	1990	2000	2001	2002
ALL CHEMISTS	41.3	44.8	44.7	45.1	41	45	45	45
BY GENDER								
Male	42.6	46.3	46.3	46.5	42	46	47	47
Female	36.3	40.4	40.8	41.1	35	39	40	40
BY DEGREE								
B.S.	37.5	40.9	40.7	41.0	35	41	41	41
M.S.	41.2	44.6	44.5	45.2	41	45	45	46
Ph.D.	42.9	46.2	46.2	46.6	43	46	46	46
BY EMPLOYER								
Industry	39.9	43.3	43.2	43.7	39	43	43	44
Government	42.1	47.1	48.1	48.3	40	48	49	50
Academia	44.2	46.9	48.0	47.7	46	47	49	48
BY RACE/ETHNICITY								
White	41.6	45.2	45.3	45.5	41	45	46	46
Asian	40.0	42.5	42.6	43.1	40	41	40	41
Black	39.1	42.8	44.7	43.4	39	43	45	43
Hispanic	38.5	41.9	42.1	42.9	37	41	41	43

SALARY TRENDS

Strong 2002 gains at all degree levels

\$ THOUSANDS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	AVERAGE ANNUAL INCREASE		
												2001–2002	1997–2002	1992–2002
BY DEGREE														
B.S.	\$42.0	\$43.5	\$44.3	\$45.4	\$45.0	\$49.4	\$49.6	\$50.1	\$53.1	\$55.0	\$58.0	5.5%	3.2%	3.3%
M.S.	50.0	51.5	52.0	53.5	53.6	56.2	57.7	61.0	62.0	65.0	68.5	5.4	4.1	3.2
Ph.D.	60.0	62.8	65.0	66.0	68.0	71.0	73.3	76.0	79.0	82.2	85.2	3.6	3.7	3.6
ALL CHEMISTS	54.6	56.0	57.9	59.7	60.0	63.0	65.0	68.0	70.0	73.0	76.5	4.8	4.0	3.4
Change in Consumer Price Index												1.2	2.2	2.5

NOTE: Median base annual salary of all chemists employed full time as of March 1 each year. **SOURCES:** ACS surveys and Bureau of Labor Statistics

Career Services under the general supervision of the Committee of Economic & Professional Affairs.

CEPA and Jordan also recently produced two special surveys—of older ACS

members from 50 to 69 years old in 2000 (C&EN, June 5, 2000, page 42) and of members under 40 last year (C&EN, Dec. 24, 2001, page 39).

The full report on the 2002 member

survey will be available this fall for \$250 from the American Chemical Society, Office of Society Services, 1155—16th St., N.W., Washington, DC 20036; phone (800) 227-5558 or (202) 872-4600.

EMPLOYMENT FACTORS

Older chemists and industry chemists are most vulnerable

	EMPLOYED			UNEMPLOYED SEEKING EMPLOYMENT
	FULL TIME	PART TIME	POSTDOCS	
ALL CHEMISTS	92.2%	3.0%	1.5%	3.3%
BY DEGREE				
B.S.	93.9	2.8	0.2	3.2
M.S.	91.9	4.1	0.1	4.0
Ph.D.	91.8	2.7	2.4	3.1
BY GENDER				
Male	93.0	2.3	1.5	3.2
Female	90.0	5.1	1.5	3.4
BY RACE/ETHNICITY				
White	92.6	3.2	0.9	3.3
Asian	90.1	1.2	5.8	2.8
Black	91.3	1.3	4.0	3.4
Hispanic origin				
Yes	93.8	2.1	1.5	2.6
No	92.2	3.0	1.5	3.3
BY CURRENT/MOST RECENT EMPLOYER				
Industry	93.7	2.0	0.2	4.1
Government	94.9	1.4	2.4	1.3
Academia	89.6	4.2	4.8	1.4
Self-employed	63.6	33.1	0.0	3.4
BY CURRENT/MOST RECENT JOB FUNCTION				
R&D	91.8	1.4	3.5	3.3
R&D management	96.0	0.9	0.0	3.1
General management	95.2	1.7	0.2	2.9
Teaching	93.1	5.7	0.3	0.9
Marketing	90.6	3.8	0.0	5.6
Production	94.5	1.1	0.0	4.4
BY AGE				
Under 25	89.6	5.2	1.0	4.2
25 to 29	91.7	1.6	5.4	1.4
30 to 34	91.6	1.4	5.5	1.5
35 to 39	92.9	2.9	2.5	1.7
40 to 44	94.8	1.9	1.0	2.3
45 to 49	94.2	1.9	0.2	3.8
50 to 54	92.2	2.5	0.0	5.2
55 to 59	90.7	4.2	0.0	5.1
60 to 64	88.9	6.2	0.2	4.8
65 to 69	85.5	12.5	0.0	2.0
BY REGION				
Pacific	90.3	4.6	2.0	3.0
Mountain	91.6	2.5	2.5	3.3
West North Central	94.5	1.9	1.2	2.4
West South Central	93.0	3.4	2.0	1.6
East North Central	93.7	2.4	1.1	2.8
East South Central	94.3	1.4	1.4	2.8
Middle Atlantic	92.4	2.8	1.1	3.7
South Atlantic	92.1	2.8	1.5	3.6
New England	89.9	3.7	2.2	4.2

NOTE: Based on a population that excludes those either fully retired or unemployed but not seeking employment. Data as of March 1, 2002.

WHERE THE JOBS ARE

Younger chemists are more likely to work for drug, analytical, and service concerns than are older chemists

% OF CHEMISTS AT ALL DEGREE LEVELS WITH FULL-TIME JOBS	UNDER		
	40	40+	ALL
MANUFACTURING	60%	52%	55%
Chemical & related	16	18	17
Pharmaceutical & related	30	18	22
Other manufacturing	14	17	16
ACADEMIA	20	26	24
University/four-year	17	20	19
Medical/professional school	1	2	2
Two-year	1	2	1
High school	1	2	2
NONMANUFACTURING/ NONACADEMIC	20	21	21
Analytical/research services	13	8	9
Government	5	9	8
Self-employed	—	1	1
Other	2	3	3

NOTE: As of March 1, 2001.

WOMEN IN CHEMISTRY

Their participation in chemical fields varies widely

BY DISCIPLINE	PERCENTAGE THAT ARE WOMEN	
	WORK SPECIALTY	HIGHEST DEGREE
Agricultural/food chemistry	23%	33%
Analytical chemistry	29	27
Biochemistry	31	32
Biotechnology	27	22
Business administration	—	24
Chemical education	37	40
Environmental chemistry	25	29
General chemistry	34	37
Inorganic chemistry	15	21
Materials science	16	17
Medicinal/pharmaceutical chemistry	25	22
Organic chemistry	18	18
Physical chemistry	21	22
Polymer chemistry	19	21
BY WORK FUNCTION	PERCENTAGE THAT ARE WOMEN	
Research & development management	16%	
General management	19	
Marketing	26	
Production	29	
Research & development	22	
Teaching	30	

Questions about the substance of ACS's employment surveys should be directed to Jordan at (202) 872-4433 or e-mail: m_jordan@acs.org.

DEMOGRAPHICS. ACS's annual salary and unemployment surveys provide the best continuous assessment of the makeup of the core of the society's membership: professionally active, full-dues-paying domestic members.

Of chemists responding this year, 22% have a bachelor's as their highest degree, 16% have a master's, and 62% have a Ph.D. This breakdown has changed little in recent years.

By race this year, 84.1% are white, 11.7% are Asian, 1.7% are black, 0.3% are American Indian, and 2.2% are "other." In response to a separate question, 2.3% identify themselves as Hispanic. With only marginal gains for blacks and Hispanics, the big change in the past decade has been in the Asian category, up from 8.6% in 1992.

Another significant change has been in the number of chemists who are women. For this year, it is 25%, up from 20% 10 years ago. Today, one-third of working bachelor's and master's degree chemists are women, as are almost one-fifth of those with Ph.D.s. Also, with 57% of the 2000-01 class of bachelor's degree chemists being women, further advances by women appear inevitable.

A third major demographic shift over the past decade is in the age of the chemical workforce. The median age is now at 45. This is up from 41 in 1990. In terms of mean age, the increase is from 41.3 to 45.1. Women chemists are much younger than men, with medians of 40 and 47, respectively. Industry has the youngest chemical workforce: a median of 44. This compares with 48 for chemists in academia and 50 for government chemists.

These changes transcend chemistry and reflect the aging of the baby boomer generation, those born between 1947 and 1964. This phenomenon has boosted the median age of the total U.S. workforce by almost three years since 1990.

EMPLOYMENT. A fuller breakdown of the 2002 employment data indicates that 92.2% of respondents had full-time jobs,

3.0% were working part time, 1.5% were on postdocs, and 3.3% were unemployed. This meant that a total of 7.8% did not have full-time jobs, up from 5.4% in 2001 and the highest since 1996, when it was 8.5%.

The 3.0% with part-time jobs this year is unusually high. During good times in the past, it has been about half this rate. Women, at least partially by choice, are

more likely to have part-time jobs: 5.1% compared with 2.3% for men this year.

The 1.5% on postdocs this year remains unusually low. It was 1.4% in 2001. This indicates that there has been a considerable exodus of ACS members from postdoc ranks since the job market started to open up in 1996. In 1995, 3.6% of respondents were on postdocs. This decrease could mean that postdocs are becoming less likely to be members of ACS. But there is no evidence for this conclusion. The percentage of postdocs usually hovers between 2.0 and 2.5%.

In general, the rate of actual unemployment of chemists does not vary much by gender, degree, race, or ethnicity. However, joblessness has always varied sharply by type of employer and by age.

The burden of the big surge in unemployment over the past year has fallen very disproportionately on industrial chemists, especially older ones. The increases among government chemists from 1.1% last year to 1.3% and for academic chemists from 0.8% to 1.4% are far smaller than the 1.7% to 4.1% increase for industrial chemists.

Older chemists have usually had higher unemployment rates. But the difference this year between the 1.9% rate for all chemists less than 45 years old and the 4.5% rate for those 45 and older is large.

Particularly at risk this year are industrial chemists over 45 years old: A very high 6.6% of

INDUSTRY SALARIES

Work function is a key determinant ...

\$ THOUSANDS	B.S.	M.S.	PH.D.
Analytical services	\$53.6	\$68.0	\$84.4
Applied research	56.6	68.0	89.7
Basic research	50.4	66.2	92.4
Chemical information	71.5	63.0	84.0
Computers	—	—	93.0
General management	77.7	90.0	106.0
Health & safety	60.7	80.0	102.3
Marketing & sales	65.0	82.0	94.1
Patents	—	—	106.9
Production/quality control	52.6	70.0	86.4
R&D management	83.0	103.2	120.0

NOTE: Values are median salaries of those with full-time jobs as of March 1, 2002. Where no salary data are shown, sample is too small (fewer than 15) to provide a meaningful figure.

... so is size of employer ...

NUMBER OF EMPLOYEES	B.S.	M.S.	PH.D.
Fewer than 50	\$54.5	\$70.0	\$81.7
50-99	53.0	68.0	85.0
100-499	55.0	71.0	88.3
500-2,499	60.0	72.0	90.0
2,500-9,999	61.5	74.1	95.0
10,000-24,999	64.0	76.0	95.0
25,000 and more	62.0	74.0	100.0

NOTE: Values are median salary in thousands of dollars as of March 1, 2002, for industrial chemists only.

... as well as degree and experience

MEDIAN SALARY, \$ THOUSANDS	YEARS SINCE B.S. DEGREE									40 OR MORE	OVERALL MEDIAN
	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39			
BY DEGREE											
B.S.	\$47.0	\$51.0	\$62.0	\$70.0	\$72.0	\$71.5	\$77.5	\$78.0	\$72.0	\$60.0	
M.S.	51.8	60.0	65.0	73.9	76.1	81.0	82.0	87.0	76.6	71.7	
Ph.D.	—	78.5	83.0	91.9	99.6	107.0	106.0	107.4	—	94.0	
BY GENDER											
Male											
B.S.	46.9	53.0	62.5	72.0	74.0	75.0	81.6	85.0	70.0	63.0	
M.S.	53.3	61.2	65.0	77.5	78.5	80.7	87.0	94.0	—	75.0	
Ph.D.	80.0	79.5	83.6	92.2	99.0	107.0	107.1	108.9	95.0	96.0	
Female											
B.S.	47.8	50.0	60.8	64.5	65.5	67.0	68.0	—	—	53.4	
M.S.	50.0	57.3	63.0	68.0	74.0	84.0	75.0	—	—	63.0	
Ph.D.	—	78.0	82.7	88.0	103.0	107.9	88.8	89.8	—	87.0	

NOTE: Data are as of March 1, 2002. Where no data are shown, sample is too small (fewer than 15) to provide meaningful figure.

them are unemployed. This rate includes 7.2% of such older chemists in manufacturing and 7.6% of those in applied research.

This year's data confirm a continuation of shifts that have been under way for the past decade or more in the profile of where chemists work. In 1990, 23% of chemists worked in chemical and related industries and 12% worked for pharmaceutical concerns. This year, those in the chemical industry are down to 16%, whereas those in pharmaceuticals have almost doubled to 22%. And if this year's results are broken down by age, 30% of those under age 40 work in pharmaceuticals, compared with only 18% of those 40 and older.

Another ongoing shift is in the number of chemists working for analytical or research service organizations. This area claims 13% of 2002 respondents under age 40 and only 8% of those 40 and older.

SALARIES. Identification and interpretation of real trends in the salaries of chemists is not easy because of the host of intertwining factors involved. These factors include degree level, age, experience (expressed as years since bachelor's degree), field of work, type of work, size of employer, and geographic location. And gender is still a factor, if less so than in the past.

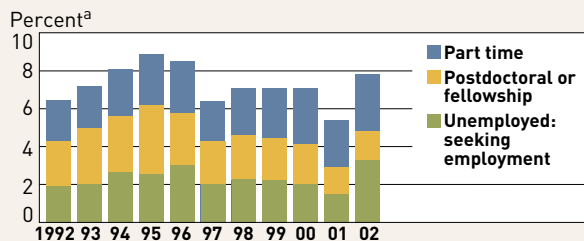
However, a few things are always true. One is that industrial chemists as a group earn somewhat more than government chemists and a lot more than academic chemists. From this year's survey, the median salary is \$81,400 for all industrial chemists compared with \$76,000 for government chemists and \$60,000 for those in academia.

By degree, the differentials between the salaries of chemists in industry and academia are even larger: \$59,000 and \$37,500, respectively, at the bachelor's degree level, \$71,700 and \$49,900 for master's degrees, and \$94,000 and \$63,800 for those with Ph.D.s.

However, those at the top in academia—full professors with 11- or 12-month contracts at Ph.D.-granting institutions—post a median salary of \$115,500 in this year's survey. This salary is above the median of about \$105,000 for industrial Ph.D. chemists who are 20 or more years beyond the bachelor's degree. What drags down

EMPLOYMENT SHIFTS

Number of chemists without full-time jobs is up sharply



a As of March 1 each year. Based on population that excludes those unemployed but not seeking employment.

ACADEMIC SALARIES

Top rewards come as a full professor

MEDIAN SALARY, ^a \$ THOUSANDS	9- TO 10-MONTH CONTRACTS		11- TO 12-MONTH CONTRACTS	
	NON-PH.D. SCHOOL	PH.D. SCHOOL	NON-PH.D. SCHOOL	PH.D. SCHOOL
Full professor	\$67.0	\$95.0	\$96.0	\$115.5
Associate professor	50.8	61.2	70.0	78.0
Assistant professor	44.8	54.0	45.8	60.0

a As of March 1, 2002.

the median salary for all academics is the relatively low pay for those in the early and even middle stages of their careers.

Another factor that is constant is the salary advantage that chemists who work

for large firms have over those working for small ones. For instance, this year, the median salary for Ph.D. chemists who work in organizations employing between 50 and 99 people—\$85,000—falls shy of the \$100,000 for those working for firms with 25,000 or more employees. For those with bachelor's degrees, the difference is from \$53,000 to \$62,000, and for chemists with master's, it is from \$68,000 to \$74,000.

These data also indicate that 47% of industrial chemists work for firms with 10,000 or more employees, while 23% are with organizations employing fewer than 500 people.

Since 1992, the median base salary from the primary full-time jobs of all chemists has grown at an average 3.4% annual rate, while the cost of living has risen at a 2.5% rate. This apparently amounts to a substantial real growth of about 9% over the decade. However, the virtual median 2002 chemist is four years older than the median 1992 chemist and hence would be expected to earn at least this much more.

The overall median salary of all women

WHERE THE MONEY IS IN INDUSTRY

Salary spread increases with experience

MEDIAN SALARY, \$ THOUSANDS	YEARS SINCE B.S. DEGREE								40 OR MORE	OVERALL MEDIAN
	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39		
B.S.										
90%	\$60.0	\$67.7	\$84.0	\$95.0	\$110.0	\$109.5	\$116.6	\$139.9	—	\$95.0
75	54.0	60.0	72.0	82.0	90.0	86.8	102.0	100.0	—	77.0
50	47.0	51.0	62.0	70.0	72.0	71.5	77.5	78.0	—	60.0
25	40.0	43.0	50.5	54.8	56.6	60.6	60.0	67.0	—	47.0
10	34.0	40.0	42.0	48.0	47.7	50.0	47.1	54.0	—	38.6
M.S.										
90%	—	71.0	89.0	110.0	115.0	120.0	122.6	130.0	—	110.0
75	—	65.0	77.9	89.6	97.2	101.0	101.0	112.0	—	90.0
50	—	60.0	65.0	73.9	76.1	81.0	82.0	87.0	—	71.7
25	—	53.0	59.0	62.0	65.0	68.0	70.0	58.2	—	59.9
10	—	45.0	47.0	51.2	54.2	58.4	54.7	48.0	—	49.0
Ph.D.										
90%	—	90.4	107.0	125.0	145.0	157.5	163.0	170.0	225.0	140.0
75	—	85.0	96.0	105.0	118.0	130.0	127.0	136.5	128.0	114.0
50	—	78.5	83.0	91.9	99.6	107.0	106.0	107.4	91.3	94.0
25	—	71.0	75.0	80.0	85.0	91.5	91.0	90.0	73.2	80.0
10	—	61.2	65.0	70.0	75.0	76.3	76.0	76.0	48.0	70.0

How to read this table: Using, as an example, industrial B.S. chemists two to four years after they have received their B.S. degree, 90% of these chemists have annual base salaries of \$60,000 or less; 75% have annual base salaries of \$54,000 or less, 50% have annual base salaries of \$47,000 or less, 25% have annual base salaries of \$40,000 or less, and 10% have annual base salaries of \$34,000 or less, as of March 1, 2002.

chemists is stuck at just under 80% of the median for men. Much, but not all, of this is due to the seven-year age differential and the higher percentage of men who have Ph.D.s.

When apples are compared with apples—for instance, industrial chemists at the same degree level and with the same amount of experience—the differences between the salaries of men and women are, as would be expected, smaller. For chemists fewer than 15 years beyond their bachelor's degrees, the differences are not significant. However, for chemists who are 25 or more years beyond the bachelor's degree, the advantage that men retain is still real and substantial.

This advantage is related to the fact that women chemists remain somewhat underrepresented in the higher paying enclaves of the chemical profession. For ex-

SALARIES OF ALL CHEMISTS

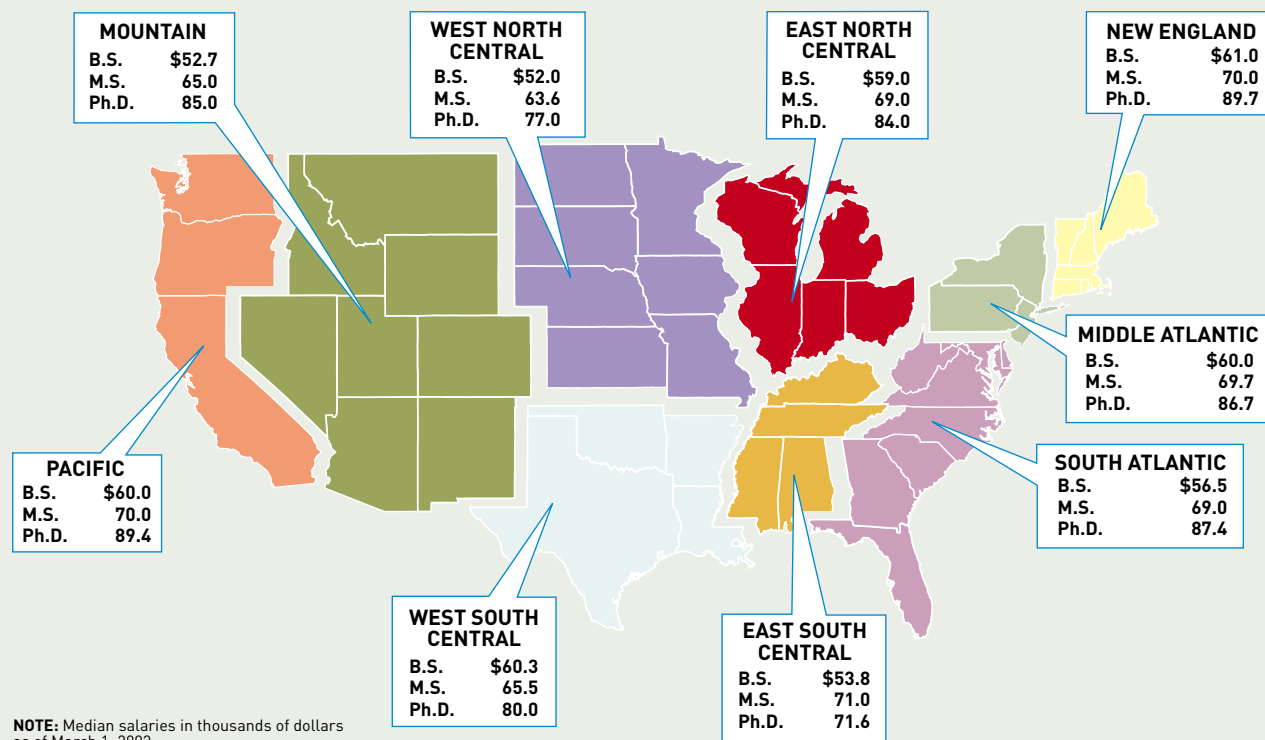
Industry chemists retain career-long edge

MEDIAN SALARY, \$ THOUSANDS	YEARS SINCE B.S. DEGREE									40 OR MORE	OVERALL MEDIAN
	2-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39			
ALL CHEMISTS	\$48.0	\$60.0	\$68.5	\$79.0	\$82.0	\$89.1	\$88.6	\$90.0	\$90.0	\$90.0	\$77.0
BY GENDER											
Male	48.2	63.0	70.0	81.0	84.0	91.1	92.5	94.4	92.0	80.9	
Female	46.5	57.0	65.5	72.0	72.5	74.8	70.0	71.0	74.2	64.0	
BY DEGREE											
B.S.	46.0	50.9	61.0	67.9	67.3	70.0	72.0	75.0	70.8	59.0	
M.S.	50.2	58.0	63.8	70.7	73.0	77.0	79.8	74.7	76.0	68.5	
Ph.D.	76.0	73.5	75.0	84.0	89.0	100.1	96.3	94.1	94.0	85.2	
BY EMPLOYER											
Industry	48.8	65.0	75.5	84.0	90.0	96.0	100.0	100.0	87.0	82.0	
Government	—	57.8	64.0	71.0	75.0	81.2	85.3	99.3	99.1	76.7	
Academia	39.0	43.1	48.0	56.0	60.6	68.6	67.4	77.7	92.0	60.1	

NOTE: All values are as of March 1, 2002.

SALARIES AND GEOGRAPHY

On the East and West Coasts, the salaries are better



ample, only 8% of full professors are women, as are only 16% of R&D managers. Women are also overrepresented in lower paying work functions. For instance, they represent 29% of the chemists in production and 30% of those in teaching.

By geographic region, a general pattern of higher salaries on the East and West Coasts persists from year to year. This year, the medians for Ph.D. chemists range from

\$89,700 in New England and \$89,400 in the Pacific region to a low of \$71,600 in the East South Central region. For chemists with bachelor's degrees, the range is from \$61,000 in New England to \$52,000 in the West North Central region.

BONUSES. Another advantage enjoyed by industrial chemists is bonuses. According to this year's survey, 67% of them were el-

igible for bonuses, as were 38% of government and 6% of academic chemists. Of these, 90% of those in industry, 81% of those in government, and 94% of the academics got them.

The median bonus for chemists in manufacturing was \$6,800. For chemists with other jobs in industry, it was \$4,500. For academics, it was \$2,850, and for government chemists, \$1,600. ■