

## **How would you categorize/summarize the overall job market for spectroscopists today?**

**(Miller-Ihli)** The chemical and pharmaceutical industries are increasingly dependent upon instrumental methods, many of which are spectroscopic in nature. The development of hyphenated techniques, such as LC-MS or CE-ICP-MS, is very important today for speciation determinations, and the use of mass spectrometers as detectors is commonplace now that they are more reasonably sized and priced. I think the job market for spectroscopists is fairly secure and likely to continue to see reasonable growth, particularly in the pharmaceutical and nutraceutical industries.

**(Frame)** I think the overall job market is weak, and therefore, the market for spectroscopists is also weak. I think there is a trend to hire inorganic, organic, physical, and biochemists with the expectation that they can also do all the analytical and spectroscopic work — run everything from mass spectrometers through NMRs to hyphenated instruments and, therefore, substitute for having a spectroscopist or analytical chemist. The marketing of instruments fosters this trend because [the instruments] are seen as being so “user friendly” that anyone can operate them. The converse does not hold: analytical chemists, including spectroscopists, are perceived as being incapable of doing “chemistry.” There is also a very definite trend in hiring B.S. level chemists, including those with no experience, to run instruments that used to be run by Ph.D.s, again from the perception of these instruments as “black boxes” that anyone can operate.

## **As in past years, the 2005 Salary Survey points out that there is still a rather substantial gap when it comes to male and female salaries. Can you discuss why this gap exists?**

**(Miller-Ihli)** I think this is most likely the result of two factors: One, women represent approximately one-third of the workforce that has a degree in analytical chemistry; and two, the median age of women spectroscopists is likely 5–10 years younger than that of males. As such, one might expect that more senior, higher paying positions are dominated by men at the present time.

## **Private industry was once again the highest paying job sector, followed by government and then academia. Why does the disparity between job sectors exist? Do you see a time when this might be different?**

**(Miller-Ihli)** I don't think it's any surprise that the highest salaries are seen in industry where there is a profit margin. I also don't think it's surprising that the lowest salaries are seen in academia, particularly when academia includes everything from B.S. granting institutions to those which grant Ph.D. and M.S. degrees. Academic salaries often represent 9-month salaries rather than 12-month salaries and it's possible the average salary calculated is not representative of 12-month salaries across the board.

I think government employment is the best of both worlds in many ways. Spectroscopists have the opportunity to be involved with education and interact with students and postdocs without the responsibility of teaching that they would have in academia. Job security is reasonably good and they're involved with applied research, focused at the resolution of a problem much as it would be in industry. In my opinion, because of the value I place on education, I feel that academic professionals, both high school teachers and professors, are underpaid. Because many of these individuals are more interested in the flexibility associated with their position and they often are not highly motivated by money, it seems unlikely that their salaries will, on average, increase significantly because it's unlikely that they will do what's necessary to result in a change. I do believe that full professors at Ph.D. granting institutions have 12-month salaries comparable to those seen in senior level positions in government and industrial labs.

**(Frame)** In general, academic salaries are for 9 months. Academia may also reflect spectroscopists, such as myself, who have been in academia in a non-tenure track contract or staff position — which are certainly at lower salaries than equivalent positions in industry or government. Government salaries are set by law, while industry reflects market forces — supply and demand. I don't think it will change as long as we are a capitalist society.

**As in past years, the survey also showed there was a difference in pay based upon geographic location. Why is there such a disparity between certain regions?**

**(Miller-Ihli)** I don't have a geographical breakdown of the number of spectroscopists in the various job sectors but my guess would be that there are a larger number of academic positions in the lower-paying regions. Likewise, the West Coast offers numerous opportunities for industrial positions associated with the constantly growing genomics/proteomics industry as well as several instrument companies. The Mid-Atlantic region probably contains the highest concentration of federal government headquarters (USDA, EPA, USGS, FDA, CIA, FBI, US Navy, etc.) where senior level staff would be located, and many of those scientists are making in excess of \$100,000 a year.

**(Frame)** I think this is based on job demand, lack of jobs, specialty areas per region, and cost of living.

**How much does the opportunity to earn supplemental income/bonuses factor into a spectroscopist's choice of job sector?**

**(Ball)** The issue is probably more based on a choice of academia versus industry, rather than the selection of spectroscopy as a career.

**(Miller-Ihli)** I would suspect that the desire to earn supplemental income is the strongest with academic spectroscopists — particularly those who are guaranteed only a 9-month salary. My experience is that "bonuses" are typically largest in industry and smallest in government. I don't think any of my government colleagues took the job because they were expecting significant income from bonuses.

**(Frame)** It certainly had no impact on my choices. I don't think I can speak for anyone else. I've received bonuses in industry and the opportunity to consult (supplemental income) in academia.

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**Last, but certainly not least, when it comes to a spectroscopist's view on his/her career, does money equal happiness? Why or why not?**

**(Miller-Ihli)** My experience is that spectroscopists are like everyone else — some are motivated by money, but many aren't. I would say that job satisfaction seems to be very important to the spectroscopists I know. Many people are happy to accept a lower salary for increased freedom in their research, or work schedule, or for better job security. Others are happy to have the opportunity to play an important role in educating young scientists, and are willing to accept a lower salary for that privilege. Some of my colleagues in industry who are earning high salaries are frustrated because of the limitations they face with not being able to attend conferences or publish their research results. It's very important that people realize that many times, money doesn't equal happiness.