

Career & Employment

January 3, 2005

Volume 83, Number 01

pp. 43-47



MANY OPTIONS IN INSTRUMENTATION

Laboratory instrumentation companies offer a broad spectrum of jobs for chemists at all levels

LINDA RABER, C&EN WASHINGTON

If anything is certain in the chemical sciences these days, it is that there will always be instrumentation and there will always be a market for more advanced instrumentation. Chemical scientists in instrumentation companies, many at the B.S. and M.S. level, are finding satisfying careers in research, development, marketing, sales, and field technology, where their technical skills are valued and their people skills are honed. Most of the companies contacted by C&EN for this story are actively recruiting.

Scientists rely on instruments to detect, separate, and analyze molecules, and abundant career options exist in companies that design and manufacture laboratory instruments and in other instrument-intensive businesses. Chemists who enjoy problem solving may want to consider working in this area. Jobs are waiting at many companies for those with the right combination of technical knowledge and the willingness and ability to communicate well with customers.

The field is constantly evolving. "When I was in graduate school, [nuclear magnetic resonance] spectroscopy was saved for the final crystallized compound. Five years later, chemists were using NMR for crude reaction mixtures to find out how much of what they wanted was in that mix," says chemist entrepreneur Amos Heckendorf, founder and president of the [Nest Group](#) in Southborough, Mass., a chromatography supply company.

For example, he says, "now mass spectrometers are no longer room-sized; they are bread-box-sized, and everybody is getting them." Heckendorf worked for an instrumentation firm for more than eight years before starting his own niche company 20 years ago that provides consumable products for liquid chromatography.

The word "instrumentation" covers a huge field of applications. George Walsh, R&D project manager of chemical analysis solutions at [Agilent Technologies](#), in Wilmington, Del., says, "The fun thing about working in this business is knowing that your work has a direct influence on virtually every product that affects people's daily lives." Agilent provides gas chromatography (GC) and GC/mass spectrometry systems, support, and supplies. "Our equipment will analyze anything that is a liquid or gas or anything that can be made into a liquid or gas," Walsh says.

Chemists and engineers at Agilent are involved in solving a variety of problems for their customers. For example, a problem could involve rule-making by the [Environmental Protection Agency](#). The agency is currently developing new regulations to decrease the sulfur content of diesel fuel and gasoline with the aim of cutting air pollution. "EPA generally writes methods based on the state of the art in the analysis business. They generally won't put something in a rule that says you have to do something that no one has proven they can physically do," Walsh says. Agilent is at the forefront of developing instruments that will measure sulfur at the lowest level of concentration to support those regulations.

Another example: "Say you have a sample of an athlete's urine that you want to analyze for the presence of a banned drug. You have a sample in a vial with a bar code on it. For analysis, the instrument has to read the bar code, take the sample, deposit it in the instrument, clean the needle, inject, measure a sample, take the vial back, maybe preheat the sample, stir it, or add anything to it. We also write the software to deal with all the data," Walsh says. "We can take a specific EPA or [Food & Drug Administration](#) method and design instruments so the customer can perform this kind of analysis. If we have an instrument that is breaking new ground, we can work with industry groups to create those methods and make proposals before standards committees to standardize on those methods."

Chemists are important every step of the way. Chemists who work at instrumentation companies often act as interpreters between the customer and a marketing person to describe exactly what an instrument has to do. Later, after engineers have started to develop prototypes of those instruments, chemists are the ones who are going to be testing the instruments to make sure that they work.

Richard Donaldson, director of process chemistry in the chemical development group at [Ricerca Biosciences](#) in Concord, Ohio, hires B.S. and M.S. chemists. The current market can lead to fast advancement for those with the right skills, he tells C&EN. Ricerca is a contract manufacturing operation for the pharmaceutical industry. Donaldson says that in his group B.S./M.S. chemists initially work in the lab with a senior person who directs and mentors them. These scientists can then grow into a project leader role through on-the-job training.

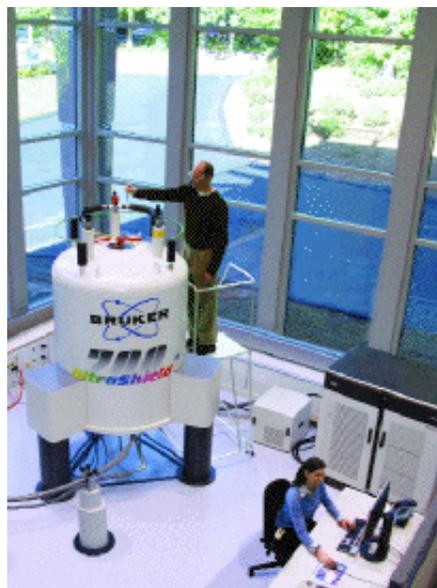
"The main thing I look for is someone with lab glassware experience," Donaldson says. This experience is specific and very difficult to find and includes the ability to handle chemicals in the lab in small--say 5-L--reactors.

People who start out as laboratory chemists at Ricerca may be promoted to project leader positions. "A project leader has to interface with the customer and coordinate projects. We are very busy with lots of contracts, lots of customers, lots of requests," Donaldson says. "In this environment, I have no choice but to ask people to take on more and more responsibility."

SALES IS a completely different career track that can allow for a healthy income. Career advancement through instrumentation sales requires a balance between technical knowledge and customer relations. Chemists with the right combination can go far.

Mark Chaykovsky is executive vice president of [Bruker BioSpin](#) in Billerica, Mass. The company manufactures equipment based on magnetic resonance. "I've been with the company 20 years, and my background is in using Bruker BioSpin NMR products for research," he says. Chaykovsky was a technician and NMR operator before he joined the company in a sales capacity and worked his way up.

Virtually all sales hiring managers working for instrumentation companies find it far superior to teach sales skills to people with technical degrees than to hire seasoned salespeople and train them in, for example,



mass spectrometry. Getting on-the-job experience using a specific type of laboratory instrument and then working in sales for a company that manufactures those same instruments is a tried-and-true career sequence.

"I believe one of the key elements to our success is hiring people into our sales force who have NMR backgrounds," Chaykovsky explains. "While having a degree is critical, what is more important is actual knowledge and ability to run the instrument so you can relate to a customer question and answer it technically and correctly," he says.

"At [Dionex](#), we have hired a couple of folks with chemistry degrees directly into sales positions," says Toni Smith of the company's human resources operations. "While we love to get somebody with a chemistry background who has a couple of years of experience, we will hire really sharp people with a personality that comes across as a sales person right out of school. This isn't typical, however." Dionex, in Sunnyvale, Calif., develops, manufactures, sells, and services chromatography and extraction systems.

Chaykovsky says that, during the interview process for a sales position, he looks for charismatic people who are able to communicate and make customers feel comfortable. He also looks for those who have science backgrounds.

Another option for B.S. and M.S. chemists in instrumentation companies is in field service. People in this area go out to customer sites to solve problems and repair equipment. Many of these positions used to be filled by electrical and electronics engineers, but today some laboratory instrumentation companies are looking to chemists.

"If you're really good with your hands and like fixing things and if you have a real technical bent and mechanical aptitude, field service is a good choice. We have a whole raft of field service engineers who go into customer sites and take care of whatever concerns they have," Smith says.

Chaykovsky explains that "20 years ago, the instruments were made with resistors and capacitors and were put on boards. Engineers came with scopes and spare parts and fixed the boards in the customer's lab. "Back then," he continues, "those jobs needed somebody who knew electronics. That has changed. Today, all boards use surface-mounted devices that are typically made via robotics.

"Because of the nature of these parts, we no longer do board repair at the customer's site; we do board exchanges to repair a problem. So we've really shifted from electrical engineers to chemists in these positions. Fixing problems tends to be quick, but finding out what's wrong requires looking at the output of the experiment and relating the failure to something in the spectrometer," he says. At Bruker BioSpin, about one-third of the field engineers have advanced chemical degrees.

Chaykovsky believes that field service is one of the most difficult jobs because "you are in front of the customer, typically when the system has failed, and, candidly, everybody is on edge, and everyone is under the gun to get things fixed." He adds that the job is stressful and requires a lot of travel, so it's not for everyone. However, these jobs can provide tremendous satisfaction to mechanically minded problem solvers who like customer interaction.

RECRUITERS for instrumentation companies look all over to fill their various jobs. Some of the resources they explore include <http://www.monster.com>, <http://www.hotjobs.com>, <http://www.cen-chemjobs.org>, classified advertising, and career fairs. In addition, many hires are initiated through networking.

Some companies have co-op programs with universities. For example, [Thermo Electron](#) has a strong co-op program with [Northeastern University](#), which works well for both university and company.

Walsh notes that it is harder for him to fill jobs now than it was 15 years ago--but that



FULL SERVE Simons (left) at Exygen Research consults with Kelly Booker on a gas chromatography problem.

PHOTO BY KIM DOOLITTLE

"good candidates are still out there. A lot of departments have shifted their budgets more toward life sciences. Because of this shift, it can be difficult for a professor to get funding to do research in the kind of instrumentation that we need," he explains. "For the bio side of our company, it's easy--everybody's doing that kind of research."

What's hot as far as instrumentation technologies go is cyclical, but in the next five or 10 years, the industry will be challenged to move toward problem solving. "The instrumentation is easy to use. Now, customers can use our systems in whatever way they need to get more information and go farther down the path to getting toward the solution they want as opposed to just collecting data," Chaykovsky says. "We are not only going to acquire data but will go farther down in terms of analysis and providing solutions."

Chemical & Engineering News

ISSN 0009-2347

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