# Jobs in Industry vs. Jobs in National Labs

By Peter FiskeJul. 23, 1999 , 8:00 AM


***D**ear Dr. Fiske,*

*I am 3 years out of my Ph.D. and am exploring national lab and industry jobs. What are jobs in these two settings like on average? I have some sense of job responsibilities in academia but have limited knowledge outside of that (typical, no?).Curious in Connecticut*

Dear C.C.,

As you can see, your interesting question has spawned its own Tooling Up column! You are correct: Most grad

students and postdocs don't have a good understanding of what life is like for scientists in settings outside academia. Next Wave has featured a few scientists in industry and in national labs, but until now, I don't think anyone has really itemized the similarities and differences.

There Is a Difference!

Most graduate students (and faculty) tend to lump jobs at both industry and national labs into a single category. They are often described as places where you can do science but where you have no freedom, are at the whim of business people and bureaucrats, and where you can't publish what you work on. This common misconception is wrong in nearly all respects.

Industry and national lab jobs are not only better than most academics believe, but they are also very different from each other. Most importantly, industry and the government employ most of the Ph.D. scientists out there! Dismissing job opportunities in these sectors blocks you from the majority of the jobs that are out there.

Before I continue I should, in the interests of full disclosure, tell you a bit about my background. I am presently a staff scientist at a Department of Energy lab, the Lawrence Livermore National Laboratory, in California. I have close friends in equivalent research centers run by NASA, NOAA, the USGS, and NIH. I also have several friends who are research scientists in industry at oil companies, biotech firms, and software development companies. So I come at this question with quite a bit of personal experience, both direct and indirect.

What Do Scientists Do Outside of the University?

Broadly speaking, scientists in industry and in national labs do the same work as their colleagues in academia: They use science and technology to answer critical questions. In industry, those critical questions are usually related to the creation of a product or a service that the company can sell. In the case of a national lab, those critical questions are defined by the mission of the sponsoring agency. To a large extent, scientists in academia are under the same constraints. Rather than answering to product managers in industry or program managers in national labs, scientists in academia answer to funding agencies!

Scientists in industry and national labs tend to work in organizational structures similar to those in academia. A senior researcher may head a group of more junior research staff members along with a few postdocs. Unlike academia, however, principal investigators (PIs) in industry or at a national lab DO answer to someone! In industry, it may be the product manager or the chief technology officer (CTO). In a national lab, a PI would answer to a division leader, who in turn might answer to a directorate leader or a lab director.

Although the company or the sponsoring agency may define the research priorities in industry or in a national lab, scientists still have great freedom in how they approach the subject of study. In this regard, industry and national labs tend to be less risk-averse than academia--and risk takers who succeed tend to be well rewarded. PIs in industry or in national labs are also more likely to subcontract out research to other labs or to academia.

The All-Important Publication Record?

Industry and national labs differ significantly over "academic-like" issues such as the role of publications and funding. A strong publication record is important to the career advancement of a scientist at a national lab.

However, unlike academia, national labs tend to prefer their scientific staff to hit "home runs," such as papers in *Science* and *Nature*, rather than a series of "singles" such as publications in niche journals. Publications in the prestige journals help the lab bolster its scientific credibility. Overall, however, the publication productivity of scientists at national labs tends to be lower than in academia. One big reason: National labs don't have graduate students!

In industry, publications may or may not be relevant. In many biotech companies, scientists are rewarded for maintaining a strong publication record because it brings attention to the company and helps the company recruit other scientists. In more mature industries, publications may matter less. Some industries organize their own conferences, so presenting papers at these venues may be encouraged. Sometimes industry scientists will go to meetings just to search out the latest hot discovery that they may be able to use in the development of a new product.

Follow the Money

One of the nicest aspects of working in industry or at a national lab is that it is often much easier to get financial support for your work. If you are doing research that is well aligned with the needs of the organization, funding is usually not a problem. Obtaining money for such research may involve nothing more than a memo to the CTO or program leader. Scientists with good ideas, and the ability to communicate them, tend to have no problem getting the resources they need to do their work.

But what about "intellectual freedom"? Are scientists in industry and national laboratories less able to pursue their own research? In some sense, yes! Companies have products and national laboratories have missions. If your research isn't addressing the needs of your employer, you don't end up contributing much to the organization. And that is not a great recipe for advancement.

That being said, it is only fair to compare academia, industry, and national labs on an equal footing. After all, you're not exactly free to do any sort of work you want in academia, as any PI will tell you. You have to get funding, so if your research doesn't fit into the scope of the granting agency or program, you are unlikely to have much success. No matter where you work, your research has to be important to *someone*. If it isn't, you should be asking yourself why you're doing it in the first place.

What Is It Like to Work There?

In terms of lifestyle and atmosphere, industry and academia vary considerably. If you've ever paid close attention to the life of your adviser, you probably know that they have some freedom: They are free to work any 80 hours a week they want! In all honesty, people do not have to work quite so hard in industry or in a national laboratory. Some in academia are a bit judgmental about this. They may think that industry and national lab scientists are "lightweights." Maybe so. But those "lightweights" manage to see their families, enjoy rearing their children, and, in general, carry out those activities we have come to label "having a life." Everyone is different in how they may prioritize work and play. For some, the flexibility of a regular workweek is a real asset. However, others, especially young hard-charging conquerors fresh out of school, can find the slower pace frustrating.

Compensation and benefits differ somewhat between industry and national laboratories. In general, industry

salaries start off lower than those in national labs, but they can rise far higher as one advances, especially if you take on management duties. For national labs run by the federal government, there is a real problem with salary advancement, especially for senior scientists. I am fortunate to work for a lab that is run by an outside contractor, the University of California.

Job security also differs a great deal in industry and national labs. At national labs, it is very rare for staff members to be laid off, for any reason. As a result, there is some fraction of the staff that really does not do much. It turns out that industry tolerates quite a bit of deadwood too, when times are good. But when the industry sector or the economy as a whole turns sour, entire R&D groups can be dismissed. Often, those who are displaced need to retool or find jobs in other firms, so this can be very traumatic.

How Do You Choose?

For a young scientist such as C.C., choosing which sector to work in--academia, industry, or the national labs--comes down to weighing what is most important to you. Some fields of science are only well represented in one of the three sectors, making your choice easy. Otherwise, you will need to weigh issues such as job security, intellectual independence, work life, and compensation. Remember: One size does not fit all. Many professors in academia are terribly judgmental about work in industry or in a national lab. Don't let their choice automatically become yours!