"Companies are no longer willing to hire Ph.D.s who don't bring additional skill sets to the table." -- Eric Celidonio

The result is an employment market where companies can afford to be choosy -- and companies have mostly stopped choosing scientists straight out of grad school or a postdoc. "Companies are no longer willing to hire Ph.D.s who don't bring additional skill sets to the table," says Eric Celidonio, a veteran corporate recruiter. "They tend to hire candidates who they think will add value [to the company] in addition to research skills."

What does that mean for industry job seekers? It means they need to go beyond traditional training. Jules Mitchel, president of Target Health, a small New York City–based clinical research organization (CRO), says his company hires Ph.D.s who "show me that they have gone out of their way to learn about the life sciences industry and how it works." Tom Ippolito, vice president of regulatory affairs and quality at Chembio, a diagnostics manufacturer, believes that Ph.D. scientists who have acquired additional industrial life sciences training "have a much better idea of what they want to do professionally, and over the long term can bring enormous value to a company.

That, then, should be the goal for scientists in training who want to work in the life sciences industry: Get familiar with industrial work. The best way to prepare for a job in industry is to have one -- the familiar catch-22 -- but fortunately that's not the only way. Training programs, including short-term certificate programs and specialized degree programs, can provide at least some of the additional knowledge and skills scientists straight out of academia need to impress industrial hiring managers and display their commitment to industrial employment.

### Biotech fundamentals

One such program is the Fundamentals of the Bioscience (FBS) Industry Program administered through the New York Biotechnology Center at Stony Brook University. Approaching its 10th year, the 3-month program (taught from January to May at the Stony Brook University campuses in Manhattan and Stony Brook) is open to graduate students, postdoctoral fellows, and industry professionals. Students meet in the evening twice weekly to learn about regulatory affairs, drug development, marketing, finance, and intellectual property. All the instructors are industry professionals. In a capstone project, students work in teams to write a business plan, which they present to a panel of venture capitalists and life science industry executives.

Sarah Oliver knew by the third year of her graduate training at New York University (NYU) that she didn't want a career as a research scientist. She enrolled in the FBS program and, shortly after completing it, decided to pursue a career in regulatory affairs. With that objective in mind, she took action: She conducted informational interviews with regulatory affairs professionals and attended regulatory affairs meetings. At one of those meetings she met a Genentech employee who encouraged her to interview for a regulatory affairs internship at the company. Oliver interviewed for the position but refused the offer of an internship. "Much to my surprise, they came back and offered me a full-time job in their regulatory affairs department," she says. She joined the company.
There are many other industry-focused biotechnology certificate programs in the United States, lasting anywhere from a few months to a year or more. Most are located on university campuses or in areas where there's a high concentration of biotechnology companies. Here's a short list.

Perrin Wilson decided midway through her Ph.D. program at Rockefeller University that a life in the laboratory was not for her. After receiving her Ph.D. in developmental neuroscience, she networked her way to a summer internship at a midsized New York City pharmaceutical company. By fall, she was working full time in the company’s business development department. "I think they offered me the internship because they were looking for a person who had a strong technical background and good communication skills," Wilson says. She is currently a manager in business development.

Shortly after starting work on a graduate degree in tumor biology at NYU's medical school, Carolina Pola, a native of Spain, decided that a research career was not for her. While still a Ph.D. student, she enrolled in the FBS program to explore alternatives. "One of the main benefits of the FBS program was that I quickly learned what I did not want to do after receiving my degree," Pola says. She earned her Ph.D. in 2008 and landed a temporary job as an editor at Wiley Publishing. She currently is an associate editor at Nature Medicine in New York City.

Despite the rise of the biotechnology industry over the past 2 decades, only a few universities -- mainly in biotechnology-rich regions -- offer Ph.D. programs that emphasize industrial training. Benefiting from these programs requires thinking ahead -- or being lucky enough to be enrolled at the right institutions.

Dane Wittrup oversees the Biotechnology Training Program at the Massachusetts Institute of Technology (MIT), an interdisciplinary program administered by the university's Department of Biological Engineering. Students participating in the 25-year-old, National Institutes of Health (NIH)-sponsored program "take a broader range of course material to integrate biochemical, genetic, and engineering knowledge," the program description says. "In addition they participate in small seminars identifying the problems at the cutting edge of the application of biotechnology to medical, industrial, and environmental problems."

While students are required to take three core courses that offer an overview of business best practices and industrial drug development, the most important aspect of the program, Wittrup says, is a mandatory internship at a local biotechnology or pharmaceutical company, a feature common to all 19 NIH-funded predoctoral training programs in biotechnology (see box). "This is where the students really learn about the ins and outs of the biotechnology industry," Wittrup says.

Another NIH-funded program is the University of California (UC), Davis's Designated Emphasis in Biotechnology (DEB) Program. DEB began in the early 1990s in response to the rapid growth of the Bay Area's biotechnology industry. In 1999, Judith Kjelstrom took over of the program and increased its capacity from 10 to 220 students. The program requires students to take courses on legal and business best practices and bioethics, a seminar series with industry professionals, and internships of 3 to 6 months at regional biotechnology companies.

The DEB Program is open to graduate students who have passed their Ph.D. qualifying exams in any of 29 participating UC Davis departments. "Our goal is to equip our students with a smattering of leadership, business, and project management skills that they will need to succeed in the biotechnology industry," Kjelstrom says. Many DEB graduates have landed jobs at biotechnology and pharmaceutical companies, and three graduates have started successful companies. "I routinely receive phone calls from companies like Genentech and Amgen inquiring about our students who may be on the job market," Kjelstrom says.

The University of Virginia's (UVa) Biotechnology Training Program is open to all
interested graduate students in the university’s life sciences and engineering departments. Like the MIT and UC Davis programs, the UVa program is funded by grants from NIH and features several core courses, an industrial seminar series, an annual biotechnology symposium, and internship programs. About 50 students have matriculated since 2000 and a majority of them have landed jobs at biotechnology, diagnostics, and science instrumentation companies.

Lessons

All the training program graduates interviewed for this article agreed that their industry internships were among the most important aspects of their training. "It opened my eyes to all kinds of possibilities that I never knew existed," says Bryan Czyzewski, an FBS graduate who received his Ph.D. in 2010 from NYU and is currently working as a research scientist at a New York City start-up. Erwin Gianchandani, a graduate of the UVa program and currently director of the Computing Community Consortium, a National Science Foundation–funded consortium that promotes high-impact computer focused research, says, "My 2-month internship showed me what industrial R&D was all about." Rebekah Neal, another UVa graduate and currently a postdoc at MIT, says, "It allowed me to add that coveted 'industry experience' to my CV."

Several trainees said their experiences helped them develop skills overlooked during their traditional graduate training. "Until I took the FBS course, I had no idea that I could do other things besides basic bench research," says Pola, the Nature Medicine editor.

"If you are undecided about your career, talk to as many other people possible," advises Wilson, the business development manager. "This will help you determine what you may or may not want to do with your career. However, once you figure out what you think you may want to do ... go for it. Waiting until the end of your graduate work when funding is running out and you are pressed for time is a big mistake -- one that may force you to take that postdoctoral position that you desperately wanted to avoid."

Other Industry-Focused NIH-Sponsored Programs

A complete list of biotechnology programs funded by NIH (http://www.nigms.nih.gov/Training/InstPredoc/PredocInst-Biotechnology.htm) is available on the NIH Web Site. All programs funded by NIH’s Biotechnology Predoctoral Training Program (http://www.nigms.nih.gov/Training/InstPredoc/PredocDesc-Biotechnology.htm) require a 2 to 3 month industrial internship.

Institutions Offering Certificate Programs in Biotechnology

Northeast

Roxbury Community College (http://www.rcc.mass.edu/MST/BiotechnologyPrograms_RCC.pdf)

Boston University (http://www.bu.edu/met/programs/undergraduate/biotechnology/)

Columbia University (http://ce.columbia.edu/Postbaccalaureate-Studies/Biotechnology-Certificate-Program)
Biotech Training Programs Expand Employment Options - Science Caree...  http://sciencecareers.scienmag.org/career_magazine/previous_issues/ar...