

## Life sciences workforce trends evolve with the industry

Kathy L Nugent & Lori Lindburg

As the biotech industry grows and shifts within an increasingly global economy, so does its need for talent that spans discovery through commercialization.

The life sciences sector represents one of the most important industries of the twenty-first century. It can lay claim to providing breakthrough products and technologies to combat debilitating diseases, reduce our environmental footprint and feed the hungry, while having a positive impact on the economy. After four-and-a-half years of financial challenges—fluctuating initial public offering (IPO) markets, financial constraints in venture and US National Institutes of Health funding and continued mergers and acquisitions—the biotech market is once again flourishing. National employment in the US life sciences industry totaled 1.62 million in 2012, with these jobs spanning over 73,000 companies<sup>1</sup>. Continued US Food and Drug Administration (FDA) approvals, new IPOs and expanding global markets are requiring companies to fill entry-level to highly advanced positions with qualified, skilled individuals. Moreover, despite year-to-year volatility, the overall trend in the industry has been growth, necessitating continued preparation of talent to meet the needs of a growing, innovative industry.

### The Coalition of State Bioscience Institutes report

To develop a national portrait of the current and projected talent needs of the industry, the Coalition of State Bioscience Institutes (CSBI) conducted a series of interviews with representatives from over 100 life sciences companies within the United States.

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The companies interviewed spanned the five major subsectors of the biosciences industry as defined by the Biotechnology Industry Organization (BIO; Washington, DC, USA): agriculture feedstock and chemicals; drugs and pharmaceuticals; medical devices and equipment; research testing and medical laboratories; and bioscience-related distribution<sup>2</sup>. The interviews were conducted during the first quarter of 2014 and were designed to address current and future business priorities and capabilities and their implications for workforce and training needs.

The interviews and qualitative analysis were conducted in parallel with a quantitative analysis using Burning Glass, a proprietary platform that aggregates, extracts, codes and normalizes job data from more than 23,000 job boards, newspapers and employer websites. These make up the *CSBI Life Sciences Workforce Trends Report*<sup>3</sup>, which highlights the demand of the life sciences industry for critical talent, training and skills and outlines actions key stakeholders should take to ensure that we are preparing a talent pipeline with competencies and insights that will ensure US competitive advantage. Qualitative and quantitative data show that the life sciences industry experienced job growth in the past three years, with a strong need for employees with a broad knowledge base incorporating skill sets from the bench to commercialization. Moreover, the life sciences continues to be a strong growth industry compared to the rest of the public sector.

Though lower than in the prior two years, job postings in the life sciences industry remained at historic highs, with over 73,000 positions listed last year, a 15% increase over 2010 (Fig. 1). According to national job board postings, the greatest demand could be found in region 1 (25% of all postings, followed by region 4 (20%), both regions 6 and 7 (15–16%), region 5 (11%), region 3 (7%) and region 2 (6%) (Fig. 2)).

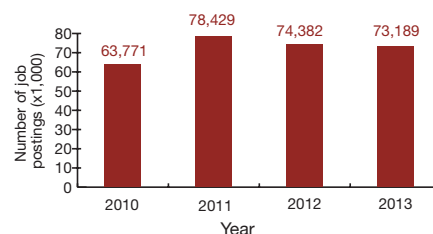


Figure 1 Life sciences industry job postings 2010–2013.

Several themes emerged among hiring managers and industry leaders from all sectors participating in the interviews, including a need for:

- individuals with strong science skills combined with multidisciplinary academic training and experience;
- regulatory professionals who can help bridge the gap between regulatory functions and organization and business activities;
- scientists, engineers and clinicians who possess cross-functional skills that promote strong communication and the ability to interface well with both internal and external partners;
- people with policy acumen who can help navigate health economics and the Affordable Care Act as well as influence legislators; and
- strong and informed partnerships between academia and industry to provide tailored and relevant training to effectively meet industry needs.

### Professional hybrids

The qualitative analysis indicates that employers still need candidates skilled in science, technology, engineering and math (STEM), but want candidates to be equally skilled in disciplines outside of STEM.

Traditionally, the approach to development within the life sciences industry has leaned

heavily on individuals trained in disciplines such as chemistry and biology. However, data from the qualitative interviews reveal that simply having a basic science degree is no longer enough to be successful. The findings suggest that there is an absolute need for “professional hybrids”—individuals who have the skill sets necessary to link scientific knowledge with business acumen to help advance a product or technology through its life cycle. Interviewees said:

“The capability to take a project and integrate business, science and computer skills together to provide solutions is critical.”

“Biology graduates without the capacity to integrate business and science is the biggest challenge.”

“We need engineers with a better understanding of the basic sciences like chemistry and biology.”

“We need people with skills in complementary disciplines.”

**Regulatory knowledge**

In recent years, the regulatory landscape has shifted dramatically, resulting in a demand for candidates who understand current regulatory policies both within and outside of the United States. Company leaders and hiring managers emphasized the need for employees who possess a stronger understanding of industry-specific ways of working, such as compliance with FDA regulations, as well as with quality assurance in product development and regulations. The qualitative interviews revealed a need across subsectors for regulatory professionals who can provide strategic direction at all stages of development. Interviewees also expressed the need for continuous training programs to keep pace with the changing regulatory environment as well as knowledge related to regulatory policies in other countries.

“We need people who have much more experience on the regulatory side, who can represent the interface of science and tech-

nology, influence regulators and successfully defend our marketing applications.”

“Having an understanding of regulatory processes outside of the FDA and EMA [European Medicines Agency] is crucial.” “Regulatory and quality practices will be key both in the R&D phase, across manufacturing and in customer-facing activities.”

**Cross-functional skills**

The ability to work across functions emerged as a dominant theme in the interviews. Specifically, the ability to work in teams in multiple areas simultaneously is highly sought after, representing a shift away from senior scientist positions that tend to be more highly specialized and narrowly focused. In addition, those interviewed cited strong communication and interpersonal skills, time management, professionalism, problem-solving abilities, leadership and agility to manage change as important for scientists, engineers, clinicians and management teams who work within the industry.

“We look for employees who have learned through experience, who have been part of multidisciplinary teams and recognize both the team accomplishment and their role in the team.”

“Individuals with capabilities in communication, leadership, problem-solving and innovative thinking are fundamental to successful company growth.”

“Potential employees need to have the capability to effectively work on a team and have excellent communication skills, especially written.”

“PhDs coming straight from a university can be very narrowly focused and have a hard time adapting to a broader work environment”

“Employees need to be flexible when working across disciplines, as they will often find themselves working in different areas within the company.”

**Policy acumen**

Several interviewees referenced the importance of understanding health economics, reimbursement and the impact of the Affordable Care Act on the life sciences industry. Knowledge of government affairs, particularly the need to educate and build relationships with legislators both locally and nationally to support industry growth, was also viewed as important.

“The changing world of healthcare requires enhanced focus on pharmacoeconomics, government affairs, market access and supply chain systems.”

“An understanding of the Affordable Care Act, Medicare/Medicaid billing practices and reimbursement are very important.”

“As reimbursement continues to evolve as an important issue, we need people who are informed regarding new regulations.”

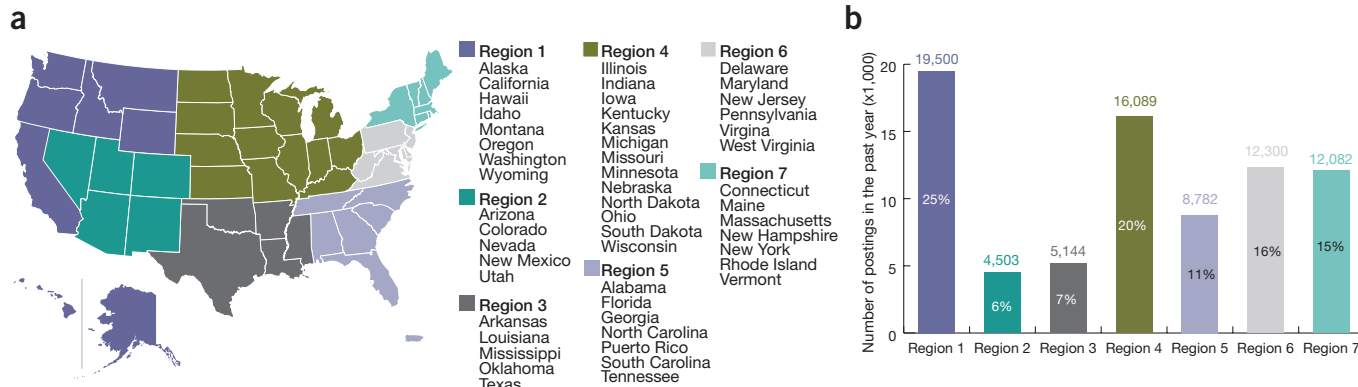
“We need to continue work at the state capital to ensure and secure future funding in an effort to continue building the necessary policy and infrastructure to create a conducive ecosystem.”

**Industry-academic partnerships**

The need for collaborative partnerships between industry and academic institutions was strongly emphasized across the subsectors. This included a particular emphasis on new approaches that incorporate experiential learning models or a learn-by-doing approach, as in internships with biotech companies.

Interviewees also expressed concerns over lag times in getting new hires up to speed, citing the hires’ inability to understand the business aspects of the company environment. Many of them indicated the importance of working with academic institutions to build curricula that are relevant and applicable to industry, and of producing graduates prepared for direct entry into the workplace.

“University knowledge extends the capacity of private companies, while private companies offer a place for students to



**Figure 2** US regional demand for the life sciences industry jobs. (a) Breakdown of US regions. (b) Number of life sciences industry job postings and percentage of total in 2013, by region.

get real-world experience and in some cases, to establish a career.”

“We should expand hands-on training for university students so they have a blend of classroom/experiential work and industry work.”

“We need academic institutions to create programs and educational tracks to produce the necessary talent that life science companies require.”

“Make work experience a required part of the curriculum.”

“Academic institutions need to function like a business and to teach results orientation versus a learning-only orientation.”

Data collected from this study point to the need for industry and academia to join forces and provide unique partnerships that will ensure that current and future workforce demands within the life sciences are adequately met. Recommendations include:

- New interdisciplinary approaches to learning: uniquely designed curricula that integrate STEM with other disciplines, and that provide the business acumen and regulatory knowledge necessary for commercializing science.
- “Educating the educators” about industry needs: development of industry advisory boards to ensure that communication is flowing in both directions so that program

curricula are providing the most relevant industry knowledge and skills while remaining aligned with current and future technologies.

- Creation of experiential learning opportunities where students learn by doing: companies offer “real life” projects that provide tailored benefits for students and no or low-cost research and/or products for industry.
- Designing courses where students must work in teams and across institutions (community colleges and universities) and other disciplines, such as engineering and business, with a goal of disrupting traditional silos, thus facilitating the completion of real-world life sciences projects for research institutions and regional companies.
- Creation of corporate post-doctoral training programs that address relevant skills and business acumen to better prepare post-docs for careers outside of academia.
- Industry and academia working in concert to inform legislators on the importance of providing funding and other incentives for academic and industry partnerships that will develop the critical talent needs for the industry.

### Conclusions

As the life sciences industry continues to grow it must also strive to meet challenges

in funding, regulatory environments, changing healthcare policies, business models, partnerships and strategic alliances. As a result the industry demands a talent pool with a strong knowledge base, with all of the components necessary to translate scientific discovery effectively and efficiently into commercial products. This report points to a clear shift in the industry’s demand for talent away from positions highly specialized and narrowly focused, to a talent pool consisting of individuals who have interdisciplinary academic training and the ability to work broadly across multiple areas and in project teams.

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### COMPETING FINANCIAL INTERESTS

The authors declare no competing financial interests.

1. *Battelle/BIO State Bioscience Jobs, Investments and Innovation 2014* <<https://www.bio.org/sites/default/files/Battelle-BIO-2014-Industry.pdf>>
2. *The Coalition of State Bioscience Institutes (CSBI) Life Sciences Workforce Trends Report 2014* <[http://www.csbinstitutes.org/download/files/reports/CSBI\\_2014WorkforceReport1vFR\\_web.pdf](http://www.csbinstitutes.org/download/files/reports/CSBI_2014WorkforceReport1vFR_web.pdf)>
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