

2018
TALENT INTEGRATION
 California Workforce Trends in the Life Science Industry

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2018 CALIFORNIA WORKFORCE TRENDS IN THE LIFE SCIENCE INDUSTRY

California's life science industry is a major driver of innovation, economic development and job creation, employing more than 360,000 individuals in the state in 2016¹. As part of a dynamic industry characterized by disruptive discoveries, an ever-complex regulatory environment, and the globalization of health care, life science employers must secure the right talent for their organizations to survive and thrive. In this third report since 2014², the Biocom Institute and the California Life Sciences Institute have collaborated to assess and forecast the most pressing talent needs of the state's life science industry. This report provides a snapshot of workforce trends, including some of the key job opportunities and corresponding educational backgrounds and skills that employers seek³. It also provides a unique statewide perspective into the workforce challenges and opportunities industry executives face in driving the industry into the next decade.

BENEFICIARIES OF THE 2018 CALIFORNIA WORKFORCE TRENDS REPORT INCLUDE:



Company executives

who must build organizations, develop talent and allocate resources to address unmet medical and societal needs



Legislators

who must set policy and allocate resources based on industry and community needs



HR professionals

who must develop, engage and motivate staff



Educators and trainers

who must prepare the next generation of industry professionals



Recruiters

who must match available talent with evolving company needs



ABOUT THE STUDY

This report highlights current and anticipated skills needed for life science industry positions in California. The analysis is drawn from three sets of quantitative and/or qualitative data:



Quantitative data from ~9,900 job postings for California life science technical jobs from representative industry NAICS codes, utilizing Burning Glass Technologies (Jan-Dec 2017). Non-technical positions in the industry, such as those in sales, accounting, purchasing, etc. are not included in this sample. Specifics on the filters applied can be found at califscienceworkforcetrends.org.



Survey responses from human resource representatives and hiring managers in 117 California life science companies on recent hiring, workforce composition and hiring challenges. Participating companies span industry sectors and sizes, although representation is skewed more toward drugs and pharmaceutical companies (36%). Participants also include medical device and equipment (21%) and research testing and medical lab (21%) companies. 67% of respondents were from small to mid-size companies (11-150 employees) followed by companies with 151-500 employees at 20%. Companies with over 500 employees and fewer than 11 employees constitute 8% and 2% of respondents, respectively.



To understand the drivers of the life science industry's hiring decisions and its future talent pipeline in more depth, 41 California life science executives were interviewed in early 2018. Their companies range from startups to emerging and multinational companies, and encompass the range of industry sectors, including drugs & pharmaceuticals, medical device & equipment, research testing & medical laboratories, industrial biotech and bioscience-related distribution.

Leaders shared their views on hiring talent, how externalities are shaping their needs for talent, their experiences with academic partnerships and the role of diversity in the workplace. These rich discussions were distilled into 5 key workforce trends that are shaping the talent demands of California's life science industry.

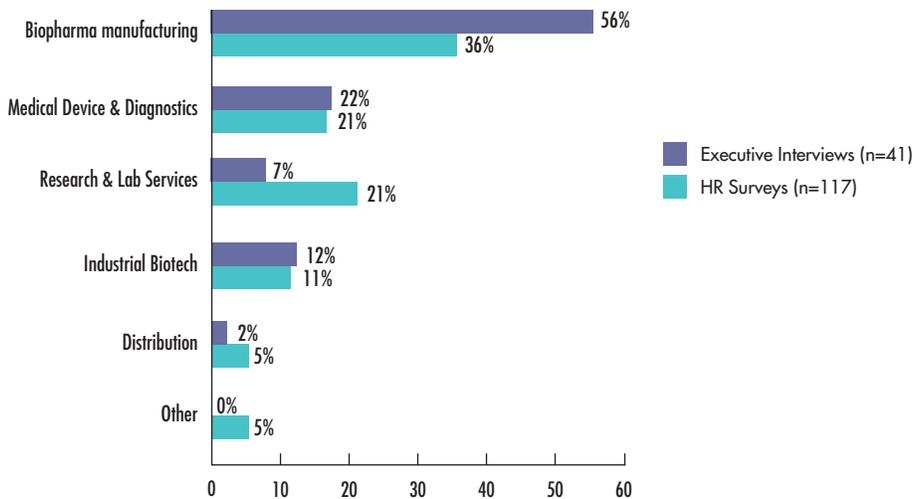


Figure 1 - Sector distribution of companies interviewed and surveyed in this study. Elsewhere in this report, the small number of companies that described their company focus as spanning more than one sector or "other" are treated as "other" for industry segmentation analysis. For a breakdown of the overall life science company sector distribution in the state of California, see the expanded methodology for this report at califscienceworkforcetrendsreport.org.

WHAT ARE COMPANIES LOOKING FOR?

Job and Functional Demand: An analysis of the approximately 9,900 statewide life science job postings for technical occupations from 2017 (Burning Glass Technologies) shows the highest demand for medical scientists - followed by chemists, biologists and clinical research coordinators. Regulatory and quality occupations, when taken together, constitute the highest area of job demand. Similarly, when looking at top specialized skill sets, regulatory and quality together constitute the highest demand (Figures 2A and 2B).



The Bureau of Labor Statistics (BLS) defines life science industry “medical scientist” as an individual with a PhD, usually in biology or a related life science, or an MD degree and conducting research aimed at understanding human diseases and improving overall human health. Burning Glass Technologies (Burning Glass) employs an expanded definition of medical scientist that includes individuals with bachelor’s degrees and a variety of additional job titles such as Clinical Research Associates and Clinical Laboratory Scientists. It is this expanded definition of “medical scientist” presented in Figures 2A and 2B.

Top Occupations: California Life Science Job Postings

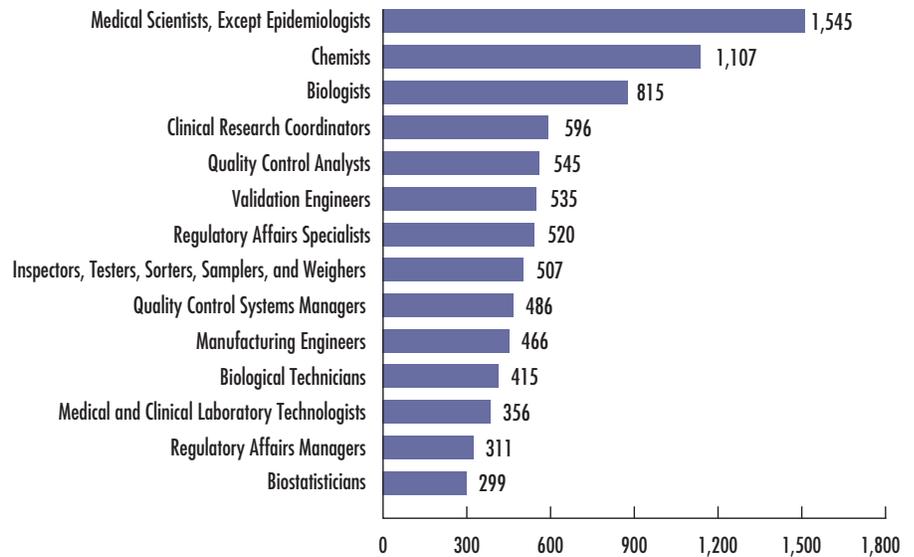


Figure 2A - Top 14 occupations in California based on approximately 9,900 online job posting in 2017 (Burning Glass Technologies)

Top Skills: California Life Science Job Postings

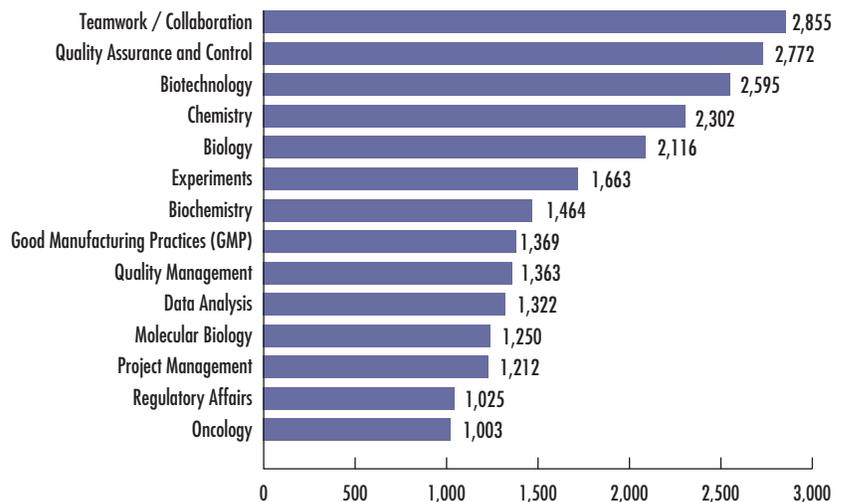


Figure 2B - California life science in-demand skills based on approximately 9,900 online job postings in 2017 (Burning Glass Technologies)

AS COMPANIES EVOLVE, SO MUST THEIR TALENT

“In this competitive space, companies are bringing products to market much more quickly and we expect that to accelerate. It’s critical to improve time from product ideation to market.”

California’s life science industry continues to evolve and adapt to new technologies, increasing globalization, an ever-changing regulatory landscape, increasing marketplace demands for demonstrable pharmaco-economic or other value, and competition with other industries. To remain competitive and relevant, the life science companies we interviewed described a landscape in which their organizations and their workforce must continually evolve, learn and respond to new opportunities.

It typically takes years for a life science company to move from concept to commercial product. A company may begin as a research-only organization. As it develops a product or service, it may grow in size and development and operational capabilities. Eventually it may grow into a commercial organization, adding more business and operational capabilities along the way, by hiring talent or engaging contract workers or outsourcing.

As a company matures through these stages, its talent needs shift and the complex interplay between functions grow. A more mature organization may have many more specialists,

but it also needs employees that can communicate across functional areas and drive informed decision-making while maintaining awareness of changes in the global, environmental and competitive landscape. Companies want employees who can help them innovate the ways they develop new products and services – shortening development cycles and reducing development risks.

Industry executives are seeking employees who come to their organizations with an understanding of how the industry works: how to develop technology into innovative products/services, how the functional pieces fit together and how the external environment impacts internal decisions. Many employees thrive in such a dynamic environment, finding opportunities for learning, growth, creativity and advancement. These complex dynamics however can limit the opportunities for individual contributors who cannot think beyond their functional area, who lack strong communication and interpersonal skills and who are not adaptable.

TRENDS IMPACTING TALENT NEEDS

As California’s life science industry evolves, and new industry sectors appear and expand while previous distinct industries collide, companies need to stay nimble as they innovate in increasingly interconnected marketplaces and ecosystems. This creates complex workforce talent requirements. To complement the quantitative data, we interviewed 41 California life science industry executives, asking each a set of open-ended questions about key developments that are impacting their current and pipeline talent needs. Five key trends emerged from the interviews and are highlighted throughout the report.

FIVE KEY TRENDS

- 1 New technologies and rapid change fuel emerging talent needs**
- 2 Demand for soft skills rises to the top**
- 3 Life sciences and tech converge and compete for talent**
- 4 Diversity of thinking / experiences drives innovation**
- 5 Industry reaps the rewards of academic partnerships**

1 TREND 1 - NEW TECHNOLOGIES AND RAPID CHANGE FUEL EMERGING TALENT NEEDS

"We see the arrival of new technologies that profoundly impact our industry, including CRISPR/gene editing technology, greater access to human cells, including pluripotent stem cells and novel ways of combining these technologies.... We need people who can think outside their core or historic area of expertise to take advantage of the newly available technologies."

"Changes will require dramatically different skill sets over time... In 10 - 15 years we will see a lot less wet lab research and see it replaced by much more computer modeling and in silico chemical design for drug research."

California's life science companies continue to operate in a dynamic and often unpredictable environment. Technological innovations, globalization and shifts in the competitive landscape and regulatory environment require companies to remain vigilant and adaptable to the changing landscape while continuing to innovate.

New technologies are emerging and shifting the ways we think about products, product development and markets. CRISPR/gene editing technology profoundly shifts our thinking and our ability to ask questions about biological systems. Computing technologies continue to impact how the industry works and drives value. New e-technologies can help make clinical trials more efficient than ever before. Products and services are becoming more interlinked and more complex. We now have medical devices, for example, that incorporate hardware, software, connectivity and monitoring capabilities.

Changing external factors are also creating hurdles and challenges for life science companies. Changes in healthcare and reimbursement increasingly demand that life science companies demonstrate the economic benefits of their products and services. Scientific challenges, regulatory hurdles and investor expectations all demand that companies remain focused and adaptable.

Combined, these forces impact the ways companies recruit and think about their workforce. Companies seek employees who are experts in the latest technologies, including proteomics, immune-oncology, epigenetics, regenerative medicine, biomarkers, robotics, AI and 3D printing. There is growing demand for people who can work in environments where large amounts of data, artificial intelligence, massive computing power and processing speeds are key in product development, decision-making and business operations. Much of this expertise for the most advanced technologies comes from academic labs.

Companies also understand that today's hot technology may quickly be superseded by the next wave of innovation. They thus seek people who have a passion for developing, learning, and combining technologies to solve new problems.

"Job responsibilities are shifting throughout the organization. Even lab jobs are requiring new skills... jobs in the past that were predominantly hands-on now require more and more planning, processing and analysis. "

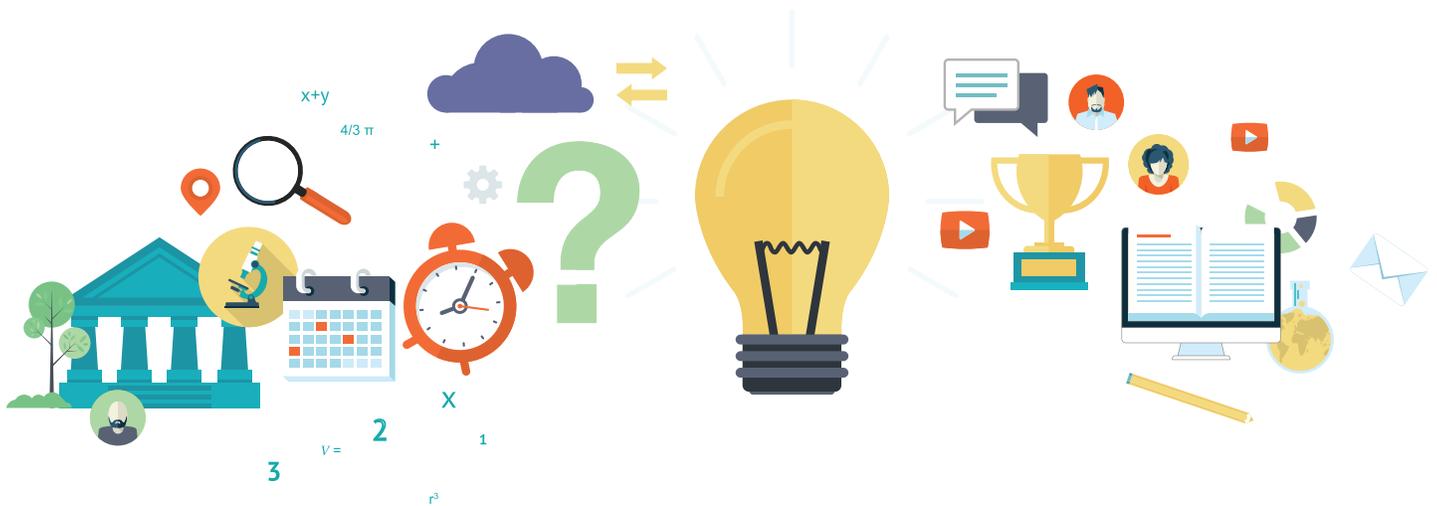
"As our product/service offerings become more complex and incorporate more technology hardware, software and connectivity capabilities, we need to bring in more people who understand how product development works and who understand these kinds of integrated offerings. This creates demand for more expertise in project management, connectivity, systems integration, analytics, Agile and Lean processes."

VALUES BASED HEALTHCARE CONTINUES TO IMPACT TALENT

As in 2016, a number of executives pointed to the impacts of continued rapid changes in the US healthcare industry on their talent needs. The US spends an unsustainably large amount of its GDP on healthcare, and while patients, hospitals and doctors still demand innovative products, payers are less willing to pay for them. Payers are looking to commoditize solutions and pay the lowest cost for a set minimum standard of care. Many companies are responding by shifting from a fee-for-service model to a model more based on economic value and risk sharing.

“The whole industry is suffering from reimbursement and high health care cost issues. Consolidation of the pharmacy benefit management and reimbursement sectors is putting more pressure on controlling healthcare costs at large and on drug prices in particular.”

Employers still look for individuals who can navigate the complex health care system, have regulatory expertise, understand reimbursement, and who are adept at managing relationships and business partnerships. They also continue to express concern that the national discourse on drug pricing adds to their recruitment challenges.



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DEMAND FOR SOFT SKILLS RISES TO THE TOP

“What is more challenging is not the ‘what’ of technical training but the ‘how’ of working in industry. It’s the ‘how’, or soft skills, that are so important. The market for people with strong soft skills and for people who can manage scientists is very competitive. There is lots of high IQ talent but most of it is high IQ-low EQ.”

“We rely on motivated self-starters [who are] able to dig up info, acquire new skills and engage in effective communications to sense the constantly-changing external environment.”

RELEVANCE & RETENTION: JOB ROTATIONS

While not a new phenomenon, several companies cited job rotations as a way of keeping employees relevant, developing their awareness of and ability to function with other functional staff, and as a retention tool.

“Performance of our existing workforce comes through “art” in practicing the business. We support this employee development through lateral job assignments/rotations, on-the-job training and additional training.”

“We rotate employees through job functions. [This] helps them appreciate the other functional perspectives and enables them to ‘play well together in the same sandbox’.”

While new discoveries and the rapidly changing life science environment create demand for new technical skills, executives continue to highlight their overarching need for more employees with strong soft skills throughout their organizations. As companies’ needs evolve and change, so does the desire for nimble, adaptive employees who are willing to continue to learn and grow. Flexibility, creativity, strong verbal and written communication skills, the ability to work well with others, comfort working with ambiguity, and the ability to work in matrix or virtual work environments are frequently cited as necessary and valued skill sets. To thrive in this dynamic and competitive environment, executives seek employees who have “fire in their bellies,” energy, passion, integrity, resilience, interest in taking on more responsibility, and commitment to the company’s success.

As multiple internal and external groups and organizations collaborate for successful product development, companies value employees who appreciate the “big picture”. Such employees take initiative to drive alignment across functional and organizational boundaries to anticipate and solve problems, and proactively identify new opportunities aligned with company goals. They possess the ability to think creatively, and to develop and implement thoughtful, team-driven solutions. Individuals who understand how to lead, persuade and make decisions, and how to energize teams are highly valued. They may need to synthesize solutions with incomplete information, and - in matrix organizations - to influence rather than manage a team of disparate stakeholders. In this environment, collaborators and team players are valued over individual contributors.

People with hybrid backgrounds and strong soft skills can be highly effective, but not easy to find. The hybrid scientist-business professional, for example, may be uniquely qualified to negotiate and sell technical products and services. An engineer with IT expertise might be ideally suited for the medical device team that is building new automation and robotics capabilities into its product line. Technology experts with holistic views of problems or systems who effectively engage with people in other functional areas to solve complex problems are increasingly valued by employers.

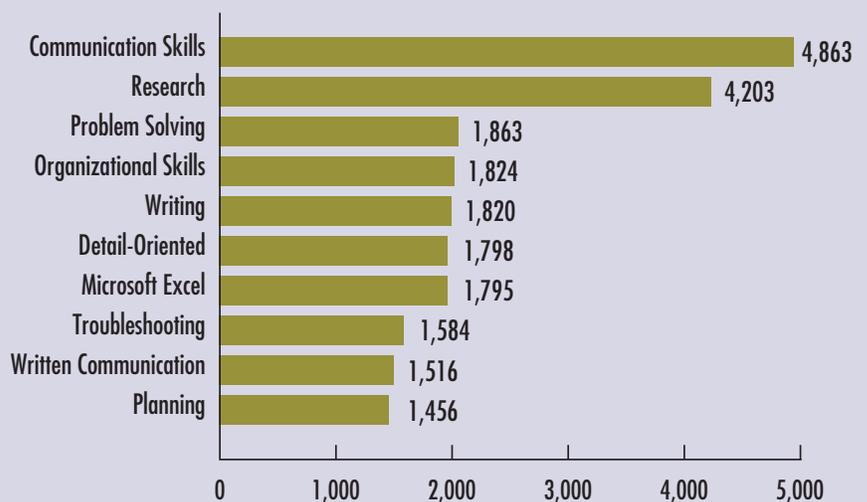


Figure 3 - Communication and Research Skills are the top two soft skills reported in the online job postings. Combined, problem solving and troubleshooting are a high third on the list. (Burning Glass Technologies)

FINDING THE RIGHT TALENT

Of the 117 companies surveyed

- 97% of responding companies report that they have hired employees within the past 12 months. This recent hiring spans the industry with respect both to industry sectors (Figure 4) and company sizes (data not shown).
- 88% of respondents were able to fill positions within 4 months; half of those within 9 weeks or less (data not shown). Regulatory Affairs/Compliance positions continue to stand out as some of the most challenging to fill. 39% of respondents described those positions as “more difficult” or “much more difficult” than average to fill. Quality, Data Analytics and R&D positions were the next most difficult positions to fill (Figure 5).
- Multiple companies also cited significant individual challenges in finding the right candidates for executive and C-suite positions and in multiple functional areas, including analytics, bioinformatics, biostatistics, clinical development, clinical operations, IT and manufacturing.

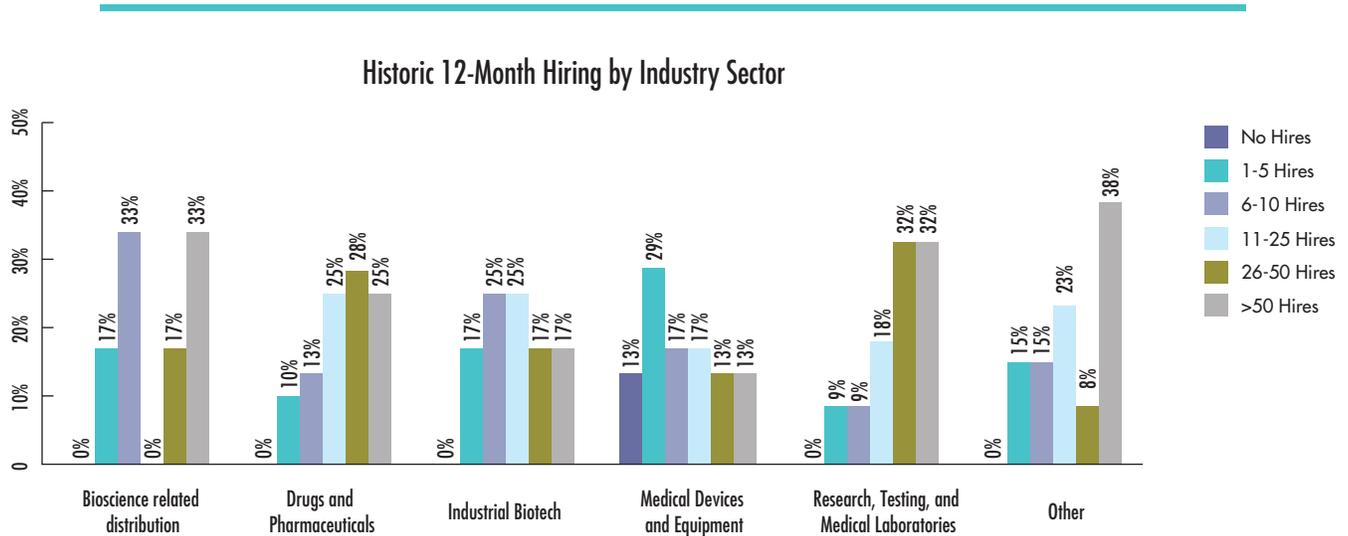


Figure 4 - Companies in the “Other” category include organizations such as integrated research/manufacturing companies, research firms, university hospital, CRO, search firm, venture capital firm, etc. (HR Survey, n=117)

Percent of functional areas in which respondents indicate difficulty filling

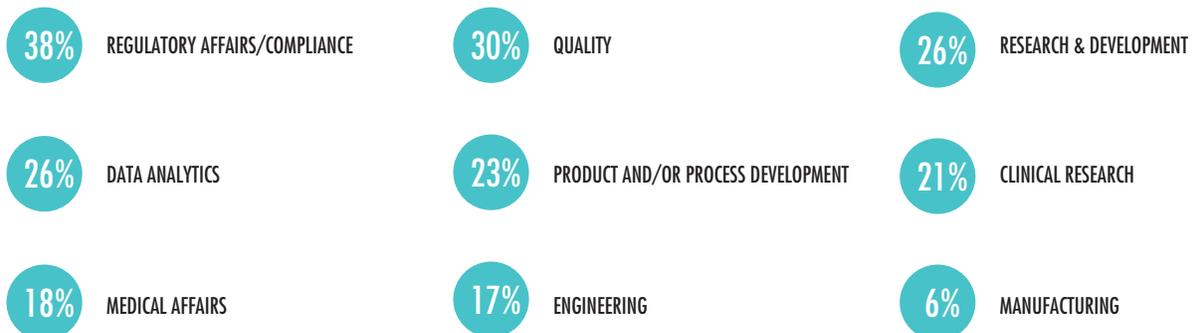


Figure 5 - Source HR Survey, n=117

TREND

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LIFE SCIENCES AND TECH CONVERGE AND COMPETE FOR TALENT

“This convergence of technologies creates great opportunities for nimble, creative people to make a big impact. It also means industries are competing ...for talent in new ways.”

“As the regulated life science industry collides with tech, finding the right talent can be a challenge.... When I talk with young people about their careers they are more excited about Google, Facebook and other tech companies and attracted to the ‘cool factor’ of technology and the rapid development cycle of tech.”

“Medical devices are more integrated with smart phones and there is increasing pressure to make [them] more like consumer electronics - things people wouldn't be ashamed to pull out and use in public.”

Innovation in computing and technology and its increasingly frequent application in the life sciences is creating more overlap and convergence between the tech and life science industries. This convergence opens new opportunities for value creation, changes the customer experience, creates new career pathways, and impacts the marketplace for talent.

Convergence with tech opens new vertical markets and opportunities for life science companies to develop connected devices, systems and networking solution to improve clinical outcomes. Increased adoption of technology into life science products, services and operations also creates new cyber security and hacking risks where the impact of a data breach can mean life or death.

This convergence of industries creates demand for people who can work at the interface of previously non-overlapping industries, think in new ways about global markets and sectors and about customer experiences, and create entirely new roles. Life science companies often find that much tech talent is not comfortable working in the regulated sectors of the life science industry, where product development cycles are long and the tolerance for error and risk is very different than in the tech industry. This limits the mobility of talent from tech to life sciences.

At the same time life science companies increasingly are competing with tech companies for talent, particularly in the San Francisco Bay Area. Marquee tech companies such as Amazon, Google and Apple are entering the field, offering rich benefit packages and rapid product development cycles with attractive resume-building opportunities. Life science companies, however, have the advantage of offering mission-inspired talent the opportunity to have high impact “working toward the greater good” while earning good salaries and enjoying careers of lifelong learning. As an industry, we need to do more to get that message out.



TOP EMPLOYERS

The top 20 life science employers in California, in 2017, as measured by number of job postings accounted for approximately 38% (3,730 of the 9,900) total life science job postings in the state.

Top Employers: California Life Science Job Postings

415	Amgen	153	Quest Diagnostics Incorporated
377	Pfizer	151	Danaher Corporation
290	Genentech	148	AbbVie
275	Thermo Fisher Scientific Inc	146	Celgene Corporation
248	Johnson & Johnson	128	Illumina Incorporated
213	Abbott Laboratories	104	Lawrence Livermore National Laboratory
202	Gilead Sciences	103	Becton Dickinson
178	Merck & Company	93	Allergan PLC
171	General Atomics	93	Novartis
154	Biomarin Pharmaceutical Incorporated	90	Edwards Lifesciences Corporation

Figure 6 - Source Burning Glass Technologies

A LONG-TERM INDUSTRY SUSTAINABILITY THREAT

Long-term industry sustainability is a looming concern for California's life science industry leaders. California used to be such a desirable destination that life science companies had their pick of talent from anywhere in the world.

Ever-increasing infrastructure challenges and affordability have made it difficult for young people to stay in the area. Employees are spending more time in long commutes and more money on housing. This makes it challenging to retain talent, let alone recruit new talent, impacting the industry's ability to compete. Some suggest that legislators need to do more to make California an affordable place for new talent to stay and live.

Nevertheless, a steady stream of companies continue to set up shop in California in order to be on the forefront of innovation and among the preeminent research and talent coalescing around the state's stellar research and academic institutions. While California pioneered the modern life science industry, past performance is no guarantee of future success. We must never forget that this is an incredibly competitive sector, and that policymakers play a critical role in nurturing the biomedical innovation that has made the Golden State a life science powerhouse.

While California is unlikely to lose its leadership in this space, many business, patient, community and industry groups are working closely with local, state and national policymakers to address this issue head on, to ensure that California remains competitive and the world leader in life science innovation.

"The economy and cost of real estate in California are becoming huge challenges for the sustainability of the state's life science industry. Employees can be attracted to low-cost regions such as Texas and the Midwest."

"The Bay Area is a challenging environment in which to operate due to the exceptionally high cost of living and lack of affordable housing...California or the region need to address this if the life science industry in the Bay Area is to remain competitive."

"[The upcoming gubernatorial race] is a great opportunity to highlight the importance of this industry and the challenges of retaining talent in the state."

TREND

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DIVERSITY OF THINKING/EXPERIENCE DRIVES INNOVATION

“Although we don’t have any formal diversity initiatives, we are a very diverse organization. It’s not by design but results from our mission of hiring the best people we can.”

“It’s not enough to assemble a team of people who look different. This historic view of diversity is not sufficient. Instead we look intentionally at the diversity of experiences people have had. Tapping the minds of people who have had different experiences and diverse thoughts is powerful and leads to better ideas and better problem solving.”

“Good ideas become great ones when we can discuss them around the table and include a diverse set of voices.”

“We have a lot of diversity at the VP level and the next level down, but it’s really tough to get the kind of diversity that people are expecting at the C level and the next level down because those individuals are in such demand now. The encouraging thing is there is a really good crop of individuals out there that are moving up the ladder. So, I’m hoping it’s not going to be as difficult in the next 3-4 years as it is right now.”

California life science industry leaders are committed to diversity and understand its importance in driving innovation. Company leaders frequently describe diversity as “diversity of thinking” or “diversity of experience” and recognize its importance across their organizations and in the way they work: from entry-level employees to the board of directors; from advisory boards, and patient advocacy groups to the experiences of customers, partners, and clinical trial subjects. Most company leaders are highly attuned to diversity and inclusion within their organizations and can point to specific examples of why diversity matters. Many readily point to examples of existing diversity within their own companies, whether or not they have formal diversity initiatives or metrics.

While many life science companies have highly diverse teams, they acknowledge that they still have work to do to reach internal diversity goals. Where diversity gaps exist, they generally are at the very tops of organizations – company leadership teams and boards.

Several companies described specific goals and plans to increase the gender diversity among their senior management ranks and boards. One company described grooming women for advancement by giving them stretch assignments earlier than they would otherwise. Another set up a training program to groom women leaders to be future industry board members. Because so many organizations are seeking to do the same thing, they are finding it very competitive to find senior women board candidates.

Executives described a wide array of programs and initiatives to build and retain diverse employees throughout their workforce ranks. One executive has a world map in his office with a pin marking the birth location for each company employee to help him monitor diversity. Other companies do not proceed with hiring decisions until their candidate pool meets their candidate diversity targets. Others have taskforces that monitor internal hiring and promotion decisions to flag potential biases. One company has tapped diversity mentors to build and maintain inclusive work environments for their diverse workforce.

HIRING MANAGERS REPORT ON “FORMAL” DIVERSITY INITIATIVES

Only 13-15% of the 117 companies surveyed have indicated they have “formal” diversity initiatives for gender or race for non-management hires; 10%-12% for management hires, and 3%-5% at the board level. Those companies with diversity training typically offer it for management and non-management. (HR Survey, n=117)

INSIGHT INTO DEMAND

88% of respondents anticipate expanding their employee headcount across major functional areas during the next 12 months, particularly in Research & Development, Quality, and Regulatory Affairs/Compliance (Figure 7).

Company 12-Month Plans to Add Headcount by Functional Area

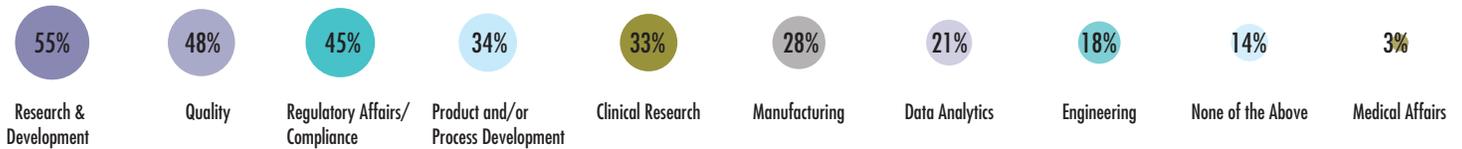


Figure 7 - Source HR Survey, n=117

Respondents rely on a variety of sources to identify and recruit talent (Figure 8). In recruiting experienced talent, most companies use a combined approach of engaging recruiters, posting on job boards and tapping internal networks.

Companies Rely on Variety of Approaches to Source Talent

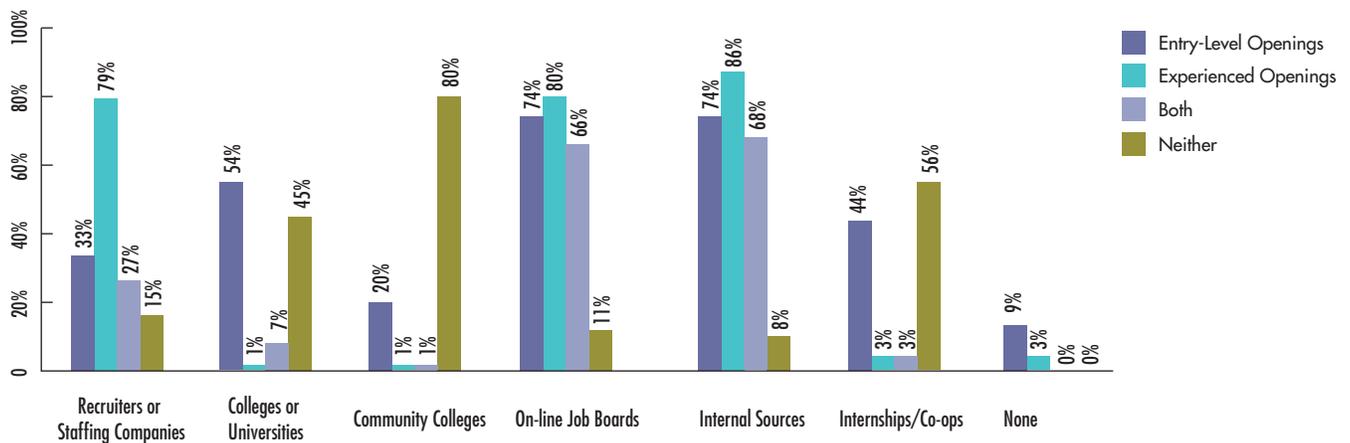


Figure 8 - Source HR Survey, n=117

TREND

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INDUSTRY REAPS THE REWARDS OF ACADEMIC PARTNERSHIPS

“Being near these universities allows us to more easily have open discussions in pre-competitive spaces.”

“[In collaborative projects between industry and universities] the onus is on industry to make sure they are engaging with more than just the PI, but also with the students to influence their understanding of drug development and our business model.”

Life science companies have a rich history of partnering with academic institutions for discovery research, technology licensing, drug candidate evaluation in disease models, clinical development and advisory board service. Many life science companies are exploring new approaches to partnering with academic institutions, many noting the misalignment of industry and academic incentives that have traditionally limited partnerships.

Companies continue to deliberately locate R&D operations near academic partners. They invest significant time in building deeper relationships with academic departments more so than in the past when relationships were more focused on individual professors or key opinion leaders at educational institutions. They are also sending their employees to partner campuses to participate in training, workshops or other events to learn side-by-side with their academic colleagues in order to establish stronger relationships and build trust.

Companies and educational institutions have also developed a number of innovative programs with academic partners at all levels to provide young people with industry exposure and experience. In one example, industry and academic partners collaborate in a co-op program in which graduate students spend six months in an academic lab followed by six months in an industry lab. Another company is investing in a large university lab and co-manages the hybrid academic-industry lab with its academic partner, providing multiple benefits for both organizations and unique learning opportunities for the lab's students and post-doctoral fellows.

Recognizing the importance of reaching students early, several companies are working with local schools to develop or customize curriculum that educates students on how the industry works and the skills it needs. They offer company tours and job shadows, give informational interviews and career talks, serve as mentors on research projects, and help teachers develop and deliver hands-on science modules with real-world applications. These companies and individuals recognize the need to inspire and develop an affinity for science early in order to attract more students - particularly underrepresented students - into STEM careers.

DEGREE AND EXPERIENCE REQUIREMENTS

Approximately 7,050 of the 9,900 California job postings in 2017 listed degree preferences in combination with years of experience. This data provides information on both the preferred and minimum/required education levels listed in job postings. For this reason, a job posting may be counted in more than one of the educational categories shown in Figure 9. An analysis of those 2017 California job postings shows that approximately 7% require or prefer a high school or associates degree only; 48%, a Bachelor's degree; 45%, an advanced degree.

Desired Experience & Education in Online Job Postings

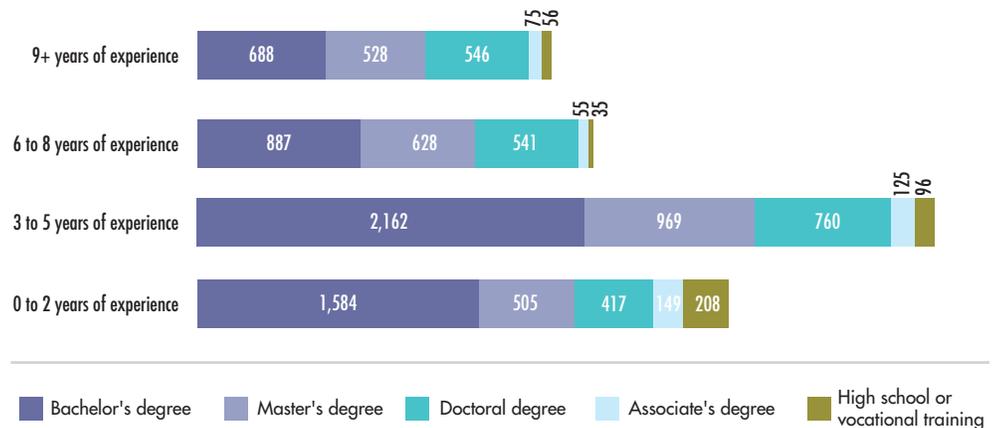


Figure 9 - Represents approximately 11,000 instances of a specific degree preference or requirement combined with years of experience from the universe of 7,050 job postings that listed both. (Burning Glass Technologies)

H1B Visa Holders and Contract Workers

We asked companies what percentage of H1B visa holders and contract workers make up their workforce:

H1B visa holders: Hiring of H1B visa holders is common across the industry, with greater participation by larger companies. 89% of the very large (>500 employees) companies have H1B visa employees representing, on average, 7.5% of their total workforce. 52% of the smaller companies (<500 employees) have on average 5% of the workforce staffed by H1B visa holders (data not shown)

Contract workers: Across industry sectors, 14% - 33% of companies rely on contract workers, with very small and very large companies reporting greater numbers of contract workers (Figure 10).

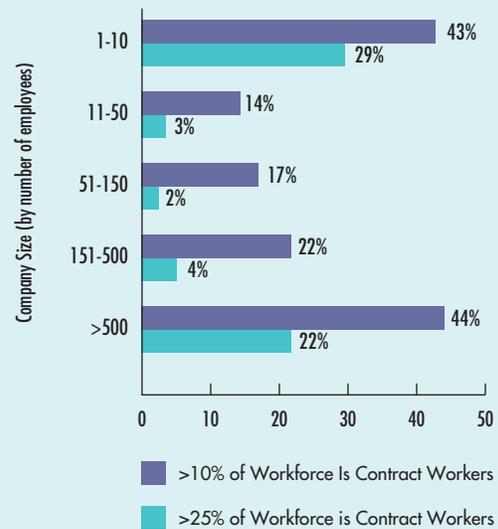


Figure 10 - Source HR Survey, n=117

TO PROVIDE INTERNSHIPS OR NOT

Internship programs with local educational institutions continue to be a coveted way for students to gain the industry experience and hands-on learning that companies continually state they want. Not only do internships provide invaluable industry experience for (community) college and graduate students in technical fields, but increasingly for students in business and non-technical fields as well. Industry internships can make candidate employees much more attractive to employers for entry-level positions, and several companies cite internships as a valuable source of pipeline talent, hiring students when they complete their programs.

Many companies have also developed internships to inspire an early appreciation for careers in the industry. Most internship programs, however, focus on college students, graduate students and post-doctoral fellows helping them to supplement pre-existing technical training with critical hands-on work experience. High school internship programs are rare, which suggests that companies need to find other ways to engage with students to help nurture and develop their interest in the life sciences.

While there is no question that internships can play an important role in new talent development, many companies are reluctant to develop such programs out of concerns for time investment, capacity, liability issues, and more. This is particularly true of smaller companies, who point to the HR and other resources available to large pharmaceutical company internship programs.

Life science startups, however, are often a great source of internships for (community) college and graduate students. Staff-starved startups have figured out a way to augment their own capacity, while providing students with valuable exposure to life science techniques and startup culture. In best case scenarios, these young companies “grow their own” and bring on students as employees as their companies grow.



Several school programs that seek to provide industry-relevant experience for their students lament the lack of internship opportunities available in life science companies and organizations. Some suggestions for expanding internship programs include:

Share internship program best practices to help peer companies understand how to develop successful, rewarding, and cost-effective programs.

Create win-wins for startups and students by making lab space available to entrepreneurs who take on interns.

Develop “reverse internship” programs where industry professionals supervise student research at their schools, with regular company site visits to present their findings.

Build more deliberate training into internships, allowing students to explore career options, functions and skills beyond their assigned internship project scope.

RECOMMENDATIONS

GROOMING THE NEXT GENERATION OF TALENT: MORE WORK NEEDED

As in prior years of this report, executives continue to lament the lack of preparedness of students coming out of university programs. Some criticize institutions for focusing on developing talent for an increasingly small number of academic positions rather than for high-demand careers in the industry. This leaves numerous graduate and post-doc job seekers ill-prepared for jobs in the corporate sector. The charge is similar for recent 4-year graduates who many executives feel are not well-prepared for entry-level positions. Fresh college graduates typically don't understand how industry works, its culture, the importance of soft skills and teamwork over individual contributions, the basics of product development or the fundamentals of business. As a consequence, some companies exclusively or predominantly hire people with prior industry experience.

"If we don't get them early, we've lost them by the time they've reached their teens."

EARLY CAREER EXPOSURE NEEDED

Too many young people are still unaware of the vast and exciting careers available in the life science industry, and the opportunities to move into well-paying, interesting, mission-driven jobs that provide lifelong learning opportunities. Many students thus don't understand the importance of early STEM education in providing access to this career pathway.

This lack of awareness is especially acute among populations most underrepresented in STEM careers (i.e., women, people of color, economically disadvantaged) who often do not have industry role models and who thus opt out of STEM pathways altogether as early as middle school. This lack of pipeline diversity makes it more difficult for industry leaders to build the diverse teams that they tell us drive innovation. Most executives agree that we cannot wait until students reach college or graduate school to get students excited about careers in the life sciences.

Industry-academic partnerships that expose young talent to the industry, its culture and the drivers of life science innovation, can better prepare students for academic and career success. Many of those interviewed agreed that more should be done to foster academic partnerships to help develop the next generation of talent. Some ideas include:

Address the foundational factors that misalign incentives between companies and academic institutions.

Collaborate more on designing curriculum in areas that are meaningful and that drive innovation for industry.

Create more opportunities for industry and academic professionals to collaborate on advisory boards and roundtables, and engage in greater dialog about talent development, education and innovation.

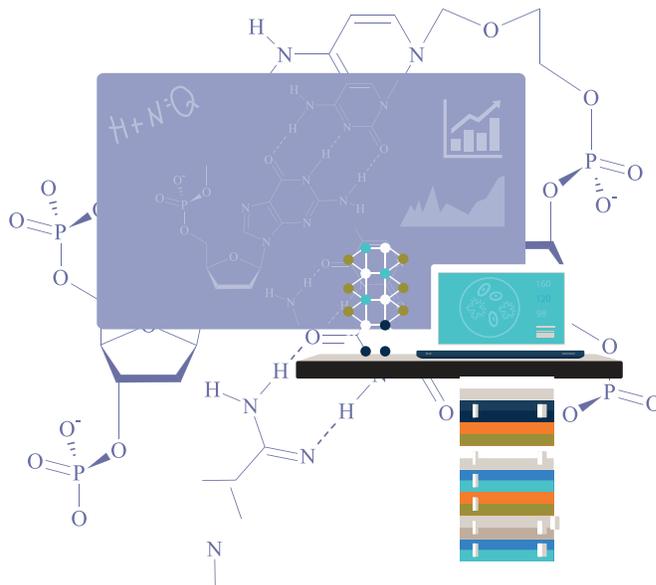
Increase focus of partnership programs on technical schools and community colleges where hands-on learning is emphasized.

RECOMMENDATIONS CONT.

Small companies often lack the resources to develop partnerships with academic institutions. Many of them expressed interest in doing more with academic partners – from participating more extensively in internship programs to establishing more R&D collaborations.

There are numerous pilot programs and initiatives underway to better prepare talent for future life science industry jobs. Companies are aware of some of these, but the means for sharing impact metrics and disseminating best practices are less clear. Some programs and approaches that might be helpful in grooming the next generation of life science industry talent include:

- Creating regional industry-academic advisory teams to develop strategic roadmaps that identify drivers of life science innovation and the skills and training needed to realize those roadmap destinations.
- Working with industry partners to design research projects that require critical thinking and the application of academic knowledge to real-world industry workplace challenges for students in STEM academic programs.
- Designing industry-academic partnerships in ways that allow students and post-docs to participate and gain working exposure to industry partners and culture.
- Expanding mentoring programs, particularly for populations that are underrepresented in STEM fields.
- Encouraging student participation in professional industry association networking and educational events
- Training students on soft skills (e.g., communication, working on teams, persuasion, leading by influencing, critical thinking, problem solving, getting along with others, dealing with ambiguity) and industry job readiness skills (e.g., understanding industry culture, decision-making, value drivers and economics)



¹ 2017 Biocom California Economic Impact Report, note that the 2018 California Life Sciences Association Life Sciences Industry Report, using a different methodology, indicates nearly 300,000 employees.

² 2016 Talent Integration: California Workforce Trends in the Life Science Industry and 2014 Talent Integration: California Workforce Trends in the Life Science Industry, Biocom Institute and the California Life Sciences Institute (prior to 2015, Bay Bio Institute).

³ Interviews and job postings data for the 2018 California report are also included in a national report of the Coalition of State Bioscience Institutes (2018 CSBI National Workforce Trends Report), to which the Biocom Institute and the California Life Sciences Institute belong. As appropriate, some of the analyses, recommendations and quotes can be found in both reports.

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DATA TEAM



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