

BIOTECHNOLOGY EMPLOYER NEEDS ASSESSMENT REPORT

BIOTECH ISSUES

Mention biotechnology and many people think of the latest pharmaceutical drugs being developed to treat illness. However, biotechnology encompasses a wide range of products and processes. From drugs and medical devices to biofuels and agricultural products, biotechnology applies to almost every facet of our daily life. Biotechnology can be defined simply as “the application of science and technology to living organisms.” As a cutting edge field, biotechnology has enabled us to make discoveries toward curing disease, saving lives, feeding the world, finding alternative energy sources, developing green manufacturing technology, and much more (Employment Development Department [EDD] 4/13, p.3).

The three major industry groups of the biotechnology sector include:

- Biotechnology – firms that are engaged in manufacturing ethyl alcohol, cellulosic and noncellulosic organic fibers, soap and other detergents, polish and other sanitation goods, surface active agents, firms that are engaged in research and development, as well as testing and medical laboratories.
- Medical Devices, Equipment and Supplies – firms that are engaged in manufacturing electromedical and electrotherapeutic apparatus, analytical laboratory instrument, irradiation apparatus, laboratory apparatus, surgical and medical instruments, and surgical appliances and supplies.
- Pharmaceuticals and Related Manufacturing – firms that are engaged in medicinal and botanical manufacturing, pharmaceutical preparation manufacturing, in-vitro diagnostic substance, and biological product manufacturing. (Northern California Center of Excellence, 2010. P.5)

California leads the country in total life sciences investment. For the first three quarters of the year, California attracted \$1.8 billion, which is more than the combined total of the next eight states (Mass., Penn., Texas, Ohio, Wash., N.J., Minn. And Ill.) Of that total, \$1.18 billion went into biotechnology, and the remaining \$779 million went into medical devices (California Biomedical Industry 2013 Report). Regionally, the Bay Area has the largest cluster of biomedical entrepreneurs and employees, with nearly 850 companies and more than 47,000 workers, representing almost one-third of the state’s biomedical jobs (Johnson, 2013). The Bureau of Labor Statistics estimates employment in biopharmaceutical and medical device manufacturing will increase 10 percent in this decade. (BioSpace, 2013 p.5). In San Mateo County, biotechnology companies will need to increase their workforce.

There are numerous questions about the biotech industry in San Mateo County: Which companies are hiring for entry-level biotech jobs? What skills are needed for these positions? What skills gaps can the Colleges address through education and training? We set out to answer these questions in this assessment of biotech employer needs.

Detailed labor market predictions for the biotechnology industry present a complex challenge. Traditional labor market classifications such as biological and chemical technicians do not capture the variety of jobs in biotechnology. Position titles shift within the biotechnology industry and many jobs are classified under other categories that are not specifically biotechnology. Other categories where biotechnology jobs can be found include manufacturing or professional services. The biotech industry has diverse job opportunities that span multiple classifications. Using a variety of data sources, we were able to gain an overview of the biotech labor market in the County.

Projections for biotech positions through the Economic Modeling Specialists Incorporated (EMSI) database show demand occupations with a large number of jobs in biotechnology throughout San Mateo County:

<i>Position</i>	<i>2012 Jobs</i>	<i>2017 Projected Jobs</i>	<i>Annual openings</i>
Biological Technicians	739	776	32
Chemical Technicians	198	226	33

Job ad postings show where most biotech jobs openings are within the County. In January 2013, EDD reported Top Job Ads by Company for San Mateo County for calendar year 2012. Many of the companies are biotechnology related, or serve the biotechnology industry.

<i>Company</i>	<i>Job Ads Posted</i>
Genentech	791
Gilead	345
Roche	193
Onyx	143
Kelly (Staffing agency that serves biotech)	95
Aerotek (Staffing agency that serves biotech)	85
TalentBurst (Staffing agency that serves biotech)	94

Source: Ruth Kavanagh, Labor market Consultant for EDD

While labor market projections and job ads do give us generalized information about the industry, further study is needed to identify specific skills gaps.

ASSESSMENT PROCESS

Our effort to understand entry-level biotechnology needs in San Mateo County began with labor market data. An internal work group comprised of Faculty and Deans from science and biotech-related fields at all three Colleges analyzed data and met to discuss how to assess biotech labor market needs. Given the complexity of data, we chose a multistage approach to our assessment:

1. *Interviews with leading biotech-related organizations throughout the Bay Area:* Interviews were designed to reveal labor market needs otherwise not captured with traditional data such as EMSI and EDD. Five biotech organizations were interviewed about entry-level biotech skill gaps and hiring needs in the bay region: Bio-Link; Center for Excellence; Bay Bio; California Applied Biotechnology Center; and Biotechnology Human Resource Network.
2. *Interviews with prominent staffing agencies specializing in biotech:* Three leading staffing agencies that specialize in biotech were interviewed to identify labor market skills gaps: Kelly Scientific; Aerotek; and Bayside Solutions. Each of the staffing agencies serve major biotech employers such as Genentech and Novartis.
3. *Interviews with employers and staffing agencies at the BioSpace career fair:* This large Career Fair, held on June 6, 2013, included seven biotech employers and three staffing agencies. Nearly 700 job seekers were in attendance.

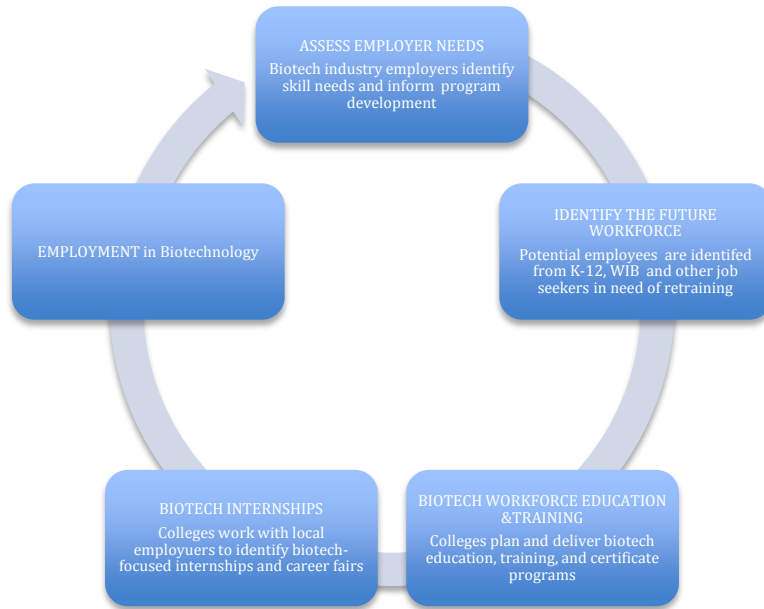
FINDINGS FOR THE COLLEGES

All interviewees confirmed both the complexity of the data and the demand for entry-level biotech training. They know that programs do exist to address the skills gaps in their industry and believe that classes or certificates in biotech or manufacturing are desirable. Graduates of biotech certificate programs such as those offered through Ohlone College are recognized by the industry as well prepared for entry level work.

Within the Bay Area, community colleges currently offer programs that address a range of specializations. East Bay colleges and San Francisco City College offer general biotechnology programs as well as some specializations. Colleges in San Mateo County and Santa Clara County do not currently offer biotech training to meet industry needs. There is a great opportunity to develop a strong biotech program that would serve San Mateo County and the South Bay area.

Industry association experts interviewed recommend that SMCCCD identify a regional biotech focus and design a program to address that need. They stressed that successful programs require a strong infrastructure. The following graphic describes the infrastructure recommended by leading experts:

Recommended Infrastructure for Biotech Program Development



Biotech employers provide the foundation for the infrastructure. They offer information about skills gaps, internships and employment opportunities. Their input contributes to program relevance. The future workforce may be identified through K-12 STEM (Science, Technology, Engineering and Math education) and Workforce Investment Boards (WIBs) who can refer those looking for career retraining to College programs. When the biotech education and training programs are completed, biotech employers can provide internships and jobs.

Skills & Credentials Required

- *Companies state that an Associate Degree can fulfill the minimum education requirement, and experience is a plus.* Experience in a manufacturing environment, some science or lab experience, and good work skills are highly desirable to biotech employers. Any understanding of the biotech industry is seen as positive. Mechanical aptitude and repetitive motion skills such as those of an Auto Technician present another desirable skill set.
- *Entry-level positions requiring only a certificate or Associate degree are largely found within manufacturing environments.* Candidates with biotechnology related certificates, Associate degrees, along with industry experience are placed in operations positions such as: Bulk Operations and Filling; Manufacturing Technician (commercial fill); and Inspection & Packaging. Positions requiring a Baccalaureate degree are often classified as entry level and are valued slightly higher than Associate degrees. Most often, candidates with Associate and Bachelor’s degrees are placed in similar jobs. Staffing agencies believe that many positions are filled internally through referrals. Internships provide opportunities for students to learn about and apply for entry level positions.

- *Staffing agencies report that employers invest in extensive on the job training.* As a result, they want workers who will stay in their jobs for long periods of time.
- *Worker flexibility is key to enter the industry.* Employers demand flexibility and the ability to work in a 24/7 operation. Shifts will fluctuate and very few entry-level workers or new hires will get day shifts.
- *Entry-level lab positions are not commonly offered to biotechnology Associate degree graduate.* Lab positions are most often filled with candidates holding Masters degrees.

Skills Gaps:

Employers identified the following baseline skills that a biotechnology worker would need:

- General Manufacturing Processes training (GMP)
- Aseptic technical skills for a sterile environment
- Basic biology and microbiology
- Basic chemistry
- Basic math/algebra (used to create different formulations)
- Occasionally a need for Histology with the required state certification
- Hands on work experience

IMPACT ON DISTRICT PROGRAMS

Based on assessment findings and consultation with the California Applied Biotechnology Center, Skyline College is updating their biotechnology certificate program. The proposed certificate will be submitted to the state for approval in 2013 with an implementation date of Fall 2014. Skyline's biotech certificate will include the following curriculum:

BIOTECHNOLOGY TECHNICIAN CERTIFICATE

Required Courses:

Biotechnology Core

BIOL 422	Foundations of Biotechnology	1 unit
BIOL 416	Laboratory Skills for Biotechnology Technicians	4 units
CHEM 416	Chemistry Laboratory Skills for Biology Technicians	2 units
CAOT 200	Introduction to MS Office Suite	2 units

and

One of the following Basic Chemistry Lecture/Labs)

CHEM 192	Introductory Chemistry	4 units <i>or</i>
CHEM 410	Chemistry for Allied Health Professions	4 units

and

One of the following Basic Biology Lecture/Labs (or both 170/171)

BIOL 110	Principles of Biology	4 units <i>or</i>
BIOL 101	Man in a Biological World	4 units <i>or</i>
BIOL 170	Principles of Applied Science	3 units <i>and</i>
BIOL 171	Laboratory Principles of Applied Science	1 unit <i>or</i>
BIOL 240	Microbiology	4 units

Plus a minimum of 1 unit from the following

BIOL 130	Human Biology	3 units
BIOL 426	Genetic Engineering	1 unit
BIOL 430	Introduction to Immunology	1 unit
BIOL 432	Fermentation Technology	1 unit

Total Required units: 18 units

The District will focus on the following next steps to implement a SMCCCD biotechnology program:

1. Build a solid infrastructure for the biotech certificate program. In Fall, 2013, a lead faculty person will convene an Advisory Committee for the Biotech certificate program at Skyline. It is recommended that the Advisory Committee include the following industry leaders:
 - a. BayBio
 - b. California Applied Biotechnology Center
 - c. Employers representing biotech and biomedical companies. Leading employers in the South Bay to recruit include:
 - i. Gilead
 - ii. Onyx Pharmaceutical
 - iii. Genentech
 - iv. Novartis Pharmaceuticals Corporation
 - v. Hyperion
 - vi. Bayer
 - d. K-12 Education Representative from STEM Programs
 - e. San Mateo County Workforce Investment Board

The Advisory Committee will validate the skills gap to be addressed as well as program design. In addition, they will advise about future specialization courses and possible internships.

2. All three Colleges will partner with the California Applied Biotechnology Center at Ohlone College to offer community workshops for local biotech employers, possibly as contract education or through the Community Education Program. The Center has a list of

workshops facilitated by industry leaders that have been successfully offered in the East Bay. These workshops will help to increase the visibility of the new biotech program and position the SMCCCD as a biotech thought leader.

3. Pursue grant funding for specialized biotech training opportunities from the federal or state resources.
4. Launch the Biotechnology Technician Certificate Program by Fall of 2014.
5. Continue investigation of other specializations within the field that are needed by local employers

References

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