** Biotechnology and Biomedical Technology Occupations Labor Market Information Report**

**Cabrillo College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

March 2019

# Recommendation

Based on all available data, there appears to be an undersupply of Biotechnology and Biomedical Technology workers compared to the demand for this cluster of occupations in the Bay region and in the SC-Monterey sub-region (Monterey, San Benito, Santa Cruz and Counties.) There is a projected annual gap of about 301 students in the Bay Region and 13 students in the SC-Monterey Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0430.00 - Biotechnology and Biomedical Technology in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Cabrillo College and in the region.

# Introduction

This report profiles Biotechnology and Biomedical Technology Occupations in the 12 county Bay region and in the SC-Monterey sub-region for a proposed new program at Cabrillo College.

|  |
| --- |
| * **Biological Technicians (SOC 19-4021):** Assist biological and medical scientists in laboratories. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.
 |
| Entry-Level Educational Requirement: Bachelor's degree |
| Training Requirement: None |
| Percentage of Community College Award Holders or Some Postsecondary Coursework: 35% |

# Occupational Demand

**Table 1. Employment Outlook for Biotechnology and Biomedical Technology Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Biological Technicians | 4,496 | 4,959 | 463  | 10% | 2,716 | 543 | $16.69  | $25.60  |

*Source: EMSI 2019.1*

**Bay Region** includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

**Table 2. Employment Outlook for Biotechnology and Biomedical Technology Occupations in SC-Monterey Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Biological Technicians | 126 | 131 | 5  | 4% | 66 | 13 | $13.84  | $29.80  |

*Source: EMSI 2019.1*

**SC-Monterey Sub-Region** includes Monterey, San Benito, Santa Cruz and Counties

### Job Postings in Bay Region and SC-Monterey Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (March 2018 - Feb 2019)**

| Occupation | Bay Region | 4- Counties | SC-Monterey |
| --- | --- | --- | --- |
|  Biological Technicians | 1,377 | 106 | 13 |

*Source: Burning Glass*

**Table 4. Top Job Titles for Biotechnology and Biomedical Technology Occupations for latest 12 months (March 2018 - Feb 2019)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Common Title | Bay | 4- Counties | SC-Monterey | Common Title | Bay | 4- Counties | SC-Monterey |
| Research Associate | 555 | 40 |  | Research Associate, Information And Technology Industry | 15 |  |  |
| Development Associate | 98 | 5 |  | Senior Research Associate, Oncology | 11 |  |  |
| Staff Research Associate | 68 |  |  | Research Associate, Cell Culturing | 9 | 1 |  |
| Research Technician | 52 | 4 |  | Research Associate, Oncology | 9 | 1 |  |
| Biological Science Technician | 36 | 8 | 7 | Research Associate, Drug Discovery | 8 | 2 |  |
| Research Associate, Laboratory | 32 |  |  | Research Associate, Flow Cytometry | 8 |  |  |
| Senior Associate Research Associate, Research | 31 |  |  | Research Associate, Genome, Engineering | 8 | 1 |  |
| Senior Research Associate | 26 | 4 |  | Research Associate, Pharmacology | 8 |  |  |
| Research Associate, Engineering | 19 | 1 |  | Biological Technician | 7 |  |  |
| Staff Research Associate, C++ | 19 |  |  | Medical Device Specialist, Microbiology | 7 | 1 |  |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Biotechnology and Biomedical Technology Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry – 6 Digit NAICS (No. American Industry Classification) Codes | Jobs in Industry (2017) | Jobs in Industry (2022) | % Change (2017-22) | % in Industry (2017) |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715) | 1,504 | 1,572 | 1% | 34.1% |
| Research and Development in Biotechnology (except Nanobiotechnology) (541714) | 769 | 818 | 44% | 17.7% |
| Colleges, Universities, and Professional Schools (State Government) (902612) | 356 | 357 |  (3%) | 7.8% |
| Colleges, Universities, and Professional Schools (611310) | 323 | 324 | 6% | 7.0% |
| Pharmaceutical Preparation Manufacturing (325412) | 323 | 311 | 2% | 6.7% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 167 | 165 |  (2%) | 3.6% |
| General Medical and Surgical Hospitals (622110) | 139 | 138 |  (5%) | 3.0% |
| Testing Laboratories (541380) | 128 | 130 | 1% | 2.8% |
| Medicinal and Botanical Manufacturing (325411) | 100 | 111 | 42% | 2.4% |
| State Government, Excluding Education and Hospitals (902999) | 65 | 66 | 6% | 1.4% |
| Colleges, Universities, and Professional Schools (Local Government) (903612) | 65 | 64 | 5% | 1.4% |
| Local Government, Excluding Education and Hospitals (903999) | 56 | 57 | 5% | 1.2% |
| In-Vitro Diagnostic Substance Manufacturing (325413) | 51 | 53 | 29% | 1.1% |
| Research and Development in Nanotechnology (541713) | 56 | 48 |  (16%) | 1.1% |

*Source: EMSI 2019.1*

**Table 6. Top Employers Posting Biotechnology and Biomedical Technology Occupations in Bay Region and SC-Monterey Sub-Region (March 2018 - Feb 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | 4- Counties | Employer | SC-Monterey |
| Bristol-Myers Squibb | 34 | Palo Alto Veterans Institute For Research Pavir | 6 | Department Interior | 4 |
| Gladstone Institutes | 33 | Department Interior | 5 | US Government | 2 |
| Prime Therapeutics | 31 | Stanford University | 5 | University Of California Santa Cruz | 2 |
| Ngm Biopharmaceuticals | 27 | Applied Stemcell, Inc | 4 | Csc Labs | 1 |
| Uc San Diego | 26 | Aragen BioScience | 4 | Merieux Nutrisciences | 1 |
| University California | 25 | Biophase Solutions Incorporated | 4 | US Department of Agriculture | 1 |
| Zymergen | 20 | Bristol-Myers Squibb | 4 | University California | 1 |
| Biophase Solutions Incorporated | 19 | Asci | 3 |  |  |
| University Of California Berkeley | 19 | Biovision Incorporated | 3 |  |  |
| Biomarin Pharmaceutical Incorporated | 18 | Arcadis | 2 |  |  |
| Gilead Sciences | 17 | East Side High School District | 2 |  |  |
| Bepc | 15 | Kodiak Sciences Inc | 2 |  |  |
| Ascent | 14 | Rd Partners | 2 |  |  |
| Department Interior | 14 | Revance Therapeutics, Inc | 2 |  |  |
| US Government | 13 | San Jose State University | 2 |  |  |
| University Of California San Francisco | 13 | US Government | 2 |  |  |
| Buck Institute | 12 | University Of California Santa Cruz | 2 |  |  |
| Rd Partners | 12 | 10X Genomics | 1 |  |  |
| Intrexon Corporation | 10 | Adicet Bio | 1 |  |  |

*Source: Burning Glass*

# Educational Supply

There are 9 community colleges in the Bay Region issuing 242 awards on average annually (last 3 years) on TOP 0430.00 - Biotechnology and Biomedical Technology. There are no colleges in the SC-Monterey Sub-Region issuing awards on this TOP code.

**Table 7. Awards on TOP 0430.00 - Biotechnology and Biomedical Technology in the Bay Region**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| College | Sub-Region | Headcount | Associates | Certificates | Total |
| **Berkeley City** | East Bay | 57 | 4 | 4 | 8 |
| **Contra Costa** | East Bay | 28 | 2 | 6 | 8 |
| **Laney** | East Bay | 96 | 9 | 41 | 50 |
| **Merritt** | East Bay | 177 |  | 3 | 3 |
| **Ohlone** | East Bay | 140 | 4 | 33 | 37 |
| **San Francisco** | Mid-Peninsula | 301 | 5 | 55 | 60 |
| **San Mateo** | Mid-Peninsula | n/a | 1 | 5 | 6 |
| **Skyline** | Mid-Peninsula | 52 | 4 | 0 | 4 |
| **Solano** | North Bay | 88 | 27 | 38 | 65 |
| **Total Bay Region** |  **939**  |  **56**  |  **186**  |  **242**  |
| **Total SC-Monterey Sub-Region** | **0** | **0** | **0** | **0** |

# *Source: IPEDS, Data Mart and Launchboard*

NOTE: Headcount of students who took one or more courses is for 2016-17. The annual average for awards is 2014-17 unless there are only awards in 2016-17. The annual average for other postsecondary is for 2013-16.

# Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 543 annual openings for the Biotechnology and Biomedical Technology occupational cluster and 242 annual (3-year average) awards for an annual undersupply of 301 students. In the SC-Monterey Sub-Region, there is also a gap with 13 annual openings and no annual (3-year average) awards, for an annual undersupply of 13 students.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0430.00 - Biotechnology and Biomedical Technology**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2015-16 | Bay (All CTE Programs) | Cabrillo College (All CTE Programs) | State (0430.00) | Bay (0430.00) | SC-Monterey (0430.00) | Cabrillo College (0430.00) |
| % Employed Four Quarters After Exit | 74% | 70% | 72% | 73% | n/a | n/a |
| Median Quarterly Earnings Two Quarters After Exit | $10,550 | $8,150 | $9,134 | $8,871 | n/a | n/a |
| Median % Change in Earnings | 46% | 58% | 82% | 107% | n/a | n/a |
| % of Students Earning a Living Wage | 63% | 54% | 54% | 57% | n/a | n/a |

*Source: Launchboard Pipeline (version available on 3/8/19)*

# Skills and Education

**Table 9. Top Skills for Biotechnology and Biomedical Technology Occupations in Bay Region (March 2018 - Feb 2019)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Molecular Biology | 809 | qPCR | 229 | Record Keeping | 115 |
| Experiments | 635 | Tissue Culture | 174 | Quality Assurance and Control | 112 |
| Biology | 583 | Microscope | 167 | Drug Discovery | 111 |
| Cell Culturing | 549 | Chemistry | 164 | Protein Expression | 101 |
| Biochemistry | 506 | Fluorescence-activated cell sorting (FACS) | 164 | Prepare Compounds and Reagents | 99 |
| Cell Biology | 467 | Assay Development | 159 | Molecular Cloning | 96 |
| Biochemical and Cell-Based Assays | 381 | Oncology | 141 | Sterile Procedures / Techniques | 95 |
| Flow Cytometry | 378 | Transfection | 137 | Fluorescence | 93 |
| Biotechnology | 358 | Microbiology | 134 | Genetics | 90 |
| DNA | 357 | Cancer knowledge | 133 | Laboratory Equipment | 83 |
| Immunology | 317 | Genome | 131 | DNA Analysis | 82 |
| Enzyme-Linked Immunosorbent Assay (ELISA) | 290 | Next Generation Sequencing (NGS) | 128 | Experimental Design | 81 |
| Data Analysis | 287 | Proteins | 128 | Protein Purification | 79 |
| Mammalian Cell Culture | 275 | Electrophoresis | 124 | Scheduling | 79 |
| Western Blot | 236 | CRISPR | 117 | Lab Safety | 78 |

*Source: Burning Glass*

**Table 10. Education Requirements for Biotechnology and Biomedical Technology Occupations in Bay Region**

Note: 11% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

|  |  |
| --- | --- |
| Education (minimum advertised) | Latest 12 Mos. Postings |
| High school or vocational training | 16 (5%) |
| Associate Degree | 170 (49%) |
| Bachelor’s Degree or Higher | 162 (47%) |

*Source: Burning Glass*

# Methodology

Occupations for this report were identified by use of skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCO Data Mart.

# Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://www.calpassplus.org/Launchboard/)

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor’s Office MIS system

# Contacts

For more information, please contact:

* Doreen O’Donovan, Data Research Analyst, for Bay Area Community College Consortium (BACCC) and Centers of Excellence (CoE), doreen@baccc.net or (831) 479-6481
* John Carrese, Director, San Francisco Bay Center of Excellence for Labor Market Research, jcarrese@ccsf.edu or (415) 267-6544