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Biotechnology and Biomedical Technology Occupations
Labor Market Analysis: Imperial County

December 2018

Summary

According to available labor market information, there is a small demand for occupations that could be trained by a *Biotechnology and Biomedical Technology* program. For the purpose of this report, these occupations are referred to as "Biotechnology Occupations." *Biotechnology Occupations* in Imperial County have a labor market demand of five annual job openings. No educational institution in Imperial County supplies awards for these occupations, suggesting that there is a supply gap for this occupation. These occupations' median earnings are higher than the Self-Sufficiency Standard, suggesting that students who successfully complete a program and obtain employment in a related field may earn a living wage.

The following list summarizes findings from the labor market analysis below for *Biotechnology Occupations:*

- Between 2017 and 2022, *Biotechnology Occupations* are projected to increase by three jobs or six percent.
- Employers in Imperial County will need to hire five workers annually to fill new jobs and backfill jobs due to attrition such as retirement or turnover.
- Between 2010 and 2017, there was an average of seven online job postings per year for *Biotechnology Occupations* in Imperial County. Of the online postings in Imperial County during the same period, there was an average of 0.5 online job postings per year that included "algae" or "biofuel."
- Based on available data, the median hourly earnings for *Biotechnology Occupations* is $23.63; this is more than the Self-Sufficiency Standard for two adults and two children (school-age) in Imperial County, which is $13.20 per hour.
- There are three TOP codes associated with these occupations: Biotechnology and Biomedical Technology (043000), Chemical Technology (095400), and Laboratory Science Technology (095500). There are four related CIP codes.
- According to TOP and CIP data, no educational institution supplies the region with awards.
- Comparing labor demand (annual openings) with labor supply suggests that there is a supply gap for these occupations in Imperial County, with five annual openings and zero awards. Comparatively, there are 3,479 annual openings in California and 474 awards.

- Between January 1, 2015 and December 31, 2017, the top five employers in Imperial County for these occupations were Western Ecosystems Technology, Imperial County, United States Fish & Wildlife Service, Amec, and Calipatria Unified School District.
- Based on the educational attainment of individuals employed in *Biotechnology Occupations* nationwide, the majority have an associate degree. Based on online job postings between January 1, 2015 and December 31, 2017, the top listed educational requirement for *Biotechnology Occupations* is a bachelor's degree.

Introduction

This report analyzes five occupations for which an individual could be trained by a *Biotechnology and Biomedical Technology* program. The occupations are:

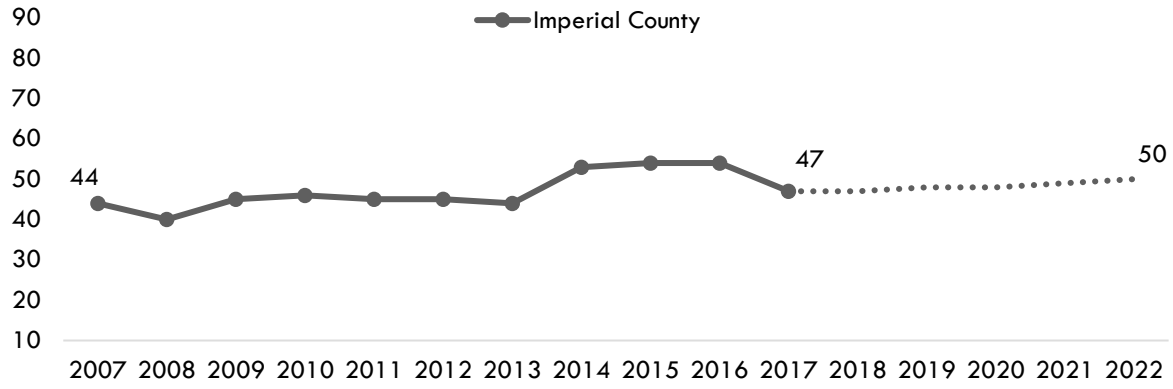
- **Agricultural and Food Science Technicians** (SOC[1] 19-4011): Work with agricultural and food scientists in food, fiber, and animal research, production, and processing; and assist with animal breeding and nutrition. Conduct tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects. Includes technicians who assist food scientists or technologists in the research and development of production technology, quality control, packaging, processing, and use of foods.
- **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.
- **Chemical Technicians** (SOC 19-4031): Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.
- **Life, Physical, and Social Science Technicians, All Other** (SOC 19-4099): For this report, Life, Physical, and Social Science Technicians include:
    - **Quality Control Analysts** (19-4099.01): Conduct tests to determine quality of raw materials, bulk intermediate and finished products. May conduct stability sample tests.

[1] The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. bls.gov/soc.

Projected Occupational Demand

Between 2017 and 2022, *Biotechnology Occupations* are projected to increase by three jobs or six percent (Exhibit 1). Employers in Imperial County will need to hire five workers annually to fill new jobs and backfill jobs due to attrition such as retirement or turnover.

Exhibit 1: Number of Jobs for *Biotechnology Occupations* (2007-2022)[2]

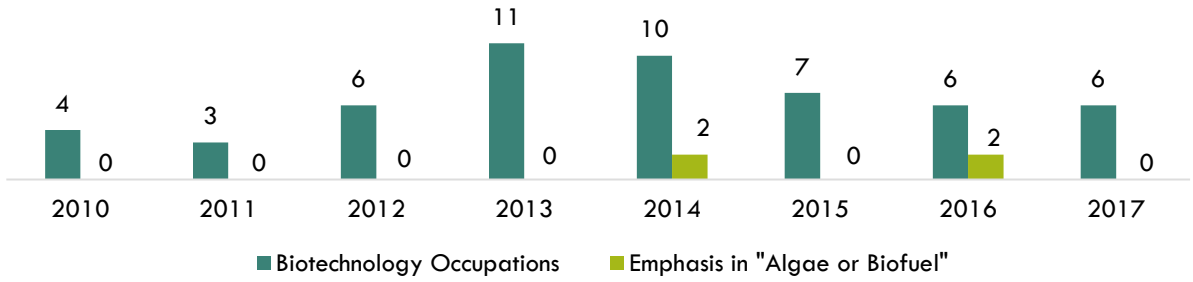


Online Job Postings

Between 2010 and 2017, there was an average of seven online job postings per year for *Biotechnology Occupations* in Imperial County. Of the online postings in Imperial County during the same period, there was an average of 0.5 online job postings per year that included "algae" or "biofuel" (Exhibit 2).

Exhibit 2: Number of Online Job Postings for *Biotechnology Occupations*
Imperial County (2010-2017)[3]

[2] Economic Modeling Specialists, Int'l. (EMSI). Imperial (6025). 2018.04 Class of Worker. QCEW + Non-QCEW + Self-Employed. 2007-2022.
[3] Labor Insight Jobs. Burning Glass Technologies. Imperial, CA. Full years 2010-2017.



Earnings

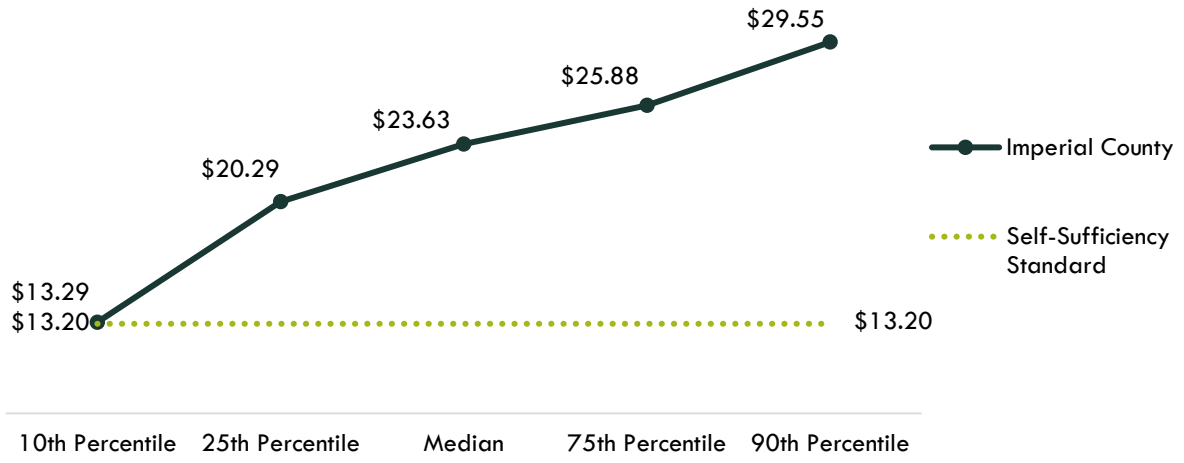
There is insufficient data on median hourly earnings for two of the four *Biotechnology Occupations* (Exhibit 3a). However, based on data available for the other two occupations, the median hourly earnings for *Biotechnology Occupations* is $23.63; this is more than the Self-Sufficiency Standard for two adults and two children (school-age) in Imperial County, which is $13.20 per hour (Exhibit 3).[4]

Exhibit 3a: Hourly Earnings for *Biotechnology Occupations* in Imperial County

Occupational Title	Entry-Level Hourly Earnings (10th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (90th Percentile)
Agricultural and Food Science Technicians	$13.08	$21.34	$22.30
Biological Technicians	Insufficient Data	Insf. Data	Insf. Data
Chemical Technicians	Insf. Data	Insf. Data	Insf. Data
Life, Physical, and Social Science Technicians, All Other	$13.49	$25.92	$29.47

[4] The standard for two adults and two children was chosen due to the 3.68 persons per household (2012-2016) as determined by the U.S. Census for Imperial County (insightcced.org/2018-self-sufficiency-standard).

Exhibit 3b: Hourly Earnings for *Biotechnology Occupations* in Imperial County[5]



Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.[6] There are three TOP codes associated with these occupations: Biotechnology and Biomedical Technology (043000), Chemical Technology (095400), and Laboratory Science Technology (095500). There are four related CIP codes (Exhibit 4).

Exhibit 4: Related TOP and CIP Codes for *Biotechnology and Biomedical Technology Occupations*

Biotechnology Occupations
TOP 043000: Biotechnology and Biomedical Technology
TOP 095400: Chemical Technology
TOP 095500: Laboratory Science Technology
CIP 15.0401: Biomedical Technology/Technician
CIP 26.1104: Computational Biology
CIP 41.0101: Biology Technician/Biotechnology Laboratory Technician
CIP 41.0301: Chemical Technology/Technician

[5] EMSI. Imperial (6025). 2018.04 Class of Worker. QCEW + Non-QCEW + Self-Employed. 2017-2022.
[6] TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

According to TOP and CIP data, no educational institution supplies the region with awards (Exhibit 5).

Exhibit 5: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Year 2013-14 Through PY2016-17 Average)

TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY14-15 to PY16-17)	Other Educational Institutions 3-Yr Annual Average Awards (PY13-14 to PY15-16)	3-Yr Total Average Supply (PY13-14 to PY16-17)
043000	Biotechnology and Biomedical Technology	**0**	**0**	**0**
095400	Chemical Technology	**0**	**0**	**0**
095500	Laboratory Science Technology	**0**	**0**	**0**
15.0401	Biomedical Technology/Technician	**0**	**0**	**0**
26.1104	Computational Biology	**0**	**0**	**0**
41.0101	Biology Technician/Biotechnology Laboratory Technician	**0**	**0**	**0**
41.0301	Chemical Technology/Technician	**0**	**0**	**0**
			Total	**0**

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply[7] suggests that there is a supply gap for these occupations in Imperial County, with five annual openings and zero awards. Comparatively, there are 3,479 annual openings in California and 474 awards[8] (Exhibit 6).

Exhibit 6: Labor Demand (Annual Openings) Compared to Labor Supply (Average Annual Awards)

Community Colleges and Other Postsecondary Educational Institutions	**Demand** (Annual Openings)	**Supply** (Total Annual Average Supply)	**Supply Gap or Oversupply**
Imperial	5	0	**5**
California	3,479	474	**3,005**

[7] Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.
[8] Centers of Excellence Student Outcomes supply table. (coeccc.net/Supply-and-Demand.aspx).

Please note: This is a basic analysis of supply and demand of labor. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed. Additionally, the data does not include workers who are currently in the labor force who could fill these positions or workers who are not captured by publicly available data.

Student Outcomes

Based on the information available in the CTE LaunchBoard, students who took courses in the related TOP codes exhibited the following outcomes (Exhibit 7).

Exhibit 7: Strong Workforce Program Metrics for *TOP 043000: Biotechnology and Biomedical Technology*
San Diego-Imperial Region vs. California (PY2015-16)

Metric	San Diego-Imperial	California
Number of course enrollments[9]	941	4,293
Completed 12+ CTE units in one year[10]	42	314
Completed 48+ CTE contact hours in one year[11]	0	N/A
Number of students who got a degree or certificate[12]	33	282
Number of students who transferred[13]	128	276
Employed in the second fiscal quarter after exit[14]	62%	69%
Employed in the fourth fiscal quarter after exit[15]	70%	72%
Job closely related to field of study[16]	N/A	N/A
Median earnings in the second fiscal quarter after exit[17]	$6,132	$9,134
Median change in earnings[18]	66%	82%
Attained a living wage[19]	41%	54%

[9] The number of enrollments in courses assigned to the TOP code in the selected year.
[10] The number of students who completed 12 or more credit CTE units.
[11] The number of students who completed 48 or more noncredit CTE instructional contact hours.
[12] The number of unduplicated students who earned a locally-issued certificate, Chancellor's Office approved certificate, associate degree, and/or California Community Colleges bachelor's degree in the selected TOP code.
[13] Students who took non-introductory courses or completed a California Community Colleges Chancellor's Office award in the selected TOP code in selected year who subsequently enrolled for the first time in a four-year institution the following year.
[14] Among all exiters with a valid SSN, the percentage who were employed two quarters after exiting California Community Colleges.
[15] Among exiting students with a valid SSN, the percentage who were employed four quarters after exiting California Community Colleges.
[16] Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.
[17] Among exiting students, the median second-quarter earnings one year after the year in which they exited California Community Colleges.
[18] Among exiting students with a valid SSN, the percentage change in earnings one year before and one year after exiting California Community Colleges.
[19] Among completers and skills builders who exited, the proportion of students who attained a living wage.

Top Employers and Work Locations

Between January 1, 2015 and December 31, 2017, the top five employers in Imperial County for these occupations were Western Ecosystems Technology, Imperial County, United States Fish & Wildlife Service, Amec, and Calipatria Unified School District (Exhibit 8).

Exhibit 8: Top Employers in Imperial County for *Biotechnology* Occupations[20]

Top Employers	
• Western Ecosystems Technology • Imperial County • United States Fish & Wildlife Service • Amec • Calipatria Unified	• Control Systems Research Incorporated • Danonewave • Earthrise Nutritionals • University of California • WhiteWave Foods

Skills, Education, and Certifications

Based on the educational attainment of individuals employed in *Biotechnology Occupations* nationwide, the majority have an associate degree (Exhibit 9a).

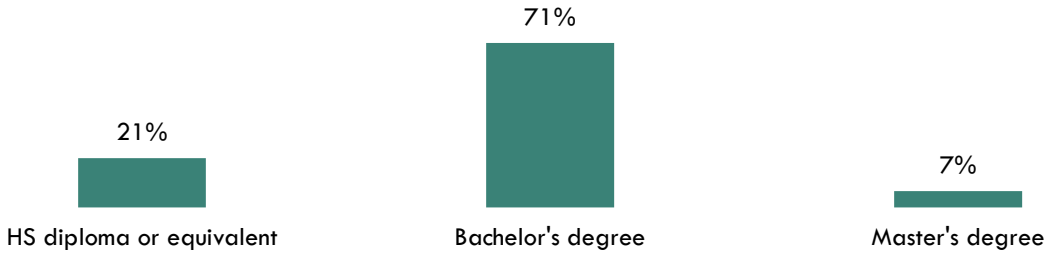
Exhibit 9a: Educational Requirements for *Biotechnology Occupations*

Occupational Title	**Typical Entry-Level Education**
Agricultural and Food Science Technicians	Associate degree
Biological Technicians	Bachelor's degree
Chemical Technicians	Associate degree
Life, Physical, and Social Science Technicians, All Other	Associate degree

Based on online job postings between January 1, 2015 and December 31, 2017, the top listed educational requirement for the *Biotechnology Occupations* is a bachelor's degree (Exhibit 9b).[21]

[20] Labor Insight Jobs. Burning Glass Technologies. Imperial, CA. Full years 2015-2017.
[21] Labor Insight Jobs. Burning Glass Technologies. Imperial, CA. Full years 2015-2017.

Exhibit 9b: Educational Requirements for *Biotechnology Occupations* in Imperial County in Online Job Postings[22]



(Percentages may not add up to 100% due to rounding.)

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings for these occupations between January 1, 2015 and December 31, 2017.

Exhibit 10: Top Skills for *Biotechnology Occupations* in Imperial County[23]

Specialized Skills	Soft Skills	Software Skills
• Biology	• Organizational Skills	• Microsoft Office
• Quality Assurance and Control	• Communication Skills	• Microsoft Excel
• Global Positioning System (GPS)	• Physical Abilities	• Microsoft Word
• Quality Management	• Writing	• Microsoft Outlook
• Budgeting	• Detailed-Oriented	

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[22] Bureau of Labor Statistics, Educational attainment for workers 25 years and older by detailed occupation. bls.gov/emp/ep_table_111.htm.
[23] Labor Insight Jobs. Burning Glass Technologies. Imperial, CA. Full years 2015-2017.

Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.