

# Cybersecurity Occupations

# Labor Market Information Report

# Foothill College

## Prepared by the San Francisco Bay Center of Excellence for Labor Market Research

**April 2021**

## Recommendation

Based on all available data, there appears to be an “undersupply” of Cybersecurity workers compared to the demand for this cluster of occupations in the Bay region and in the Silicon Valley sub-region (Santa Clara county). There is a projected annual gap of about 4,277 students in the Bay region and 1,678 students in the Silicon Valley Sub-Region.

## Introduction

This report provides student outcomes data on employment and earnings for TOP 0708.00 - Computer Infrastructure and Support programs 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 Foothill College and in the region.

This report profiles Cybersecurity Occupations in the 12 county Bay region and in the Silicon Valley sub-region for a proposed new program at Foothill College.

* **Computer and Information Systems Managers (11-3021):** Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Excludes “Computer Occupations” (15-1111 through 15-1199).  
    Entry-Level Educational Requirement: Bachelor’s degree  
    Training Requirement: None  
    Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%
* **Information Security Analysts (15-1212):** Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses. Excludes “Computer Network Architects” (15-1143).  
    Entry-Level Educational Requirement: Bachelor’s degree  
    Training Requirement: None  
    Percentage of Community College Award Holders or Some Postsecondary Coursework: 27%

## Occupational Demand

**Table 1. Employment Outlook for Cybersecurity Occupations in Bay Region**

| **Occupation** | **2019 Jobs** | **2024 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Computer and Information Systems Managers | 38,017 | 41,772 | 3,755 | 10% | 19,146 | 3,829 | $ 73.85 | $ 91.71 |
| Information Security Analysts | 3,714 | 4,835 | 1,121 | 30% | 2,595 | 519 | $ 44.51 | $ 59.46 |
| **Total** | **41,731** | **46,607** | **4,876** | **12%** | **21,741** | **4,348** | **$71.24** | **$88.84** |
| Source: EMSI 2020.4 | | | | | | | | |

**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 Cybersecurity Occupations in Silicon Valley Sub-region**

| **Occupation** | **2019 Jobs** | **2024 Jobs** | **5-yr Change** | **5-yr % Change** | **5-yr Total Openings** | **Annual Openings** | **25% Hourly Earning** | **Median Hourly Wage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Computer and Information Systems Managers | 15,012 | 16,431 | 1,419 | 9% | 7,485 | 1,497 | $ 77.52 | $ 95.17 |
| Information Security Analysts | 1,284 | 1,680 | 396 | 31% | 906 | 181 | $ 46.94 | $ 63.77 |
| **Total** | **16,296** | **18,111** | **1,815** | **11%** | **8,391** | **1,678** | **$75.11** | **$92.70** |
| Source: EMSI 2020.4 | | | | | | | | |

**Silicon Valley Sub-Region includes:** Santa Clara County

### Job Postings in Bay Region and Silicon Valley Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (Mar 2020 - Feb 2021)**

| **Occupation** | **Bay Region** | **Silicon Valley** |
| --- | --- | --- |
| Information Security Analysts | 7,577 | 112 |
| Computer and Information Systems Managers | 1,951 | 49 |
| Source: Burning Glass | | |

**Table 4a. Top Job Titles for Cybersecurity Occupations for latest 12 months (Mar 2020 - Feb 2021) Bay Region**

| **Title** | **Bay** | **Title** | **Bay** |
| --- | --- | --- | --- |
| Security Engineer | 277 | Chief Technology Officer | 61 |
| Senior Security Engineer | 135 | Director, Software Engineering | 52 |
| Information Security Engineer | 115 | IT Security Analyst | 47 |
| Security Analyst | 114 | Cyber Security Engineer | 45 |
| Information Security Analyst | 80 | Senior Cloud Security Engineer | 40 |
| Network Security Engineer | 76 | IT Security Specialist | 37 |
| Cloud Security Engineer | 75 | Security Operations Engineer | 32 |
| Cyber Security Analyst | 68 | Penetration Tester | 31 |
| Security Architect | 64 | Chief Information Officer | 31 |
| Source: Burning Glass | | | |

**Table 4b. Top Job Titles for Cybersecurity Occupations for latest 12 months (Mar 2020 - Feb 2021) Silicon Valley Sub-Region**

| **Title** | **Silicon Valley** | **Title** | **Silicon Valley** |
| --- | --- | --- | --- |
| Director Of IT | 7 | Director, Center Of Technology | 3 |
| Information Systems Security Officer Isso | 5 | Cyber Security Engineer | 3 |
| Chief Technology Officer | 5 | Technology Director | 2 |
| Security Analyst | 4 | Sterility Assurance Leader/Specialist Remote | 2 |
| Director Of Information Technology | 4 | Senior IT Internal Auditor | 2 |
| IT Security Analyst | 3 | Senior IT Director - Brm Coronary & Renal Denervation And Cardiac Surgery | 2 |
| Information Security Engineer | 3 | Senior Information Security Engineer | 2 |
| Information Security Consultant, Identity And Access Management | 3 | Security Network Engineer | 2 |
| Information Security Analyst | 3 | IT Director | 2 |
| Source: Burning Glass | | | |

## Industry Concentration

**Table 5. Industries hiring Cybersecurity Workers in Bay Region**

| **Industry – 6 Digit NAICS (No. American**  **Industry Classification) Codes** | **Jobs in Industry (2019)** | **Jobs in Industry (2024)** | **% Change (2019-24)** | **% Occupation Group in Industry (2019)** |
| --- | --- | --- | --- | --- |
| Custom Computer Programming Services | 7,950 | 9,461 | 19% | 19% |
| Computer Systems Design Services | 4,558 | 5,127 | 12% | 11% |
| Internet Publishing and Broadcasting and Web Search Portals | 3,623 | 4,379 | 21% | 9% |
| Software Publishers | 3,325 | 4,180 | 26% | 8% |
| Corporate, Subsidiary, and Regional Managing Offices | 2,374 | 2,236 | -6% | 5% |
| Data Processing, Hosting, and Related Services | 1,770 | 2,253 | 27% | 4% |
| Electronic Computer Manufacturing | 1,251 | 1,413 | 13% | 3% |
| Other Computer Related Services | 1,139 | 1,459 | 28% | 3% |
| Research and Development in the Physical, Engineering, and  Life Sciences (except Nanotechnology and Biotechnology) | 902 | 1,020 | 13% | 2% |
| Local Government, Excluding Education and Hospitals | 721 | 747 | 4% | 2% |
| Source: EMSI 2020.4 | | | | |

**Table 6. Top Employers Posting Cybersecurity Occupations in Bay Region and Silicon Valley Sub-Region (Mar 2020 - Feb 2021)**

| **Employer** | **Bay** | **Employer** | **Silicon Valley** |
| --- | --- | --- | --- |
| Wells Fargo | 198 | Capital One | 10 |
| Palo Alto Networks | 184 | Accion Labs | 7 |
| Cisco Systems Incorporated | 153 | Wells Fargo | 5 |
| Splunk | 139 | General Dynamics | 5 |
| Facebook | 109 | Ultragenyx Pharmaceutical | 4 |
| IBM | 106 | Thermo Fisher Scientific Inc | 4 |
| Salesforce | 90 | Lockheed Martin Corporation | 4 |
| KPMG | 88 | Biomarin Pharmaceutical Incorporated | 4 |
| Deloitte | 84 | Sonoma State University | 3 |
| Accenture | 83 | Crowdstrike | 3 |
| Source: Burning Glass | | | |

## Educational Supply

There are three (3) community colleges in the Bay Region issuing 71 awards on average annually (last 3 years ending 2018-19) on TOP 0708.00 - Computer Infrastructure and Support. In the Silicon Valley Sub-Region, there are no community colleges issuing awards on average annually (last 3 years) on this TOP code.

**Table 7. Community College Awards on TOP 0708.00 - Computer Infrastructure and Support in Bay Region**

| **College** | **Subregion** | **Associate** | **Certificate Low** | **Total** |
| --- | --- | --- | --- | --- |
| Los Medanos | East Bay | 6 | 5 | 11 |
| Ohlone | East Bay | 0 | 1 | 1 |
| San Francisco | Mid-Peninsula | 46 | 13 | 59 |
| **Total** |  | **52** | **19** | **71** |
| Source: Data Mart | | | | |

*Note: The annual average for awards is 2016-17 to 2018-19.*

## Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 4,348 annual openings for the Cybersecurity occupational cluster and 71 annual (3-year average) awards for an annual undersupply of 4,277 students. In the Silicon Valley Sub-Region, there is also a gap with 1,678 annual openings and no annual (3-year average) awards for an annual undersupply of 1,678 students.

## Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0708.00 - Computer Infrastructure and Support**

| **Metric Outcomes** | **Bay**  **All CTE Program** | **Foothill**  **All CTE Program** | **State 0708.00** | **Bay 0708.00** | **Silicon Valley 0708.00** | **Foothill 0708.00** |
| --- | --- | --- | --- | --- | --- | --- |
| Students with a Job Closely Related to Their Field of Study | 75% | 88% | 69% | 73% | 77% | N/A |
| Median Annual Earnings for SWP Exiting Students | $44,574 | $63,205 | $45,276 | $52,482 | $61,093 | $76,521 |
| Median Change in Earnings for SWP Exiting Students | 31% | 63% | 21% | 26% | 19% | 19% |
| Exiting Students Who Attained the Living Wage | 52% | 67% | 64% | 57% | 64% | 77% |
| Source: Launchboard Strong Workforce Program from version 2017-18. | | | | | | |

## Skills, Certifications and Education

**Table 9. Top Skills for Cybersecurity Occupations in Bay Region (Mar 2020 - Feb 2021)**

| **Skill** | **Posting** | **Skill** | **Posting** |
| --- | --- | --- | --- |
| Information Security | 3,547 | Software as a Service (SaaS) | 817 |
| Python | 2,121 | Customer Service | 802 |
| Linux | 1,622 | Authentication | 775 |
| Software Development | 1,502 | C++ | 763 |
| Information Systems | 1,420 | Kubernetes | 756 |
| Network Security | 1,310 | Business Process | 743 |
| Project Management | 1,295 | Threat Modeling | 732 |
| Java | 1,268 | Splunk | 708 |
| Software Engineering | 1,253 | Good Clinical Practices (GCP) | 673 |
| Cryptography | 1,212 | Threat Analysis | 673 |
| Penetration Testing | 946 | Health Insurance Portability and Accountability Act (HIPAA) | 651 |
| Security Operations | 915 | JavaScript | 620 |
| DevOps | 906 | Product Management | 610 |
| Budgeting | 844 | UNIX | 609 |
| Source: Burning Glass | | | |

**Table 10. Certifications for Cybersecurity Occupations in Bay Region (Mar 2020 - Feb 2021)**

| **Certification** | **Posting** | **Certification** | **Posting** |
| --- | --- | --- | --- |
| Certified Information Systems Security  Professional (CISSP) | 1,858 | Cisco Certified Security Professional | 210 |
| Certified Information Systems Auditor (CISA) | 921 | Project Management Certification | 185 |
| Certified Information Security Manager (CISM) | 807 | GIAC Certified Incident Handler (GCIH) | 179 |
| SANS/GIAC Certification | 730 | GIAC Security Essentials Certification | 168 |
| Information Systems Certification | 539 | Cisco Certified Network Professional (CCNP) | 128 |
| Certified in Risk and Information Systems Control | 344 | GIAC Certified Intrusion Analyst | 123 |
| CompTIA Security+ | 296 | Driver's License | 120 |
| Security Clearance | 279 | Project Management Professional (PMP) | 105 |
| IT Infrastructure Library (ITIL) Certification | 229 | Certified Ethical Hacker (CEH) | 99 |
| Cisco Certified Network Associate (CCNA) | 226 | Systems Security Certified Practitioner (SSCP) | 83 |
| Source: Burning Glass | | | |

*Note: 68% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.*

**Table 11. Education Requirements for Cybersecurity Occupations in Bay Region**

| **Education (minimum advertised)** | **Latest 12 Mos. Postings** | **Percent 12 Mos. Postings** |
| --- | --- | --- |
| High school or vocational training | 348 | 6% |
| Associate's degree | 85 | 1% |
| Bachelor's degree | 5,036 | 87% |
| Master's degree and higher | 335 | 6% |
| 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/  
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:

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