



# Information & Communication Technologies Regional Industry Advisory Meeting: Cybersecurity



March 31, 2022 | 3:00 PM - 5:00 PM

# Welcome & Introduction

Caitlin Blockus, Valley Vision, Project Manager




# Thank you

to all of our supporters





# ➤ Housekeeping

- ✓ Enable your video camera (optional)
- ✓ Please stay on  unless you are called on to ask a question
- ✓ Submit all questions and commentary using the chat function
- ✓ This meeting will be recorded and will be provided as part of the post-meeting materials

# Agenda

- 3:00 PM**      **Welcome & Introduction**
- 3:10 PM**      **Keynote Speaker**
- 3:40 PM**      **Labor Market Analysis**
- 4:00 PM**      **Industry Panel Discussion**
- 4:50 AM**      **Conclusion & Next Steps**

# Welcome & Introduction

Markus Geissler, Cosumnes River College, Professor of  
Computer Information Science



# ➤ Keynote Address



**Nathaniel Le**  
Supervisory Special Agent  
FBI Sacramento Field Office

# ➤ Labor Market Analysis



**Ebony Benzing**

**California Community Colleges'  
North/Far North Center of Excellence  
Research Manager**



# Cybersecurity North (Greater Sacramento) Regional Advisory

Thursday, March 31, 2022



# Who is the Center of Excellence?



Region	Director
North/ Far North	Aaron Wilcher (North)
	Sara Phillips (Far North)
Bay Area	John Carrese
Central	Nora Seronello
South Central	Adele Hermann
Los Angeles	Luke Meyer
Orange County	Jesse Crete
Inland Empire/Desert	Michael Goss
San Diego/Imperial	Tina Ngo Bartel
Statewide	Laura Coleman

# Typical COE Research Questions



- What is the employment **outlook** for students?
- What **skills** and **credentials** are needed?
- What **programs** look ripe for investment?

# Presentation Overview

- Traditional Labor Market Demand
- Job Postings Analysis
- Skill Analysis
- Postsecondary Supply



# Traditional Labor Market Demand

- Source: EMSI Burning Glass
- 9 ICT major occupations + 1 ADMJ occupation
- Projections 2020 - 2025
- Seven-county North (Greater Sacramento) subregion
- Detailed data at end of presentation

# Greater Sacramento Cybersecurity Jobs

31,970

2020 Jobs

33,688

2025 Jobs

5%

2020-2025 Projected  
Job Growth

(regional average 6%)

2,720

Annual Openings,  
2020-2025

\$96,347

2020 Median Annual  
Wage

# Cybersecurity Occupations

Occupation	2020 Jobs	2025 Jobs	2020 - 2025 Change	2020 - 2025 % Change	2020 – 2025 Avg. Annual Openings
Computer User Support Specialists	12,237	12,322	85	1%	945
Software Developers and Software Quality Assurance Analysts and Testers	8,090	9,093	1,003	12%	812
Computer Occupations, All Other	4,023	4,198	175	4%	335
Computer Systems Analysts	3,143	3,296	153	5%	255
Network and Computer Systems Administrators	1,646	1,728	82	5%	126
Detectives and Criminal Investigators	1,518	1,562	44	3%	120
Computer Network Support Specialists	914	970	56	6%	80
Database Administrators and Architects	717	762	46	6%	62
Computer Network Architects	685	713	28	4%	48
Information Security Analysts	514	607	92	18%	58
<b>North (Greater Sacramento) Totals</b>	<b>33,488</b>	<b>35,251</b>	<b>1,763</b>	<b>5%</b>	<b>2,840</b>

Note: Detectives and Criminal Investigators were excluded from the traditional LMI section of this presentation (slides 6 and 8).



# Job Posting Demand

- Source: Labor Insights from Burning Glass Technologies (EMSI Burning Glass)
- 9 ICT major occupations + 1 ADMJ occupation
- Online job posting from Mar 1, 2021 – Feb 28, 2022
- Seven-county North (Greater Sacramento) subregion

# Cybersecurity Job Posting Search

20,851  
ICT + ADMJ  
Job Postings



2,397  
Cybersecurity-related  
Job Postings

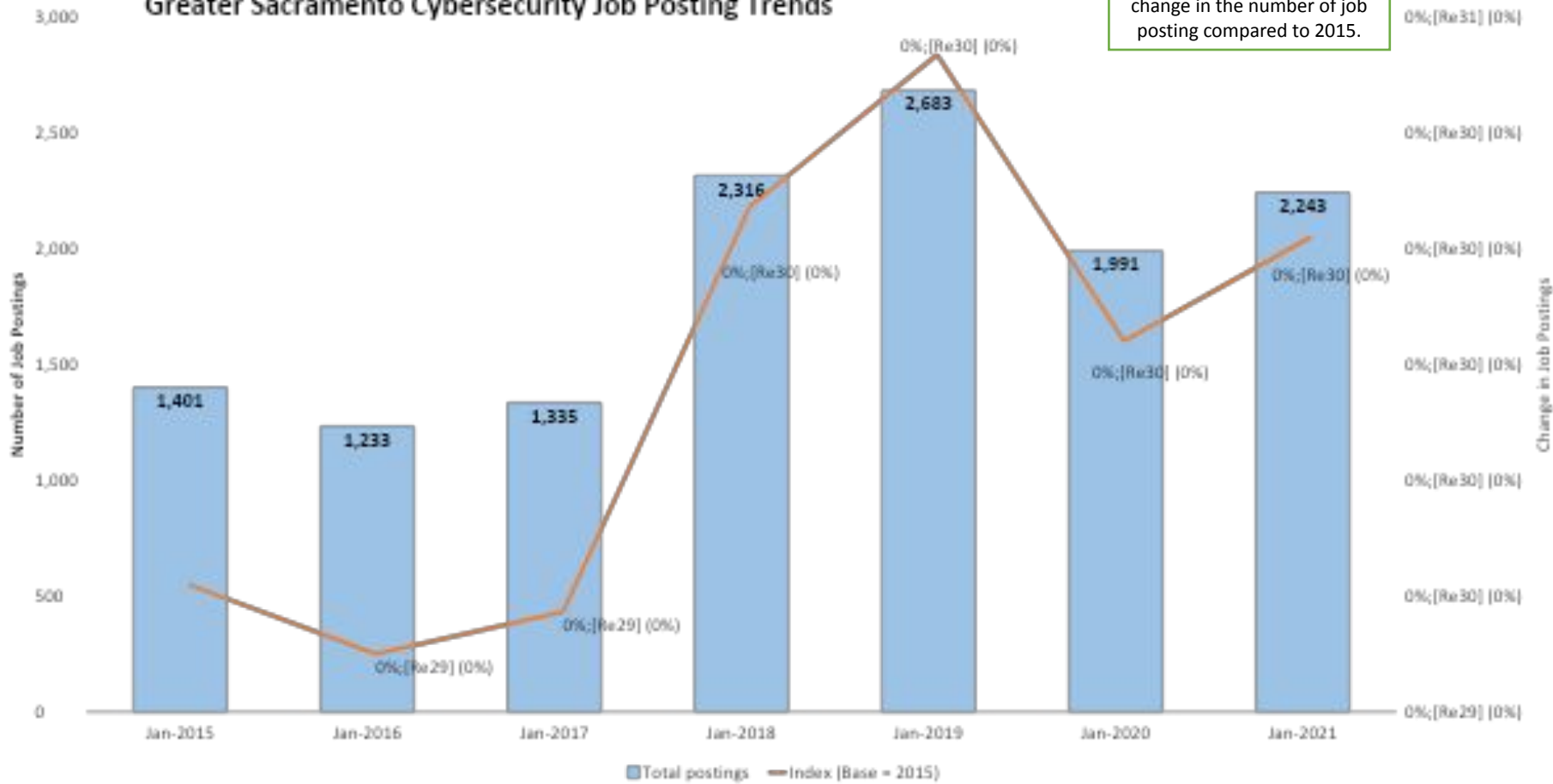
Search Filter = Cybersecurity Skill Cluster

125 distinct skills related to cybersecurity, including:

Authentication	Password Management
Cryptography	Penetration Testing
DevSecOps	Phishing
Network Security	SAP Enterprise Threat Detection
HackerOne	Threat Intelligence
ICS Security Standards	Virtualization Security
Information Assurance, Governance, and Security	Web Access Control and Web Application Security Testing

# Greater Sacramento Cybersecurity Job Posting Trends

The Index (orange line) tracks change in the number of job posting compared to 2015.



## Industries by Share of Postings

- Professional, Scientific, and Technical Services (25%)
- Finance and Insurance (11%)
- Manufacturing (7%)
- Public Administration (4%)
- Educational Services (4%)
- Information (3%)
- Utilities (3%)

57% job postings  
in 7 sectors

## Employers with the Most Postings

- Accenture
- Deloitte
- Pacific Gas and Electric Company
- Intel Corporation
- Blue Cross Blue Shield of California
- University Of California
- Peraton Corporation
- General Dynamics
- American Express
- KPMG

## Employer-Preferred Education

62% of job postings required  
a Bachelor's degree

(8% required HS diploma, vocational training, or  
an associate's degree)

## Employer-Preferred Experience

35% of job postings required  
3 to 5 years of prior work  
experience.

(9% required 0 to 2 years of experience)


# Cybersecurity Skills Analysis

- Source: Labor Insights from Burning Glass Technologies (EMSI Burning Glass)
- Skills Analysis Report
- Online job posting from Mar 1, 2021 – Feb 28, 2022
- Seven-county North (Greater Sacramento) subregion

## Top Occupations Requiring Cybersecurity Skills

- Cyber / Information Security Engineer / Analyst
- Software Developer / Engineer
- Network Engineer / Architect
- Computer Support Specialist
- Computer Systems Engineer / Architect
- Network / Systems Administrator
- Systems Analyst
- IT Project Manager
- Business / Management Analyst
- Database Architect

## Top Co-Occurring Specialized Skills


- Information Security
- Project Management
- Information Systems
- Linux
- Customer Service
- Network Security
- Authentication
- Python 
- SQL
- Microsoft Active Directory

## Top Co-Occurring Software Skills

- Linux
- Python 
- SQL
- Software Development
- Microsoft Office
- Java
- Microsoft Excel
- Microsoft Azure 
- Microsoft PowerShell
- JavaScript

## Top Co-Occurring Human Skills

- Communication Skills
- Teamwork / Collaboration
- Troubleshooting
- Problem Solving
- Planning
- Research
- Writing
- Written Communication
- Organizational Skills
- Microsoft Office

A green arrow indicates growth in demand for a particular skill at the national level 

# Educational Program Supply

- Source: CCCC DataMart, IPEDS, and EMSI Burning Glass
- Online job posting from Mar 1, 2021 – Feb 28, 2022
- Seven-county North (Greater Sacramento) subregion

# Cybersecurity-Related Training Programs in Greater Sacramento

## California Community Colleges

- American River
- Cosumnes River
- Folsom Lake
- Lake Tahoe
- Sacramento City
- Sierra
- Yuba

## Public Four-Year Colleges and Universities

- California State University, Sacramento
- University of California, Davis

## Private Four-Year Colleges

- William Jessup University

## Other Postsecondary

- Asher College
- MTI
- Brightwood College

- **1,140 completions in 2019-2020**
- **Average of 1,097 awards issued between 2015-16 and 2019-20.**

# Educational Program Data

Program	Completions (2016)	Completions (2017)	Completions (2018)	Completions (2019)	Completions (2020)	Five-Year Average
Computer Science	367	572	546	614	656	551
Computer Support Specialist	132	157	97	88	64	108
Computer Systems Networking and Telecommunications	101	92	109	113	76	98
Computer and Information Systems Security/Auditing/Information Assurance	79	74	107	80	154	99
Computer Programming/Programmer, General	76	92	112	134	94	102
Network and System Administration/Administrator	53	57	90	99	23	64
Data Modeling/Warehousing and Database Administration	34	32	36	30	15	29
Information Technology	23	33	35	33	26	30
System, Networking, and LAN/WAN Management/Manager	7	5	4	5	6	5
Computer Graphics	2	1	1	2	3	2
Computer and Information Sciences and Support Services, Other	1	4	2	2	3	2
Computer and Information Sciences, General	0	0	3	8	14	5
Telecommunications Technology/Technician	0	0	0	0	6	1
<b>North (Greater Sacramento) Totals</b>	<b>875</b>	<b>1,119</b>	<b>1,142</b>	<b>1,208</b>	<b>1,140</b>	<b>1,097</b>

Note: Completions count the number of awards issued in the academic year ending in (XXXX). These counts include certificates, associate degrees, and bachelor degrees only.

# Thank you!

Ebony J. Benzing  
Research Manager

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[coecc.net](http://coecc.net)



C·O·E

CENTERS OF EXCELLENCE  
FOR LABOR MARKET RESEARCH

# Data Sources & Methods

- Center of Excellence TOP-SOC Crosswalk. <http://coecc.net/>
- Emsi 2022.1 QCEW Employees, Non-QCEW Employees, and Self-Employed. <https://www.economicmodeling.com/>. EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors).
- “Labor Insight Real-Time Labor Market Information Tool.” Burning Glass Technologies. <http://www.burning-glass.com>.
- “Taxonomy of Programs.” California Community Colleges Chancellor’s Office. June 2012, 6<sup>th</sup> Edition. <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Educational-Services-and-Support/Academic-Affairs/What-we-do/Curriculum-and-Instruction-Unit/Files/TOPmanual6200909corrected12513pdf.ashx>.
- Management Information Systems (MIS) Data Mart. California Community Colleges Chancellor’s Office. <https://datamart.cccco.edu/>.
- Integrated Postsecondary Education Data System (IPEDS). National Center for Education Statistics. U.S. Department of Education. <https://nces.ed.gov/ipeds/>.
- O\*NET OnLine. U.S. Department of Labor/Employment and Training Administration (DOLETA). <https://www.onetonline.org/>.
- The seven-county North (Greater Sacramento) includes El Dorado, Nevada, Placer, Sacramento, Sutter, Yolo, and Yuba Counties

# Cybersecurity Occupations (w/ wages)

Occupation	2020 Jobs	2025 Jobs	2020 - 2025 Change	2020 - 2025 % Change	2020 – 2025 Avg. Annual Openings	Median Hourly Earnings	Typical Entry Level Education
Computer User Support Specialists	12,237	12,322	85	1%	945	\$42.88	Some college, no degree
Software Developers and Software Quality Assurance Analysts and Testers	8,090	9,093	1,003	12%	812	\$57.01	Bachelor's degree
Computer Occupations, All Other	4,023	4,198	175	4%	335	\$39.60	Bachelor's degree
Computer Systems Analysts	3,143	3,296	153	5%	255	\$50.73	Bachelor's degree
Network and Computer Systems Administrators	1,646	1,728	82	5%	126	\$44.64	Bachelor's degree
Detectives and Criminal Investigators	1,518	1,562	44	3%	120	\$49.00	High school diploma or equivalent
Computer Network Support Specialists	914	970	56	6%	80	\$34.85	Associate's degree
Database Administrators and Architects	717	762	46	6%	62	\$54.76	Bachelor's degree
Computer Network Architects	685	713	28	4%	48	\$56.17	Bachelor's degree
Information Security Analysts	514	607	92	18%	58	\$55.07	Bachelor's degree
<b>North (Greater Sacramento) Totals</b>	<b>33,488</b>	<b>35,251</b>	<b>1,763</b>	<b>5%</b>	<b>2,840</b>	<b>--</b>	<b>--</b>

Note: Detectives and Criminal Investigators were excluded from the traditional LMI section of this presentation (slides 6 and 8).

# Educational Program Data (w/CIP codes)

CIP Code	Program	Completions (2016)	Completions (2017)	Completions (2018)	Completions (2019)	Completions (2020)	Five-Year Average
11.0701	Computer Science	367	572	546	614	656	551
11.1003	Computer and Information Systems Security/Auditing/Information Assurance	79	74	107	80	154	99
11.0201	Computer Programming/Programmer, General	76	92	112	134	94	102
11.0901	Computer Systems Networking and Telecommunications	101	92	109	113	76	98
11.1006	Computer Support Specialist	132	157	97	88	64	108
11.0103	Information Technology	23	33	35	33	26	30
11.1001	Network and System Administration/Administrator	53	57	90	99	23	64
11.0101	Computer and Information Sciences, General	0	0	3	8	14	5
11.0802	Data Modeling/Warehousing and Database Administration	34	32	36	30	15	29
11.1002	System, Networking, and LAN/WAN Management/Manager	7	5	4	5	6	5
15.0305	Telecommunications Technology/Technician	0	0	0	0	6	1
11.0803	Computer Graphics	2	1	1	2	3	2
11.9999	Computer and Information Sciences and Support Services, Other	1	4	2	2	3	2
	<b>North (Greater Sacramento) Totals</b>	<b>875</b>	<b>1,119</b>	<b>1,142</b>	<b>1,208</b>	<b>1,140</b>	<b>1,097</b>

Note: Completions count the number of awards issued in the academic year ending in (XXXX). These counts include certificates, associate degrees, and bachelor degrees only.

# Educational Program Data by Award Level (2020 Completions, Only)

Awards by Program (CIP Code)	Completions (2020)
<b>Computer Science (</b>	<b>655</b>
Associate's Degree	90
Award of at least 1 but less than 2 academic years	0
Award of less than 1 academic year	0
Bachelor's Degree	565
<b>Computer and Information Systems Security/Auditing/Information Assurance</b>	<b>154</b>
Associate's Degree	97
Award of at least 1 but less than 2 academic years	33
Award of less than 1 academic year	24
<b>Computer Programming/Programmer, General</b>	<b>94</b>
Associate's Degree	74
Award of at least 1 but less than 2 academic years	13
Award of less than 1 academic year	7
<b>Computer Systems Networking and Telecommunications</b>	<b>76</b>
Associate's Degree	62
Award of at least 1 but less than 2 academic years	5
Award of less than 1 academic year	9
<b>Computer Support Specialist</b>	<b>64</b>
Associate's Degree	26
Award of at least 1 but less than 2 academic years	35
Award of less than 1 academic year	3
<b>Information Technology</b>	<b>26</b>
Associate's Degree	23
Award of at least 1 but less than 2 academic years	2
Award of less than 1 academic year	1

Awards by Program	Completions (2020)
<b>Network and System Administration/Administrator</b>	<b>23</b>
Associate's Degree	16
Award of at least 1 but less than 2 academic years	0
Award of less than 1 academic year	7
<b>Data Modeling/Warehousing and Database Administration</b>	<b>15</b>
Associate's Degree	4
Award of at least 1 but less than 2 academic years	0
Award of less than 1 academic year	11
<b>Computer and Information Sciences, General</b>	<b>14</b>
Associate's Degree	14
Award of at least 1 but less than 2 academic years	0
Award of less than 1 academic year	0
Bachelor's Degree	0
<b>Telecommunications Technology/Technician</b>	<b>6</b>
Award of at least 1 but less than 2 academic years	5
Award of less than 1 academic year	1
<b>System, Networking, and LAN/WAN Management/Manager</b>	<b>6</b>
Award of less than 1 academic year	6
<b>Computer and Information Sciences and Support Services, Other</b>	<b>3</b>
Associate's Degree	0
Award of at least 1 but less than 2 academic years	0
Award of less than 1 academic year	3
<b>Computer Graphics</b>	<b>3</b>
Associate's Degree	0
Award of at least 1 but less than 2 academic years	3
Award of less than 1 academic year	0
<b>Grand Total</b>	<b>1139</b>

Source: Integrated Postsecondary Education Data System (IPEDS).

# Educational Program Data by Awards (2020 Completions, Only)

Award	Completions (2020)
Bachelor's Degree	565
Associate's Degree	406
Award of at least 1 but less than 2 academic years	96
Award of less than 1 academic year	72
<b>Grand Total</b>	<b>1139</b>

Source: Integrated Postsecondary Education Data System (IPEDS).

# Educational Program Data by College/University (2020 Completions, Only)

College/University	Completions (2020)
<b>University of California-Davis</b>	<b>321</b>
Bachelor's Degree	321
<b>California State University-Sacramento</b>	<b>239</b>
Bachelor's Degree	239
<b>Asher College</b>	<b>148</b>
Associate's Degree	87
Award of at least 1 but less than 2 academic years	55
Award of less than 1 academic year	6
<b>American River College</b>	<b>103</b>
Associate's Degree	87
Award of less than 1 academic year	8
Award of at least 1 but less than 2 academic years	8
<b>Sierra College</b>	<b>99</b>
Associate's Degree	69
Award of less than 1 academic year	30
<b>Sacramento City College</b>	<b>75</b>
Associate's Degree	64
Award of at least 1 but less than 2 academic years	8
Award of less than 1 academic year	3

College/University	Completions (2020)
<b>Cosumnes River College</b>	<b>72</b>
Associate's Degree	47
Award of less than 1 academic year	16
Award of at least 1 but less than 2 academic years	9
<b>MTI College</b>	<b>39</b>
Award of at least 1 but less than 2 academic years	16
Associate's Degree	15
Award of less than 1 academic year	8
<b>Folsom Lake College</b>	<b>28</b>
Associate's Degree	28
Award of less than 1 academic year	0
Award of at least 1 but less than 2 academic years	0
<b>Yuba College</b>	<b>10</b>
Associate's Degree	9
Award of less than 1 academic year	1
<b>William Jessup University</b>	<b>5</b>
Bachelor's Degree	5
<b>Brightwood College-Sacramento</b>	<b>0</b>
Associate's Degree	0
Award of less than 1 academic year	0
Award of at least 1 but less than 2 academic years	0
<b>Lake Tahoe Community College</b>	<b>0</b>
Award of less than 1 academic year	0
Associate's Degree	0
<b>Grand Total</b>	<b>1139</b>

Source: Integrated Postsecondary Education Data System (IPEDS).

# ➤ Industry Panel Discussion



**Tania Webb**

**Deloitte**  
*Managing  
Director*



**Benjamin Troglia**

**Accenture**  
*Associate Director*



**Andrew Maroun**

**Golden 1 Credit Union**  
*Director of Information  
Security*



**David Bitter**

**SMUD**  
*Cybersecurity  
Manager*



# Thank you for joining!

For more information, please contact:

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