



**[www.cyberhawaii.org](http://www.cyberhawaii.org)**

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## Mission:

To identify and mitigate cyber risks, develop cyber education and workforce pathways for students, and invest in innovation and economic development for a cyber secure and resilient Hawaii



Dennis Gibson  
CyberHawaii Chair  
Senior Vice President  
Booz Allen Hamilton

# CyberHawaii: Education & Workforce Development

- Overview of CyberHawaii
- CH Education & Workforce Development Committee
- Cybersecurity Landscape Assessment
  - Jobs Outlook
  - Pipeline Development - Education & Workforce Development Initiatives
- Clearance Process
- Opportunities for Collaboration



# CyberHawaii Education and Workforce Development

Promote deeper awareness & understanding of cyber threats

- Cyber exercises, training, workshops, speaking engagements

Develop and accelerate educational opportunities

- K-12 teacher professional development
- Higher Ed faculty development, developing curriculum/courses & articulation pathways
- Developing early college models
- Incumbent worker training/certifications

Ensure students are job ready & are successful in securing jobs

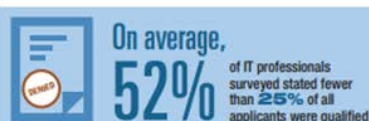
- Engage with business, industry, government, military communities
- Internships, mentorships, job fairs
- Industry Sector Strategy alignment
- Review/revisit industry job descriptions & skill requirements



# Cybersecurity Workforce Demand



Source: ISCF 2015 Global Information Security Workforce Study



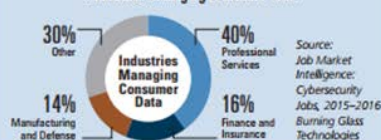
Source: State of Cybersecurity: Implications for 2015:  
An ISACA and RSA Conference Survey

## The biggest skill gaps of today's cybersecurity professionals



Source: State of Cybersecurity: Implications for 2015 An ISACA and RSA Conference Survey

## Fastest cybersecurity demand sectors are in industries managing consumer data



Source: Job Market Intelligence: Cybersecurity Jobs, 2015-2016  
Burning Glass Technologies

## Cybersecurity

job postings took  
**8%** longer to fill than  
IT job postings overall

Source: ISCF 2015 Global  
Information Security  
Workforce Study

## Expertise required for various cybersecurity roles in demand

- Information Security
- Network Setup
- Auditing
- Network Protocols
- Core Database, Coding and Scripting
- Systems Administration

Source: Job Market Intelligence: Cybersecurity Jobs, 2015

## Approximately

**10%**

of the current cybersecurity  
workforce are comprised of women

Source: ISCF 2015 Women in Security:  
Wisely Positioned for the Future of InfoSec

**18%**  
Growth

Computer and mathematical  
occupations will grow much  
faster than the average job  
during 2012-2024

Source: Bureau of Labor Statistics,  
U.S. Department of Labor

## Fastest growing skills in cybersecurity job postings

- Python
- HIPAA
- Risk Management
- Internal Auditing
- Audit Planning

Source: Partnership for  
Public Service

## Hardest to fill skills in cybersecurity job postings

Source: Job Market  
Intelligence:  
Cybersecurity  
Jobs, 2015-2016  
Burning Glass  
Technologies



Software Architecture  
Network Attached Storage (NAS)  
Software Issue Resolution  
Internet Security  
Legal Compliance  
Data Communications  
Platform as a Service (PaaS)  
Computer Forensics  
Internal Auditing  
Apache Hadoop



## OCCUPATION PROFILE



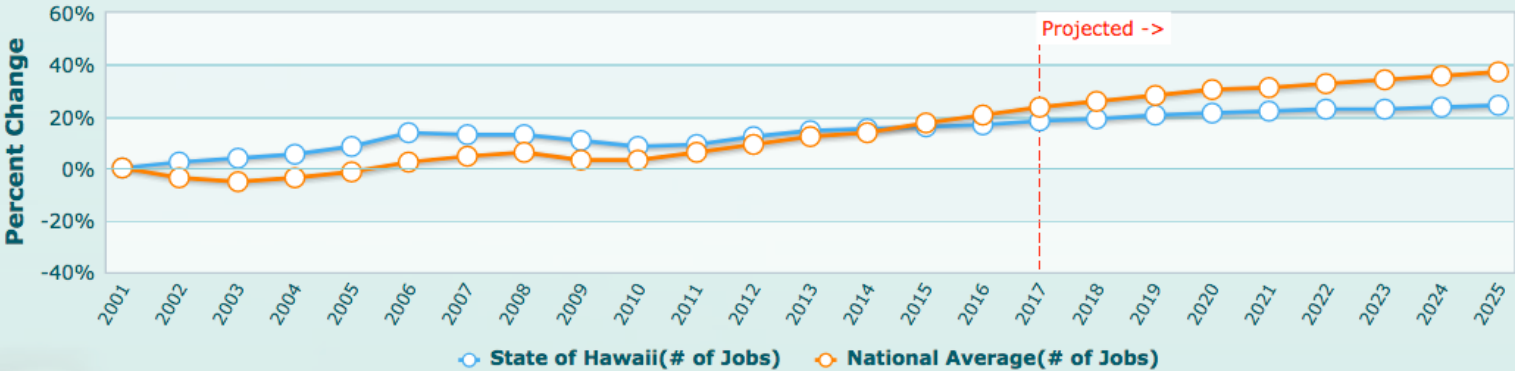
### Information Security Analysts [ State of Hawai'i ]

15-1122 Standard Occupational Classification (SOC) [Related Occupations](#)

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).



### Regional Job Market Trends (click to view job numbers)



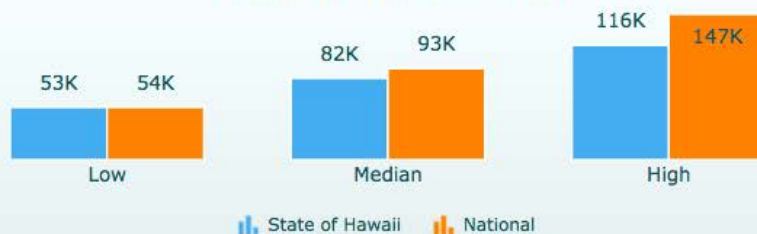
**253**  
Jobs (2017)

Number of Jobs  
+ Increased

## How much will I get paid (2017) ?



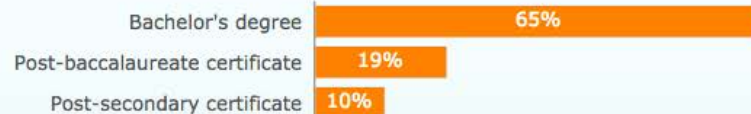
### Earnings (Hawaii vs National)



**\$82,108** (State of Hawai'i Average Salary)  
is **below** the National Average **\$96,044**

Learn more about [Wages](#)

## Will I need a college degree ?



Legend: % of Respondents (National)

Learn more about [Education Requirements & Training](#)

## Which skills are in High Demand (March 2017) ?



### Skills in High Demand

### # of Times Posted

Information Assurance	218
Information Systems	94
Vulnerability	90
Cyber Security	65
Security Policies	57
Intrusion Detection And Prevention	53
Incident Response	47
Intrusion Detection Systems	40

Learn more about [Skills in High Demand](#)

## Will I be able to find a job (2017) ?



**10,977** Total Job Postings (2016) | **1,804** Total Unique Postings (2016)

### Job Posting Analytics



Learn more about current [Job Openings](#)

## Occupation Matching: 15

SOC	Occupation Title	Annual Openings
15-1122.00	Information Security Analysts	20
15-1199.03	Web Administrators	108
15-1199.02	Computer Systems Engineers/Architects	*
15-1199.12	Document Management Specialists	*
11-3021.00	Computer and Information Systems Managers	70
13-1081.02	Logistics Analysts	46
15-1133.00	Software Developers, Systems Software	57
15-1134.00	Web Developers	36
15-1141.00	Database Administrators	25
15-1151.00	Computer User Support Specialists	122
15-1199.01	Software Quality Assurance Engineers and Testers	*
13-1199.02	Security Management Specialists	469
15-1143.00	Computer Network Architects	22
15-1143.01	Telecommunications Engineering Specialists	*
17-3026.00	Industrial Engineering Technicians	4
	<b>Estimated ANNUAL NEW Job openings</b>	<b>979</b>

\* Parent SOC code duplication

\*\* Aggregate SOC code

CIP	Programs of Study	Graduates	Workforce Contribution by Program
110101	Computer and Information Sciences, General	72	7.35%
111003	Computer and Information Systems Security/Information Assurance	1	0.1%
140901	Computer Engineering, General	12	1.23%
140999	Computer Engineering, Other	0	0
110201	Computer Programming/Programmer, General	0	0
110701	Computer Science	106	10.83%
110501	Computer Systems Analysis/Analyst	0	0
110901	Computer Systems Networking and Telecommunications	27	2.76%
430116	Cyber/Computer Forensics and Counterterrorism	0	0
110103	Information Technology	52	5.31%
111005	Information Technology Project Management	0	0
111001	Network and System Administration/Administrator	0	0
111002	System, Networking, and LAN/WAN Management/Manager	0	0
110801	Web Page, Digital/Multimedia and Information Resources Design	1	0.1%
111004	Web/Multimedia Management and Webmaster	0	0
	<b>Total WORKFORCE Contribution</b>	<b>271</b>	<b>27.68%</b>





# Cybersecurity Pipeline Gap

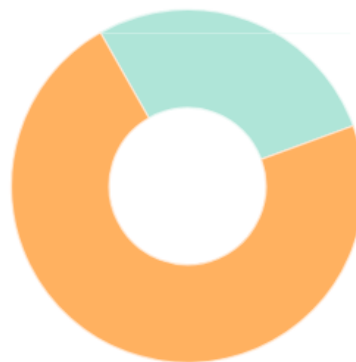
## Pipeline GAP:

**271 graduates to fill  
979 job openings**



## Workforce Analysis

Estimated Annual NEW Jobs	Estimated Annual REPLACEMENT Jobs	Estimated GAP
2	977	979 NEW Job Openings - 271 Graduates
979 Estimated NEW and REPLACEMENT Job Openings		708



The **271** regional graduates represents  
**27.68%**  
locally produced workforce to meet an  
annual demand of **979** job openings

The **708** estimated gap represents  
**72.32% GAP**  
of this cluster's workforce that may go  
unfilled due to insufficient workforce

# Education & Workforce Development Initiatives

***FACT: Cybersecurity professionals have unique skills, are in short supply, and are vital to our security***



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# Hawai'i Cybersecurity Workforce Initiative

*Developing a clear education  
and workforce pathway to the  
cybersecurity profession*

A  
**CYBERHAWAII**  
PARTNERSHIP

## WHAT IS CYBERSECURITY?

Cybersecurity is the ability to protect or defend the use of cyberspace from cyber attacks. With cyber threats in a state of rapid and continuous evolution, keeping pace in cybersecurity strategy and operations is a major challenge to governments, private industry and individuals.

## THE ISSUES

- 2013 Target breach cost \$300 million
- 2014 Home Depot breach cost \$263 million
- Estimated global losses from cyber crime \$400 billion annually
- 14 million federal worker identities compromised in 2015 breach
- According to privaterights.org, there have been an estimated 889,308,911 records (government, private, and personal) breached since 2005
- The cybersecurity field is expected to experience a deficit of 1.5 million professionals by 2020

## THE SOLUTION

To develop a clear education and workforce pathway to the cybersecurity profession.

# Cybersecurity Career Pathways

Cybersecurity professionals have unique skills, are in short supply, and are vital to our nation's national security. There are many pathways to get to this goal, follow the one that is right for you.



TOP: Cyber Security Coordinator  
Carrizosa at UH West Oahu

MIDDLE: GenCyber camp held  
at Honolulu Community College

BOTTOM: Cybersecurity Career at  
Kapoleli Community College

# 4

### Graduate Path [MA / MS / PhD]

Competency Level: Expert / Sr Practitioner  
Principles:  
Information Security Governance  
Security Architecture / Engineering

# 3

### University Path [4 yr. degree - BS / BA]

Competency Level: Practitioner  
Principles:  
Networks + Communications  
Access Control

# 2

### College Path [2 yr. degree - AS/NS / AA]

Competency Level: Technician  
Principles:  
Information Security  
Security Tools + Techniques

# 1

### General Education [K-12 high school diploma]

While K-12 schools in Hawaii offer a wide array of STEM programs and curricula, it is essential that students concentrate on the STEM Foundation. Students who plan to attend higher education in Hawaii or on the mainland, should focus their academic preparation on chemistry, physics and biology while math preparation should lean toward calculus.

## INVESTIGATE THREATS

Specialty areas responsible for investigating cyber events or crimes of information technology (IT) systems, networks, and digital evidence.

- Computer Forensic Analyst
- Computer Network Defense (CND) Forensic Analyst
- Digital Forensic Examiner
- Digital Media Collector
- Forensic Analyst

## CYBER LEADERSHIP

Specialty areas responsible for providing leadership, management, direction, or development and advocacy so that the organization may effectively conduct cybersecurity work.

- Legal Advisor/Staff Judge Advocate
- Paralegal
- Cyber Trainer
- Information Security Trainer
- Security Training Coordinator

## OPERATE AND MAINTAIN

Specialty areas responsible for providing support, administration and maintenance necessary to ensure effective and efficient information technology (IT) system performance and security.

- Systems Security Analyst
- System Administration
- Network Services
- Knowledge Management
- Data Administration

## SECURITY PROVISION

Specialty areas responsible for conceptualizing, designing and building secure information technology (IT) systems, i.e., responsible for some aspect of systems development.

- Systems Security Architecture
- Software Assurance and Security Engineer
- Technology Research and Development
- Test and Evaluation
- Systems Development

## PROTECT AND DEFEND

Specialty areas responsible for identification, analysis and mitigation of threats to internal information technology (IT) systems or networks.

- Computer Network Defense Analyst
- Incident Response
- Computer Network Defense Infrastructure Support
- Vulnerability Assessment and Management



# Hawaii's Cybersecurity Workforce Initiative Partners

- UH Campuses:
  - 4YR: UH Manoa, UH Hilo, UH West Oahu
  - 2YR: Hawaii CC, Honolulu CC, Kapiolani CC, Kauai CC, Leeward CC, Windward CC, UH Maui College
- NSA, PACOM, military, Federal/State/Local Government, etc.
- HI Dept. of Education (CTE, STEM, JROTC)
- Business/Professional Organizations (CIO Council, HBR, MEDB, Workforce Development Council)
- Private industry/corporations



# UH Academics

- NSA/DHS Centers of Academic Excellence:
  - HCC: CAE2Y; UHM: CAE-R; UHWO: CAE-CD4Y
- NSA Faculty imbedded at UH for 3 years
- Incumbent Worker Prior Learning Assessment Articulation
- 2YR Career Technical Education (CTE):
  - Associate in Science (AS) IT
  - Certificate of Achievement and/or Competence in CENT/Information Security & Assurance (ISA)
  - AS Computing Electronics & Networking Technology (CENT)
  - Articulate to 4Y Bachelors of Applied Science (BAS) CENT/(ISA) at UHWO
- 2YR STEM:
  - ASNS Pre-computer science
  - AS Information & Computer Sciences (ICS)
  - Can articulate to BS CS at UH Manoa



# UH 4Y & Advanced Degrees

- UH Manoa
  - BA Information & Computer Sciences (ICS)
  - BS Computer Sciences (CS)
  - BS Computer Eng
  - MS CS
  - PhD CS
  - PhD Communication & Information Sciences (CIS)
  - *[Stay tuned! New program in MIS]*
- UH West Oahu
  - BAS Computing, Electronics, Networking Technology (CENT)
  - BAS Information Technology (IT)
  - BAS Information Security & Assurance (ISA)
- UH Hilo
  - BS ICS
- UH Maui College
  - BAS Applied Business & IT (ABIT)

# K-12 Academic Initiatives

- Early College Initiative
  - Earn UH college credits in high school
  - HS students potentially earn between 15-30 credits
  - Pilot: underway on Maui, additional Oahu HS Fall '18
  - Dual credit model
- CTE Pathway in Cybersecurity
  - Waipahu already in progress
  - In development - Leilehua, Roosevelt, Campbell, Kapolei, Mililani progress

# K-12 Activities

- NSA/NSF GenCyber Camps
  - [www.gencyber-hi.org](http://www.gencyber-hi.org)
  - 6 Statewide student camps
  - 7 Statewide teacher camps: <https://www.gencyber.com/camp/info/hawaiiiteacher2017/>
- Summer Cyber Patriot Cyber Camps
  - Check [www.cyberhui.org](http://www.cyberhui.org)

<u>GenCyber Performance</u>	
	<u>Total To Date</u>
-	
Teacher camps	18
Teachers Trained	549
Student Camps	11
Students Trained	390



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# NSA GenCyber

*"Inspiring the Next Generation of  
Cyber Stars"*



- Cybersecurity summer camp for Elementary School Teachers and High School Teachers and Students
- **Students:** to understand correct and safe on-line behavior, increase diversity and interest in cybersecurity and careers in the cybersecurity workforce of the Nation
- **Teachers:** improve teaching methods for delivering cybersecurity content in K-12 computer science curricula.





# A Day in the Life of...

















# Security Clearance

- Individuals cannot apply for Security Clearance. A cleared contractor or government entity must be a sponsor.
  - Individuals (a) must be an employee of or consultant for a cleared contractor, or (b) individual received and accepted a written offer of employment from the cleared contractor.
- The National Security Agency (NSA) has its own security clearance process.
- In the past three years, DoD has had a significant backlog of security clearances and reinvestigations pending, most especially for TOP SECRET level access. In general, a CONFIDENTIAL or SECRET clearance can take between 1 and 3 months. A TOP SECRET will probably take between 4 and 8 months.
- Costs range from \$3,000 to \$15,000. The law requires that contractors pay most of the costs of obtaining clearances for their employees.
- Optimal path for students is to secure an internship or apprenticeship and have employer sponsor



## Collaboration with CyberHawaii

- Drive awareness and support for Cybersecurity Education and Workforce Development
- Assist with internship and apprenticeship security clearance placements
- Partner and engage in military, veterans and adult education efforts
- Participate in community exercises & events
  - Mentor college, high school, middle school students at cybersecurity exercises
  - Volunteer to develop & plan exercises



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