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.
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
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

1.5 Million
MORE cybersecurity professionals will be needed to accommodate the predicted global shortfall by 2020

Source: BSCP 2015 Global Information Security Workforce Study

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Source: BSCP 2015 Global Information Security Workforce Study

On average, 52% of IT professionals surveyed stated fewer than 26.8% of all applicants were qualified

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The biggest skill gaps of today’s cybersecurity professionals

72% Ability to Understand the Business
46% Technical Skills
42% Communication Skills


Fastest cybersecurity demand sectors are in industries managing consumer data

40% Professional Services
30% Other
16% Manufacturing & Defense
14% Finance & Insurance

Source: Job Market Intelligence: Cybersecurity Jobs: 2015-2016

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

Source: BSCP 2015 Global Information Security Workforce Study

18% Growth
Computer and mathematical occupations will grow much faster than the average job during 2012-2024


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


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


18% Growth
Computer and mathematical occupations will grow much faster than the average job during 2012-2024


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


Fastest growing skills in cybersecurity job postings

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

Source: Partnership for Public Service

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Hardest to fill skills in cybersecurity job postings

• 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

Source: Job Market Intelligence: Cybersecurity Jobs, 2015-2016

Hardest to fill skills in cybersecurity job postings

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• Software Issue Resolution
• Internet Security
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• Data Communications
• Platform as a Service (PaaS)
• Computer Forensics
• Internal Auditing
• Apache Hadoop

Source: Job Market Intelligence: Cybersecurity Jobs, 2015-2016

nist.gov/nice
Information Security Analysts [State of Hawai‘i]

15-1122 Standard Occupational Classification (SOC)

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).

STEM Bright Outlook

Regional Job Market Trends (click to view job numbers)

Projected ->

253 Jobs (2017)
Number of Jobs + Increased

State of Hawai‘i (# of Jobs) National Average (# of Jobs)
**How much will I get paid (2017)?**

**Earnings (Hawaii vs National)**

- **Low:** State of Hawaii: 53K, National: 54K
- **Median:** State of Hawaii: 82K, National: 93K
- **High:** State of Hawaii: 116K, National: 147K

$82,108 (State of Hawaii Average Salary) is **below** the National Average $96,044.

Learn more about [Wages](#).

**Will I need a college degree?**

- Bachelor's degree: 65%
- Post-baccalaureate certificate: 19%
- Post-secondary certificate: 10%

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

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

<table>
<thead>
<tr>
<th>Skills in High Demand</th>
<th># of Times Posted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Assurance</td>
<td>218</td>
</tr>
<tr>
<td>Information Systems</td>
<td>94</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>90</td>
</tr>
<tr>
<td>Cyber Security</td>
<td>65</td>
</tr>
<tr>
<td>Security Policies</td>
<td>57</td>
</tr>
<tr>
<td>Intrusion Detection And Prevention</td>
<td>53</td>
</tr>
<tr>
<td>Incident Response</td>
<td>47</td>
</tr>
<tr>
<td>Intrusion Detection Systems</td>
<td>40</td>
</tr>
</tbody>
</table>

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

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

- Total Job Postings (2016): 10,977
- Total Unique Postings (2016): 1,804

Job Posting Analytics:

Learn more about current [Job Openings](#).
### Occupation Matching: 15

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

**Estimated ANNUAL NEW Job openings**: 979

### Programs of Study

<table>
<thead>
<tr>
<th>CIP</th>
<th>Programs of Study</th>
<th>Graduates</th>
<th>Workforce Contribution by Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>110101</td>
<td>Computer and Information Sciences, General</td>
<td>72</td>
<td>7.35%</td>
</tr>
<tr>
<td>110003</td>
<td>Computer and Information Systems Security/Information Assurance</td>
<td>1</td>
<td>0.1%</td>
</tr>
<tr>
<td>140901</td>
<td>Computer Engineering, General</td>
<td>12</td>
<td>1.23%</td>
</tr>
<tr>
<td>140999</td>
<td>Computer Engineering, Other</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>110201</td>
<td>Computer Programming/Programmer, General</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>110701</td>
<td>Computer Science</td>
<td>106</td>
<td>10.83%</td>
</tr>
<tr>
<td>110501</td>
<td>Computer Systems Analysis/Analyst</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>110901</td>
<td>Computer Systems Networking and Telecommunications</td>
<td>27</td>
<td>2.76%</td>
</tr>
<tr>
<td>430116</td>
<td>Cyber/Computer Forensics and Counterterrorism</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>110103</td>
<td>Information Technology</td>
<td>52</td>
<td>5.31%</td>
</tr>
<tr>
<td>111005</td>
<td>Information Technology Project Management</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>111001</td>
<td>Network and System Administration/Administrator</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>111002</td>
<td>System, Networking, and LAN/WAN Management/Manager</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>110801</td>
<td>Web Page, Digital/Multimedia and Information Resources Design</td>
<td>1</td>
<td>0.1%</td>
</tr>
<tr>
<td>111004</td>
<td>Web/Multimedia Management and Webmaster</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total WORKFORCE Contribution**: 271 | 27.68%
Cybersecurity Pipeline Gap

Pipeline GAP:
271 graduates to fill
979 job openings
Education & Workforce Development Initiatives

FACT: Cybersecurity professionals have unique skills, are in short supply, and are vital to our security.
Hawai‘i Cybersecurity Workforce Initiative

Developing a clear education and workforce pathway to the cybersecurity profession
Cybersecurity is the ability to protect or defend the use of computers and networks. With cyber threats in a state of rapid and constant evolution, keeping up in the cyber security strategy and operations is a major challenge to governments, private industry and institutions.

The Issues
- 2013 Target breach cost $100 million
- 2014 Home Depot breach cost $233 million
- Estimates global losses from cyber crime: $400 Million annually
- 14 million federal worker identities compromised in 2015 breach
- According to privyright.org, there have been 889,368,931 records (government, private, and personally) breached since 2000
- The cybersecurity field is expected to experience a shortage 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.

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 STEMM subjects and biology while math preparation should sustain toward calculus.

2. College Path (2yr. degree - AS/AA)
   Competency Level: Technician
   Principles:
   Information Security
   Security Tools & Techniques

3. University Path (4yr. degree - BS/BA)
   Competency Level: Practitioner
   Principles:
   Information Security
   Security Architecture & Engineering

4. Graduate Path (MA/MS/PhD)
   Competency Level: Expert & Practitioner
   Principles:
   Information Security Governance
   Security Architecture & Engineering

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 cyber security work.
- Legal Advocate/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) systems performance and security.
- Systems Security Analyst
- System Administration
- Network Security
- Knowledge Management
- Data Administration

SECURITY PROVISION
Specialty areas responsible for conceiving, designing, and building secure information technology (IT) systems, i.e., responsible for some aspect of systems development.
- Systems Security Architect
- 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

- Summer Cyber Patriot Cyber Camps
  - Check [www.cyberhui.org](http://www.cyberhui.org)

<table>
<thead>
<tr>
<th>GenCyber Performance</th>
<th>Total To Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher camps</td>
<td>18</td>
</tr>
<tr>
<td>Teachers Trained</td>
<td>549</td>
</tr>
<tr>
<td>Student Camps</td>
<td>11</td>
</tr>
<tr>
<td>Students Trained</td>
<td>390</td>
</tr>
</tbody>
</table>
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...
What is the FBI?

- The Federal Bureau of Investigation (FBI) is the domestic intelligence and security service of the United States, which simultaneously serves as the nation's prime federal law enforcement agency.
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