




# *Getting Started in Cybersecurity: How to Hone Your Hacking Skills*

**Dr. Davina Pruitt-Mentle**

**Portia Pusey**

**CyberWatch**

The background of the slide is a 3D perspective view of a grid of nodes and lines. The nodes are small, light-colored spheres, and the lines are thin, light-colored lines connecting the nodes. The grid recedes into the distance, creating a sense of depth. The text is overlaid on this grid.

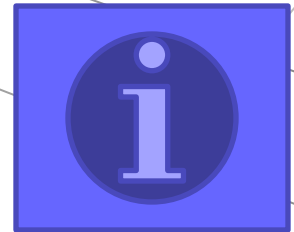
**What do you know about  
Cybersecurity?**


# The Net --- Eagle Eye



# What is Cybersecurity?

What is Information Assurance?



The background of the slide is a 3D perspective view of a grid of nodes and lines. The nodes are small spheres, some light gray and some light blue, connected by thin gray lines. The grid recedes into the distance, creating a sense of depth. The text is centered over this grid.

**What Jobs/Careers are  
there in Cybersecurity?**

# CyberSecurity: Which Job is for Me?

## Computer Programmer/ Engineer/ Software Developer/ Web Designer

**Description:** Analyzes user needs to design, build, test, and maintain software applications and systems.



## Penetration Tester/Systems/Networks / Vulnerability Researcher/ Exploit Developer

**Description:** Think like a hacker to identify flaws and vulnerabilities which jeopardize the safety and security of the data and communications of businesses and organizations.



## Information Security Engineer / Architect / Analyst/ Compliance Manager

**Description:** Assists Information Security professionals in designing plans, evaluating organizational weaknesses, and implementing procedures to protect the information assets of an institution or company.



## Malware Analyst/ Expert

**Description:** Examines malicious code to understand the type of damage it can do and how it replicates and spreads. Determines methods for detecting and deleting malware from systems. These professionals also investigate the source of the malware.



## CyberSecurity What are you interests?



## Network Security/ Engineer

**Description:** Protects the data and information of an organization's information and communication technology from damage or unauthorized access.



## Cryptographer

**Description:** Uses math, logic, and computer science to turn readable text into an unreadable form. Cryptographers also analyze encrypted (unreadable text) to turn it into a readable form.



## Computer Forensics / InfoSec Crime Investigator/ Forensics Expert/Analyst / Computer Crime Investigator

**Description:** Investigates digital media for data stored or encrypted. Test information security systems. Analyzes security breaches. These professionals often work in the law enforcement or military and defense fields.



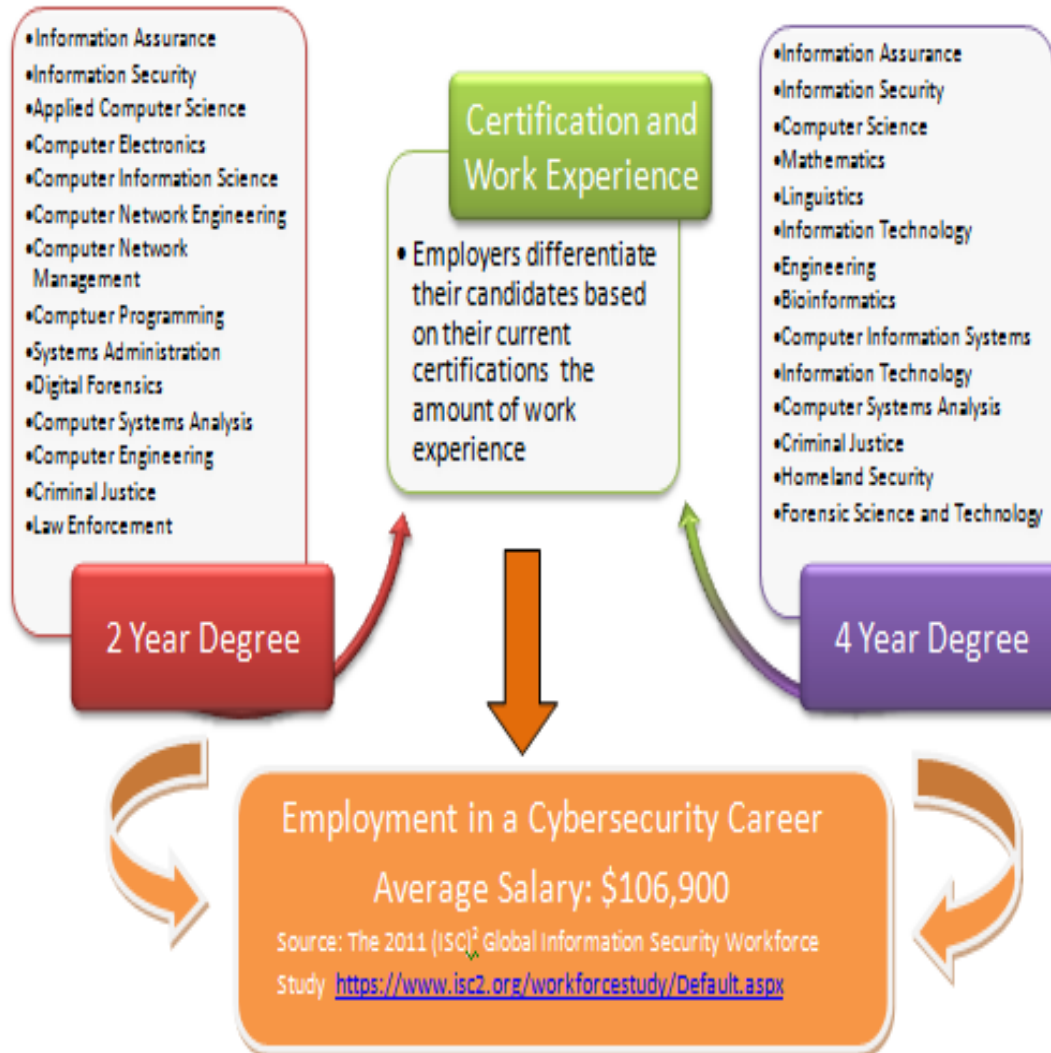
## Incident Responder/Disaster Recovery / Business Continuity Analyst/ Manager

**Description:** Recognizes, analyzes, and responds to incidents which have caused damage to information, data, and information and communication technologies. This includes recovering from all types of threats-- natural (tornados, hurricanes), human (hackers) and technical (malware, equipment failure)

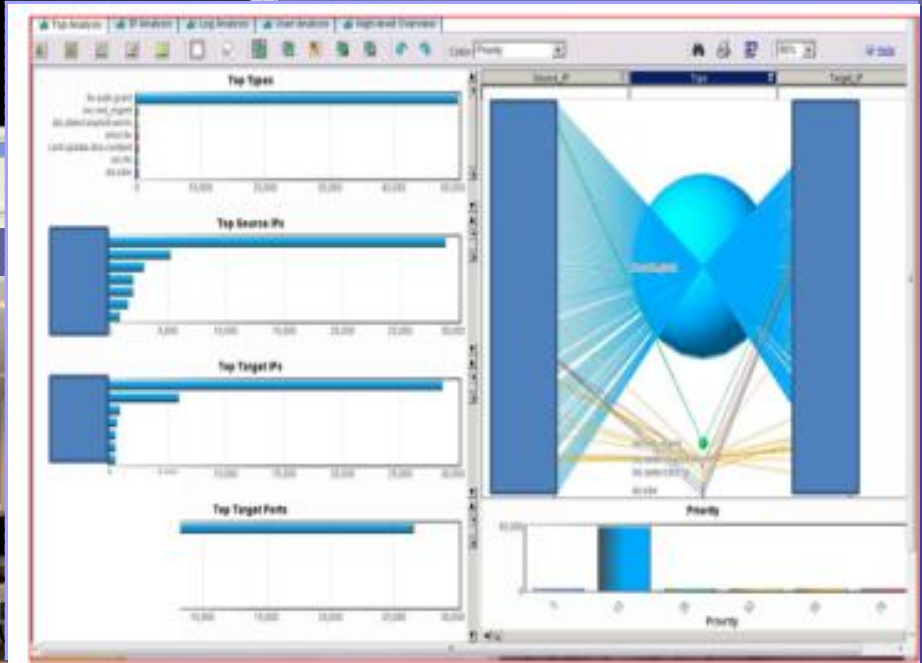
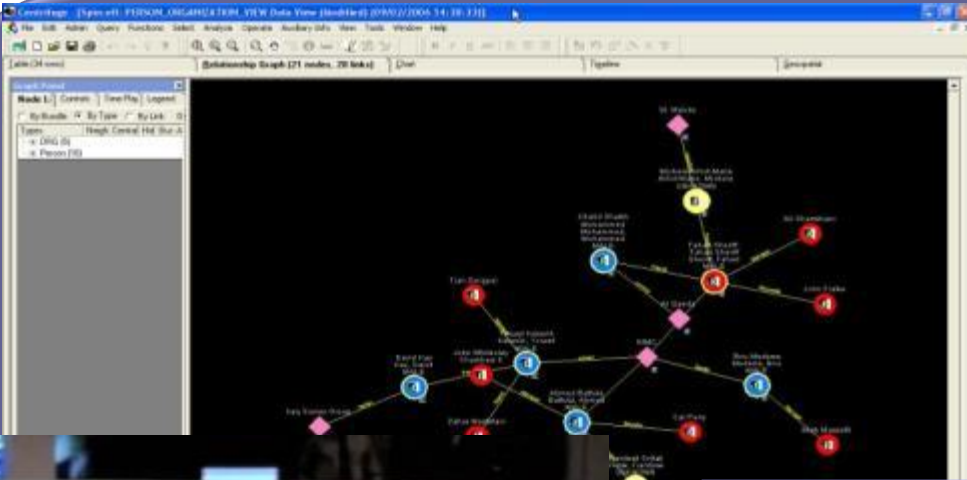


# Pathways to Cybersecurity Careers

Employers want graduates who understand that technical as well as human interventions provide for effective defenses. In addition to technical competence, IA professionals need to exhibit creative problem solving, organizational awareness, patience, self-management and teamwork skills.



# Cybersecurity a Growing Field?





# Cybersecurity: A National Growth Career Occupations Projected to Grow Fastest, 2006-2016

## **Network Systems and Data Communications Analysts**

Personal and Home Care Aides

Home Health Aides

## **Computer Software Engineers, Applications**

Veterinary Technologists and Technicians

Personal Finance Advisors

Makeup Artists, Theatrical and Performance

Medical A

Veterinarians

Substance Abuse and Behavioral Disorder Counselors

Skin Care Specialists

Financial Analysts

Social and Human Service Assistants

## **Gaming Surveillance Officers and Gaming Investigators**

### **Physical Therapist Assistants**

Pharmacy Technicians

### **Forensic Science Technicians**

Dental Hygienists


Mental Health Counselors

Mental Health and Substance Abuse Social Workers

US Dept of Labor

US Department of Labor: Bureau of Labor  
 Statistics <http://www.bls.gov/news.release/ecopro.nr0.htm>

Table 3. The 10 industries with the largest wage and salary employment growth, 2008-18 (1)  
 (In thousands)



Industry	Sector	Employment		Change	
		2008	2018	Number	Percent
Management, scientific, and technical					
consulting services.....	Professional and business services..	1,009	1,844	835	82.8
Offices of physicians.....	Health care and social assistance...	2,266	3,038	772	34.1
Computer systems design and related services..	Professional and business services..	1,450	2,107	656	45.3
Other general merchandise stores.....	Retail trade.....	1,490	2,097	607	40.7
Employment services.....	Professional and business services..	3,144	3,744	600	19.1
Local government, excluding education and					
hospitals.....	Government.....	5,819	6,306	487	8.4
Home health care services.....	Health care and social assistance...	958	1,399	441	46.1
Services for the elderly and persons with					
disabilities.....	Health care and social assistance...	585	1,016	431	73.8
Nursing care facilities.....	Health care and social assistance...	1,614	2,007	394	24.4
Full-service restaurants.....	Accommodation and food services.....	4,598	4,942	343	7.5

1 Data are from the National Employment Matrix.

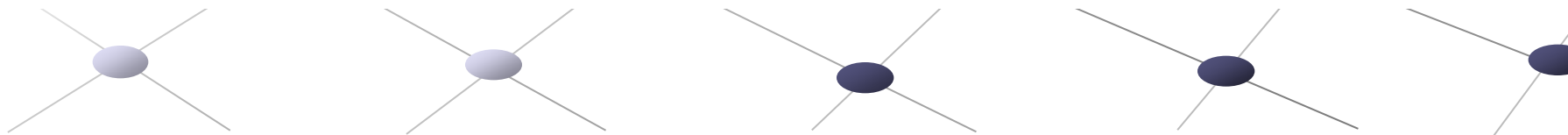


Table 1.6 Occupational Employment and Job Openings Data, 2008–18, and worker characteristics, 2008

(Numbers in thousands)

2008 National Employment Matrix title and code		Employment		Change, 2008-18		Job openings due to growth and replacement needs (in thousands)	Median annual wages	Median annual wage quartile	Most significant source of education and training category
		2008	2018	Number	Percent				
Financial examiners	13-2061	27.0	38.1	11.1	41.16	16.0	\$70,930	VH	Bachelor's degree
Computer software engineers	15-1030	909.6	1,204.8	295.2	32.46	371.7	-	-	-
Computer software engineers, applications	15-1031	514.8	689.9	175.1	34.01	218.4	\$85,430	VH	Bachelor's degree
Computer software engineers, systems software	15-1032	394.8	515.0	120.2	30.44	153.4	\$92,430	VH	Bachelor's degree
Network systems and data communications analysts	15-1081	292.0	447.8	155.8	53.36	208.3	\$71,100	VH	Bachelor's degree
Biomedical engineers	17-2031	16.0	27.6	11.6	72.02	14.9	\$77,400	VH	Bachelor's degree
Environmental science and protection technicians, including health	19-4091	35.0	45.2	10.1	28.91	25.2	\$40,230	H	Associate degree
Self-enrichment education teachers	25-3021	253.6	334.9	81.3	32.05	120.3	\$35,720	H	related occupation
Physician assistants	29-1071	74.8	103.9	29.2	38.99	42.8	\$81,230	VH	Master's degree
Surgical technologists	29-2055	91.5	114.7	23.2	25.32	46.3	\$38,740	H	award
Veterinary technologists and technicians	29-2056	79.6	108.1	28.5	35.77	48.5	\$28,900	L	Associate degree
Home health aides	31-1011	921.7	1,382.6	460.9	50.01	552.7	\$20,460	VL	training
Dental assistants	31-9091	295.3	400.9	105.6	35.75	161.0	\$32,380	L	training
Personal and home care aides	39-9021	817.2	1,193.0	375.8	45.99	477.8	\$19,180	VL	training

Source: Employment Projections Program, U.S. Department of Labor, U.S. Bureau of Labor Statistics

# Computers & Information Technology Cybersecurity Specialist

Source: <http://www.geteducated.com/career-center/>

## Outlook & Growth

- **34 percent—faster** than normal
- **An increase** in computer security jobs is expected as technology continues to advance and become more affordable.
- More businesses will **add computers** and will need specialists to make their networks secure.
- In addition, **use of the Internet** by businesses should increase the demand for computer security specialists.
- Some specialists will work inside consulting firms dedicated exclusively to computer security issues.

## Salary & Wages

- Those in executive roles— with titles such as chief information security officer, chief security officer or security **manager—earned \$106,326 on average.**
- Those in more technical roles (security engineer, security penetration tester or web security manager) **earned an average of \$75,275.**

# Computers & Information Technology Cybersecurity Specialist

Source: <http://www.geteducated.com/career-center/>

## What is a Cybersecurity Specialist?

- Work with companies to build secure computer systems.
- Question managers and staff about their current security methods.
- Find out what information the company wants to protect.
- Determine what information employees should be able to access.
- Plan the security system.
- Train staff on how to use security software and properly use computers to prevent any problems.
- Write rules and procedures for employees to follow.
- Evaluate security breaks and determine if there are problems or errors.
- Track where the break came from and shut off the access point.

## Education & Degree Path

- **AS or AAS or BS degree** in
  - computer science,
  - engineering,
  - information systems
  - information assurance
- **Another route** is to major in your area of interest and **minor in one** of these degrees.
- Many programs offered online

# Cybersecurity: A National Growth Career

Maryland wants to be cybersecurity epicenter

By Ben Bain; Jan 12, 2010

<http://fcw.com/articles/2010/01/12/web-cybersecurity-center-maryland.aspx>

Gov. O'Malley's report, titled *CyberMaryland*

- Maryland is positioned to be the hub for federal, academic and private-sector cybersecurity efforts
  - Maryland is already home to the National Institute of Standards and Technology, the National Security Agency, the Intelligence Advanced Research Projects Activity — the soon-to-be home of the Defense Information Systems
- ✓ Maryland's IT employment rate rose by 3.3 percent between 2001 and 2008, while nationwide it fell by 17.1 percent during that same time period



Very interesting....  
but how does  
this apply to  
me?

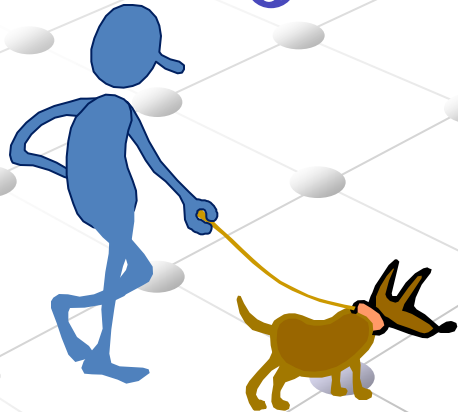
## Ft Meade, Maryland

US Cyber Command  
USCYBERCOM: is a sub-unified command,  
subordinate to U.S. Strategic Command

- protecting DoD networks  
from cyber attacks and will manage cyber  
warfare activity.

[The Defense Information Systems Agency  
\(DISA\)](#)

[The Colocation of Defense/Military  
Adjudication Activities](#)  
[Defense Media Activity \(DMA\)](#)



A 3D perspective view of a diamond lattice structure, consisting of a grid of spheres connected by lines. The spheres are arranged in a diamond pattern, and the lines form a grid of diamond shapes. The spheres are colored in a gradient from light gray to dark blue. A path of dark blue spheres is highlighted, starting from the bottom left and moving towards the top right, following a zig-zag pattern through the lattice. The text "How to Get There?" is overlaid on the lattice in a blue, sans-serif font.

**How to Get There?**





**CyberWatch**

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



# Centers of Academic Excellence

CAE

CAE2Y

CAER

# Certificates

- PMI PMP
- PMI CAPM
- ITIL v2 Foundations
- CISSP
- Cisco CCIE Routing & Switching
- Cisco CCVP
- ITIL v3 Master
- MCSD
- CCNP
- Red Hat Certified Engineer

# UPCOMING PROGRAMS IN CYBERSECURITY



**Expanding Knowledge  
in Cyberawareness and  
Careers in  
Cybersecurity**

## MD SUMMER CYBERWARRIOR CAMPS

- Cryptography
- Building Games/Simulations
- Digital Forensics
- Computer Security
- Cyberethics, safety and security
- Field Trips and Guest Speakers

**ASK ABOUT DATES AND  
LOCATIONS**



**2 MARYLAND LOCATIONS  
JULY 11-15, 2011 CCBC or  
JULY 18-22, 2011 UMCP**

5 days of training

- Intrusion Detection in Depth
- Hacker Techniques
- Web Application Pen Testing & Hacking
- Programming
- Computer Forensics

## SAVE THE DATES

- HS Networking Security Competition
- MD US Cyber Camps
- MD Cyberwarrior Camps
- Sept 22, 2011 Careers in Cybersecurity GC Workshop
- Oct 6-7, 2011 10th Annual Cyberethics, safety and security Conference
- Oct 18, 2011 Cool Careers in Cybersecurity for Girls Summit

HS Networking Security Competition  
Cool Careers in CyberSecurity 4 Girls Summit  
US Cyber Challenge Camps  
After School Cyberwarrior Programs  
Careers in Cybersecurity for Guidance Counselors  
SECURE IT Program  
Annual Cyberethics Safety Security Conference

**VISIT: <http://www.edtechpolicy.org/cyberk12/>**

**Contact person: Davina Pruitt-Mentle, Ph.D.**

**410 531 3910**

**dpruitt@umd.edu**



# "How to become a hacker in 8 steps"

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1. Embody the "hacker spirit"
2. Setup a home hacking lab
3. Work in the IT department
4. Attend local user groups & security conferences
5. Read security blogs & listen to podcasts
6. Write about security
7. Socially network yourself
8. Get hacked

**And  
go to  
school!**



**Suggested by:  
Paul Asadoorian**



# How NOT to become a hacker

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- Choosing a really cool NIM like “ZeroCool”
- Write 3v3ryth1ng in 1337sp3@k (translated: Write everything in “leetspeak”)
- Break into your friends computers and change their backgrounds to images of Barney and blast Justin Beiber 24/7
- Violate state, federal, or international law
- Wear black all the time
- Take the “8 steps to becoming a hacker” seminar you found on the Internet

# Before we go any further...

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## Top ten best/worst hacker movies of all time:

1. **War Games** - My parents wouldn't let me get a modem
2. **Sneakers** - "It's all about the information"
3. **Tron** - Cool body suits
4. **Hackers** - Angelina Jolie, do I need to say more?
5. **Swordfish** - Halle Berry, notice a trend?



# Continued...

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6. **The Net** - Ruining people's lives is not cool
7. **The Matrix** - Believe whatever you want to believe
8. **Johnny Mnemonic** - Don't format my brain
9. **Antitrust** - More about software than hacking
10. **Takedown** - Read the book instead





# So You've Watched 10 movies

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- Hopefully not in one sitting, but whatever
- What does it mean to be a hacker? (Note: it should have nothing to do with rollerblades or “hacking the gibson”)
- Hacking really means being curious and exploring that curiosity
- Making things do stuff they were not intended to do

**Be curious about technology!**



# Setup A Home Hacking Lab



Preferably **NOT** in your Mom's living room, like I did...

# Computers Are Cheap

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- You can find old computers everywhere
- Set them up, install Linux on them (thats free too)
- You can find archives of old software to exploit:
  - [www.oldapps.com](http://www.oldapps.com)
- VMware is also free, cheap, and easy to use
  - This also helps you learn virtualization

# By The Way...

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- Paul's Top 5 Hacker TV Shows:
  1. **The IT Crowd** - British people are funny
  2. **Tiger Team** - Don't forget your USB cable
  3. **Prototype This** - Build it!
  4. **Battlestar Galactica** - Yea, its a stretch...
  5. **Hak.5** - Technology and hacking stuff

\*Honorable Mentions: Myth Busters and To Catch A Thief!



# Seriously, Get A Job

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- There is not better preparation for information security than working in the IT department
- Programming experience helps too, depends on where you want your career to go
- Ideally you work on the help desk, networking, systems administration
- Then move into security with a solid foundation of skills and experiences



# No Shortage of Cons

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- Shmoocon

- HOPE

- Defcon

- Blackhat

- Toorcon

- Derbycon

- Quahogcon

- and more...

- Brucon

- SOURCE

- Bsides

- Cansecwest



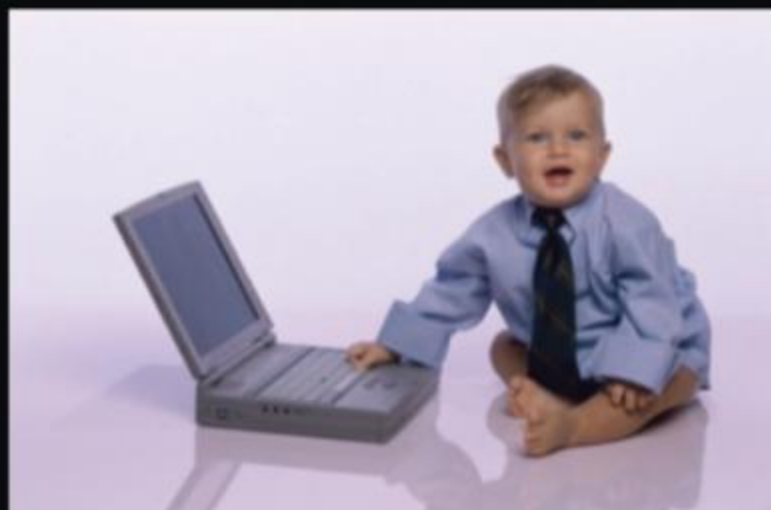
**DEFCON**



# Local Groups

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- Defcon groups - DC<your area code>
- ISSA
- ISACA
- NAISG
- 2600 groups
- Infraguard chapters
- OWASP meetings



<http://site.infosecmentors.com/>

# Listen to Security Podcasts

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- We do a weekly show called PaulDotCom Security Weekly
- Several others:
  - Risky Business
  - Securabit
  - Exotic Liability (Parental Advisory!)
  - Network Security Podcast
  - Go to <http://getmon.com/> for a complete list





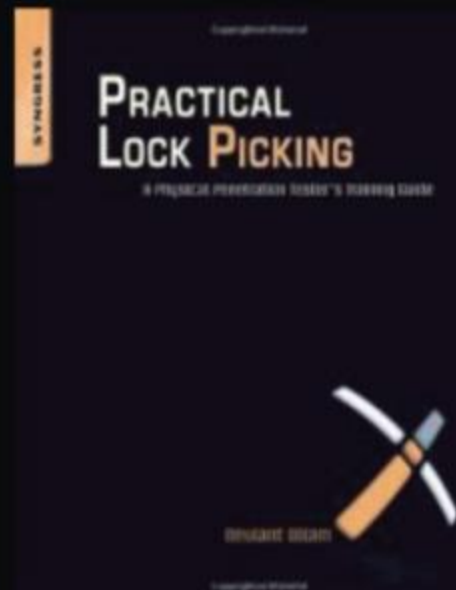
# Read Stuff

- Blogs

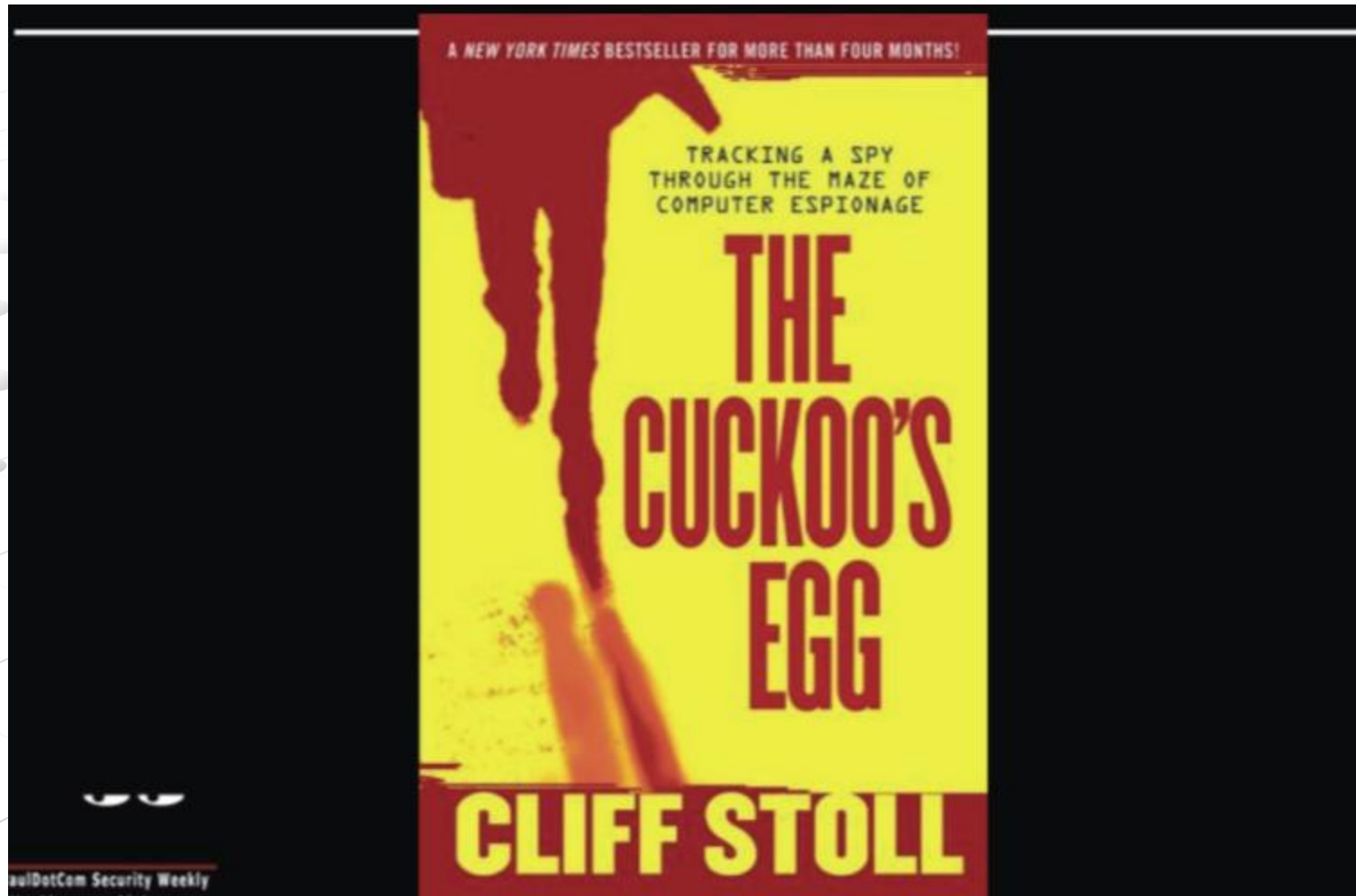
- I subscribe to over 500 blogs
- You should too
- Read them, assimilate knowledge
- <http://pauldotcom.com/PaulFeeds.opml>

- Books

- So many great books, Wireless Hacking Exposed and Lockpicking by Deviant Ollom
- I co-authored a book called "WRT54G Ultimate Hacking"



# Paul's Favorite Hacking Book



# Socially Network Yourself

How not to socially network yourself:



Remember, whatever you put on the Internet is public forever

# Social Network Productivity

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- Twitter
  - LOTS of security professionals on Twitter
  - Many events, like CCDC, are “live Tweeted”
  - Several events have a “Tweetup”
- Facebook
  - Most users BY FAR
  - Can be productive
  - Don't play farmville



# PaulDotCom On Facebook

- PaulDotCom Fan Page
  - <https://www.facebook.com/pages/PaulDotCom-Security/56074056651>
- PaulDotCom Facebook Group
  - <https://www.facebook.com/group.php?gid=6678027341>



The screenshot shows the Facebook interface for the "PaulDotCom Security Weekly Podcast" page. The top navigation bar includes the Facebook logo, a search bar, and a "Home" link. The page header features the name "PaulDotCom Security Weekly Podcast" with a profile picture icon. Below the header are tabs for "Wall", "Info", "Photos", "Discussions", and a plus sign for more options. A "Share:" section offers options for "Status", "Photo", "Link", and "Video". A text input field with the placeholder "Write something..." is visible. On the left side, there is a profile picture of a stylized face with white eyes on a black background, and a cover photo with the text "PaulDotCom Security Weekly" and the URL "http://www.pauldotcom.com". A "Message All Members" button is located at the bottom left of the page.

**<http://pauldotcom.com/gettingstarted.pdf>**

## Listen

- <http://pauldotcom.com/radio> (24/7)
- Podcast in iTunes

## Watch

- Live! <http://pauldotcom.com/live>
- "TV" <http://pauldotcom.blip.tv>

## Participate

- Mailing List: <http://mail.pauldotcom.com>
- Community: <http://pauldotcom.com/insider>
- IRC: irc.freenode.net #pauldotcom

## Read

- <http://pauldotcom.com> (Blog)
- Email us [psw@pauldotcom.com](mailto:psw@pauldotcom.com)





*Questions  
Thank You*

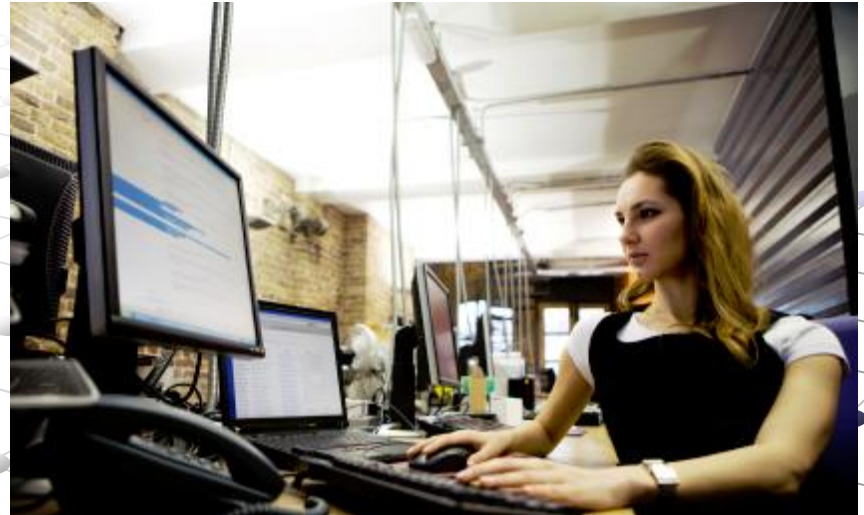
# Careers in IS/IA & Digital Forensics

- Handout for Labor Stats and Career Paths
- <http://www.careeronestop.org/>



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  - build,
  - test, and
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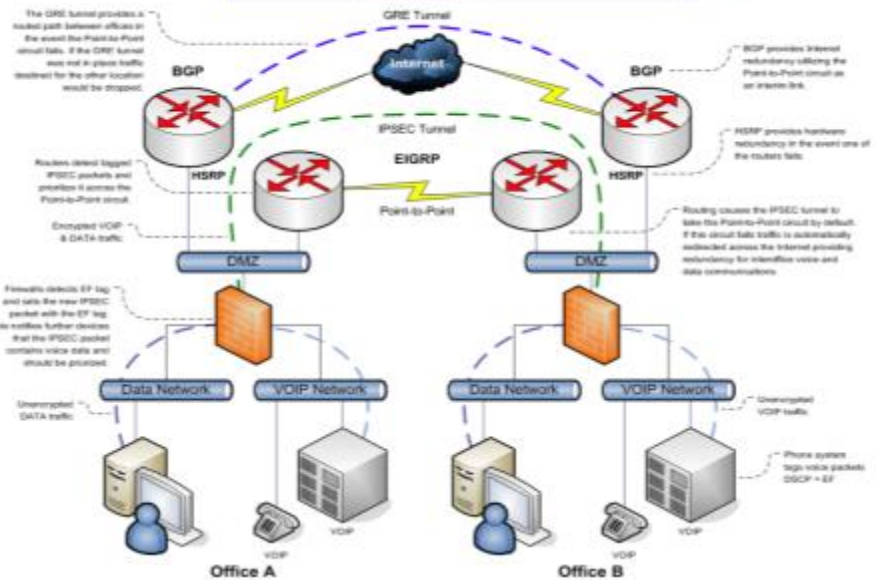


# Network Security/ Engineer

- Protects the data and information of an organization's information and communication technology from damage or unauthorized access



Redundant Internet and Interoffice Communications  
Frederick J. Stuck, Jr.

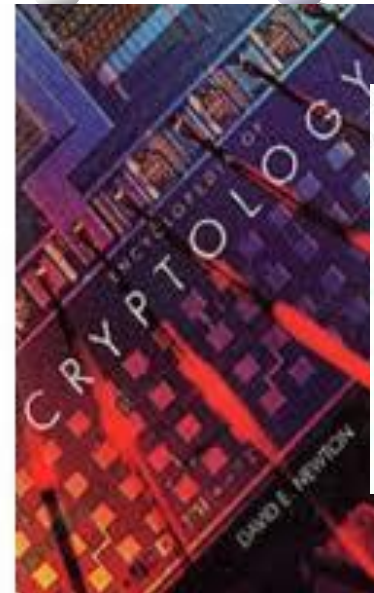


# Cryptographer

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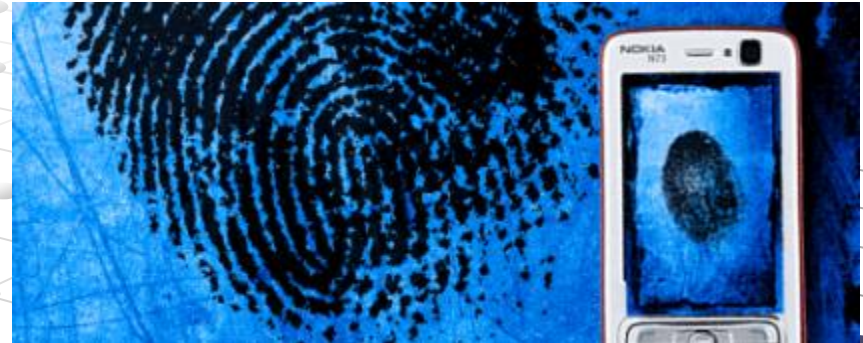
CODE TABLE

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	
Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
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H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	
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H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	
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L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	



# Computer Forensics / InfoSec Crime Investigator/ Forensics Expert/Analyst / Computer Crime Investigator

- Investigates digital media for data stored or encrypted.
- Tests information security systems.
- Analyzes security breaches.
- These professionals often work in the law enforcement or military and defense fields.



# Incident Responder/Disaster Recovery / Business Continuity Analyst/ Manager

- Recognizes, analyzes, and responds to incidents which have caused damage to information, data, and information and communication technologies.
- This includes recovering from all types of threats-- natural (tornados, hurricanes), human (hackers) and technical (malware, equipment failure)



NOAA's Command Center





# Defining CyberSecurity?

- **CyberSecurity focuses on the technical aspects of computer defense**
  - the safety of computers and computer systems in a networked environment, while Information Assurance focuses on confidentiality, integrity, availability and validation of data, and therefore CyberSecurity is a subset of Information Assurance.
- **Information Assurance (DOD)**
  - is a subset of CyberSecurity , and CyberSecurity includes management of the risks associated with computers and networks and mission assurance.

# The Center for Strategic and International Studies (CSIS) Commission on CyberSecurity

● for the 44<sup>th</sup> Presidency suggests the term  
***“cyber security services”***

- the development, implementation, operation and administration of measures and/or activities intended to prevent, detect, recover from and/or respond to intentional or inadvertent compromises of the confidentiality, integrity and availability of information technology including but not limited to intrusion detection, computer forensics, configuration management, and system development.

# CyberSecurity involves protecting that information by...

- Preventing
- Detecting
- and responding to attacks

- In the fields of:
  - management science
  - systems engineering
  - criminology
  - security engineering
  - computer science
  - robotics

In the fields of:

- data and communications
- accounting
- forensic science
- law enforcement
- bioengineering
- intelligence

## Everything relies on computers and the internet now

- communication (email, cellphones)
- entertainment (digital cable, mp3s)
- transportation (car engine systems, airplane navigation)
- shopping (online stores, credit cards)
- medicine (equipment, medical records)
- and the list goes on.

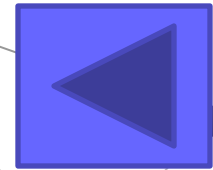
**How much of your daily life relies on computers?  
How much of your personal information is stored either  
on your own computer or on someone else's system?**



# The Defense Information Systems Agency (DISA)



- **DISA**, is responsible for DoD computer and automated information systems and networks.



# Defense Media Activity (DMA)



- **DMA**, is the Department of Defense's direct line of communication for news and information to U.S. forces worldwide.
- The agency presents news, information and entertainment on a variety of media platforms.



# The Colocation of Defense/Military Adjudication Activities



- DoD's place for workers from three military services and other defense activities to 'adjudicate' or determine who should receive security clearances after proper background investigations.
- More than 750 people from 10 different agencies will work in the new 150,000 square feet facility.



# What is IA?

- CyberWATCH Video
  - <http://www.cyberwatchcenter.org/CyberWATCH/>
- Fox Video—Cyber challenge
- Sneakers
  - <http://www.imdb.com/video/screenplay/vi2448753433/>
- The Net
  - <http://www.imdb.com/video/screenplay/vi2046230809/>
- Staying Safe Online: The Need for Cybersecurity
- NATO Brief
- Obama Need for Cybersecurity
  
- National Collegiate Cyber Defense Competition
- The Duhs of Security
- Hacker
  - <http://www.youtube.com/watch?v=2efhrCxl4J0>
- NSA Commercial
  - [http://www.nsa.gov/careers/Media\\_Center/index.shtml](http://www.nsa.gov/careers/Media_Center/index.shtml)



# What is IA (cont)?

- Theory and Practice of Cryptography
  - <http://www.youtube.com/watch?v=lzVcSrZIX8>
- There May be a Shortage of Cybersecurity Professionals
  - <http://www.youtube.com/watch?v=MUPIMT2Mjyk>
- Lockheed Martin HOW Cyber Security
  - <http://www.youtube.com/watch?v=fhjFsWGcUm4&feature=related>
- Whoa, That's Awkward (EDUCAUSE WINNER)
  - <http://www.youtube.com/watch?v=gtSIDpoX0r0&feature=related>
- Northrop Grumman Battlespace Command
  - <http://www.youtube.com/watch?v=WsWW6HskcWg&feature=related>
- NSA spy techniques (good background--bias messaging)
  - <http://www.youtube.com/watch?v=48dRrNCjLus&feature=related>
- Lockheed Martin Security Intelligence Center
  - <http://www.youtube.com/watch?v=uSSBjpljvOA&feature=related>
- United States Air Force-Cyberspace Domain
  - <http://www.youtube.com/watch?v=xeWnZRZrpaY&feature=related>

# Other Videos

## Robotics

- [Lockheed Martin HULC Exoskeleton](#)
  - [http://www.youtube.com/watch?v=kat8l5UM\\_Vs&feature=related](http://www.youtube.com/watch?v=kat8l5UM_Vs&feature=related)

## Remove Cyber Security Removal Video

### [How to remove bad videos/bots](#)

- <http://www.youtube.com/watch?v=pM8bU0MHVEI&feature=related>

## Humorous October is cybersecurity awareness month--good example of what to do

- [Cyber Security Awareness - Missouri S&T](#)  
<http://www.youtube.com/watch?v=XSMuaaWjnJ8&feature=related>

## ● CyberChallenge

- <http://www.uscyberchallenge.org/>



# Careers in IS/IA & Digital Forensics

- Handout for Labor Stats and Career Paths
- <http://www.careeronestop.org/>

# IT Security EBK:

## A Competency and Functional Framework for IT Security Workforce Development

### Functional Perspectives

- M - Manage
- D - Design
- I - Implement
- E - Evaluate

## IT Security Roles

### IT Security Competency Areas

		IT Security Roles																	
		Executive			Functional				Corollary										
		Chief Information Officer	Information Security Officer/ Chief Security Officer	IT Security Compliance Officer	Digital Forensics Professional	IT Security Engineer	IT Security Operations and Maintenance Professional	IT Security Professional	Physical Security Professional	Privacy Professional	Procurement Professional								
IT Security Competency Areas	1 Data Security	M	M	D	E			D	E	I	E	M	D	E			D	E	
	2 Digital Forensics		M	D	E	M	D	I	E										
	3 Enterprise Continuity	M	M	E	E					I	D		E	I	D				
	4 Incident Management	M	M	D	E	E	I			I	E	D	D	E	I	M	D	E	
	5 IT Security Training and Awareness	M	M	E	E								D	E			D	E	
	6 IT Systems Operations and Maintenance			E	E	I	E	I	D	M	D								
	7 Network Security and Telecommunications			E	E	I	D	I	D	M	D								
	8 Personnel Security			E	E								D	E	E	I	D		
	9 Physical and Environmental Security	M	M	E	E								D	E	M	D	E		
	10 Procurement	M	D	M	D	E	E	E			E			E				M	D
	11 Regulatory and Standards Compliance	M	E	M	D	E	I	E					I			M	D	E	
	12 Risk Management	M	E	M	D	E	I	E	I	I	I	I	D	E	I	M	D	E	
	13 Strategic Management	M	D	M	D	E	E	E											
	14 System and Application Security	M	E	M	E	E				D	I								

# Mapping Professional Specialist Groups to Career Levels

<b>Professional Specialist Group Model</b>						
		<b>Management</b>	<b>Technology</b>	<b>Architecture</b>	<b>Assurance</b>	<b>Risk Management</b>
<b>Senior Executive</b>	CISO	CTO	CIO	COO	CAO	CRO
<b>Manager/Director</b>	ISM,ISD, Mgr Dir, Ops Mgr/Dir, Consulting Mgr/DIR	Development Manager Systems and Infrastructure			Head of Internal Audit	Information Risk Mgr/Dir Consulting Mgr/Dir
<b>Expert</b>	Principal Consultant	Senior Dev Engineer	Senior Architect	Senior Architect	Senior Security Auditor	Principal Consultant
<b>Sepecialist Managerial</b>	Product/Program manager, Team Leaders, Account Sales managers					
<b>Specialist Technical</b>	Security Consultant Business Analyst	Security Product Manager	Security Designer	Security Designer	Security Auditor	Information Risk Consultant
<b>Entrant</b>	Analyst	Deverloper	Security Designer Trainee	Security Designer Trainee	Security Auditor Trainee	Information Risk Trainee

# Career Levels and Traditional Paths

Senior Executive

**CIO; CISO; CTO; CRO; COO**

**EXPERT**

Principal Consultant;  
Senior/Chief Architect;  
Senior Security Auditor; Etc.

**MANAGER/DIRECTOR**

Consulting Manager/Director; Information  
Security Manager/Director; Head of  
Security Audit; Information Risk  
Manager/Director; Operations  
Manager/Director

Specialist (Technical/Business)

Security Consultant; Security  
Designer/Architect; Security Auditor;  
Information Risk Consultant; Security  
Product Manager; Business Analyst

Specialist (Management) Project Manager;  
Program Manager; Team Leader;  
Account Manager; Sales Manager;  
Marketing Manager

**ENTRANT**

Security Analyst; Security Developer; Security Administrator; Trainee  
Information Risk Consultant; Security Product Sales; Etc.

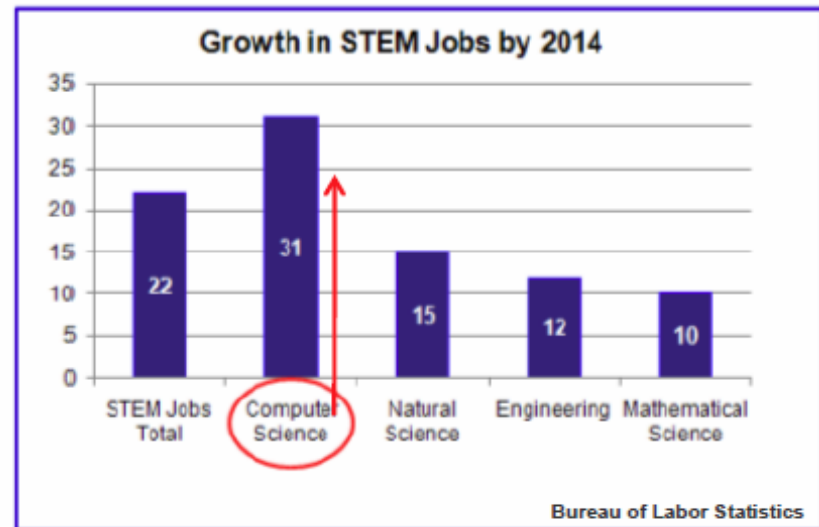
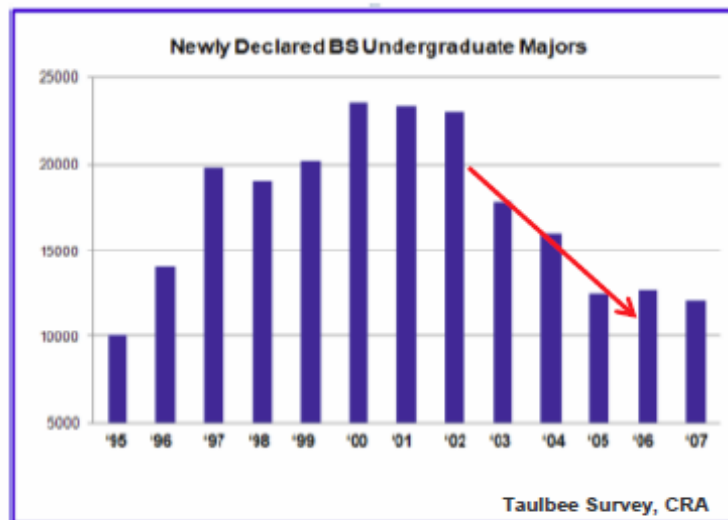
Years of experience & ability



# Our Education Problem

Problem: The U.S. is not producing enough computer scientists and CS degrees

- CS/CE enrollments are down 50% from 5 years ago<sup>1</sup>
- CS jobs are growing faster than the national average<sup>2</sup>



- National Collegiate Cyber Defense Competition (NCCDC)
  - ◆ Provides a controlled, competitive environment to assess a student's depth of understanding and operational competency.
- U.S. Cyber Challenge (High School)
  - ◆ DC3 Digital Forensics Challenge, CyberPatriot Defense Competition, Netwars Capture-the-Flag Competition

<sup>1</sup>Taulbee Survey 2006-2007, Computer Research Association, May 2008 Computing Research News, Vol. 20/No. 3

<sup>2</sup>Nicholas Terrell, Bureau of Labor Statistics, *STEM Occupations*, Occupational Outlook Quarterly, Spring 2007