The ICS Security Workforce:
Issues and Answers

ICSJWG
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about me

- 20+ years in cybersecurity
- Electric utility staff (8 years)
- NERC CIP Auditor (14 months)
- EnergySec (full-time since 2010)
- Consulting (as little as possible)
- CISA, CISSP
- Hobby Farmer (chickens, goats, llamas, …)

(hypo|hyper)thesis

The need for qualified cybersecurity professionals has far exceeded supply, particularly in specialty areas such as ICS. This will continue in the near-term, but numerous efforts are underway to correct this imbalance. There is reason for optimism.

the problem

State of Cyber Security 2017 — Workforce Trends and Challenges

the problem

http://cyberseek.org
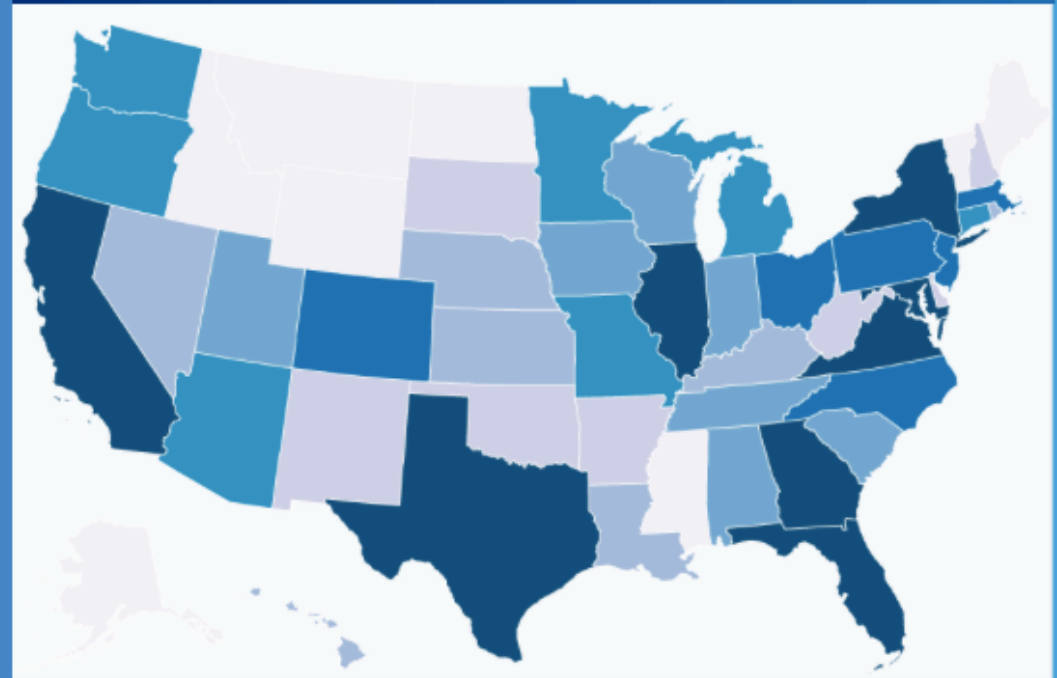

A heat map of cybersecurity supply and demand

the disconnect

- Employers can't find workers
- Students can't find jobs
- HR doesn't understand the market
- Academic programs don't align with industry needs (sometimes)
- Unrealistic expectations

the players

- Academia
- Government – Federal
- Government – State/Local
- Business
- Non-Profits
- Coalitions
- Individuals

academia

- Significant expansion of cybersecurity degree programs
- Community Colleges expanding programs
  - https://www.nationalcyberwatch.org
  - http://www.cyberwatchwest.org
  - http://www.c5colleges.org
- NSA Centers of Academic Excellence
  - https://www.iad.gov/NIETP/reports/current_cae_designated_institutions.cfm
- More programs addressing ICS
  - http://www.uh.edu/tech/cisre/
- Competitions in the classroom (NCL)
  - https://www.nationalcyberleague.org

federal government

- DOL – American Apprenticeship Grants
  - https://www.dol.gov/featured/apprenticeship/grants
- National Initiative for Cybersecurity Education (NICE)
  - http://csrc.nist.gov/nice/
- DOE – Secure Power Systems Professional
  - https://www.controlsystemsroadmap.net/Efforts/Pages/SPSP.aspx
- Scholarship for Service
  - https://www.sfs.opm.gov

state and local initiatives

- State Workforce Investment Boards
- Colorado's "National Cyber Security Center"
  - https://www.nationalcybersecuritycenter.org/about
- Cyber competitions as sanctioned activities
- TechHire
  - https://obamawhitehouse.archives.gov/issues/technology/techhire
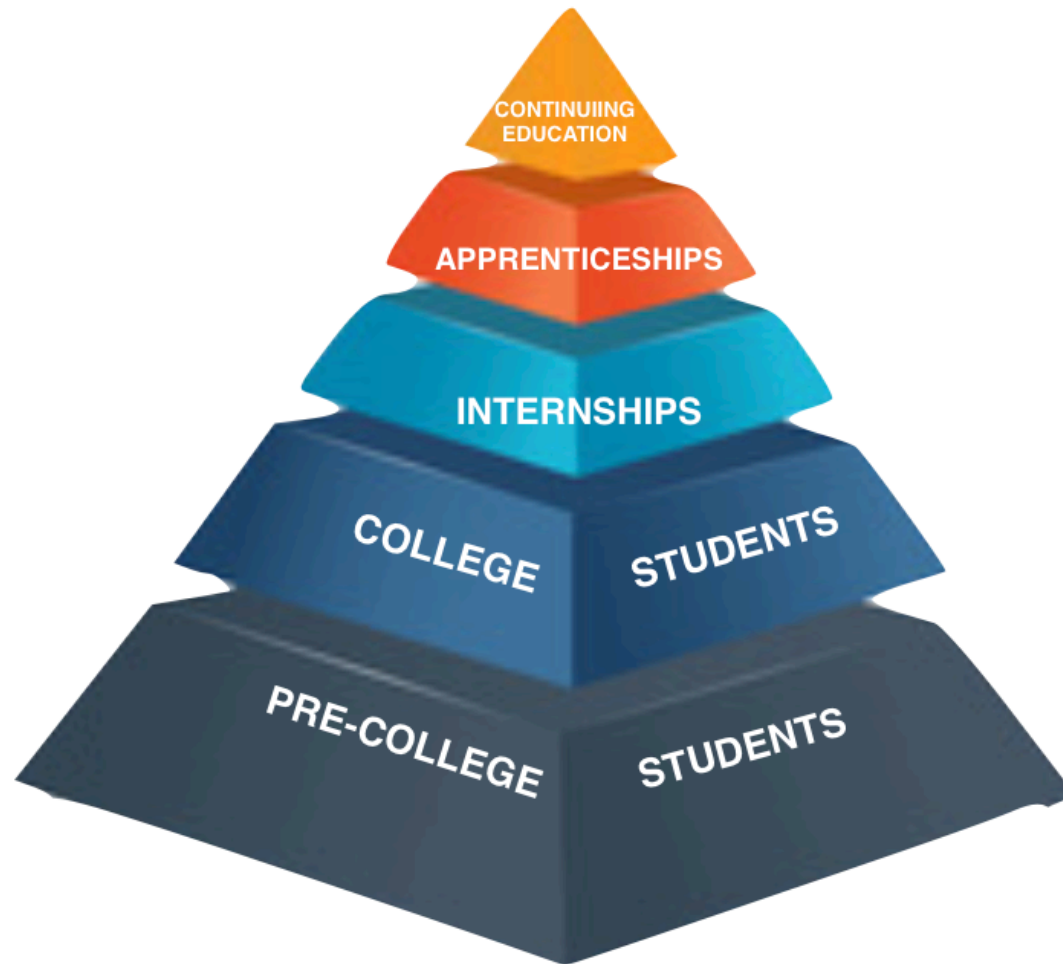 - http://techhire.org/community/riverside/

collaborations

- Phoenix Chamber of Commerce
  - http://phoenixchamber.com/2017/01/13/workforce-talent-pipeline-education-funding-top-phoenix-chambers-priorities/

- Washington Technology Industry Association
  - http://lni.wa.gov/News/2015/pr150909a.asp

- TechHire Grants
  - https://obamawhitehouse.archives.gov/sites/default/files/skills/techhiregrant-summaries_final.pdf

the pyramid

pre-college

- Cyber Patriot
  - https://www.uscyberpatriot.org
- INTERRUPT
  - http://www.1nterrupt.com
- NSA Day of Cyber
  - https://www.nsadayofcyber.com
- INL K-12
  - https://www.inl.gov/inl-initiatives/education/k-12-stem/
- CyberGirlz
  - http://www.cyberwatchwest.org/index.php/curriculum-development/cyber-sec-courses/cybergirlz-summit

internships

- Cybersecurity internships are becoming more common
- Effect method of identifying qualified candidates for entry level positions
- Companies may need help identifying meaningful work for interns
- Leverage existing programs for new positions (i.e. cybersecurity)

apprenticeships

- Registered Apprenticeships
  - https://www.doleta.gov/OA/apprenticeship.cfm
  - Can provide college credit
  - Often lead to a recognized credential
  - Eligible for government funding such as GI Bill
- Cybersecurity apprenticeships are being developed
  - https://ccap-coastline.org/apprentices/

professional education

- SANS
- Cybati
- ISA
- INL Red/Blue
- Cyber Ranges
  - http://azcwr.org
- Many Others

key challenges

- Just not enough people in the market
- Disconnect between job descriptions and available resources in the market
- Lack of entry-level positions
- Identifying Career Pathways
- The other "Duck Curve"

the path forward

- Start early! (Junior High or below)
  - Identify career pathways
  - Provide mentoring
- Coalitions must be built to tie together disparate efforts
  - Employers must engage
  - Academics must listen
  - Government (and NGOs) can assist and enable
- Current industry professionals must mentor the next generation
- "Professionalization" of the industry must continue
- Scale…

questions

thank you

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SECURING CRITICAL INFRASTRUCTURE

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