Cybersecurity Education Need and Opportunity
A National Perspective

WHAT CAN WE DO?

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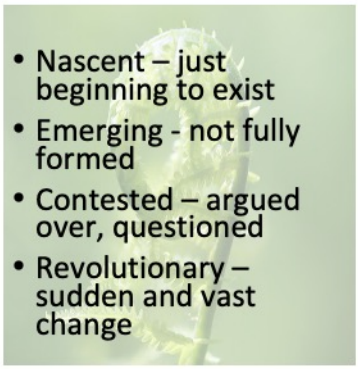
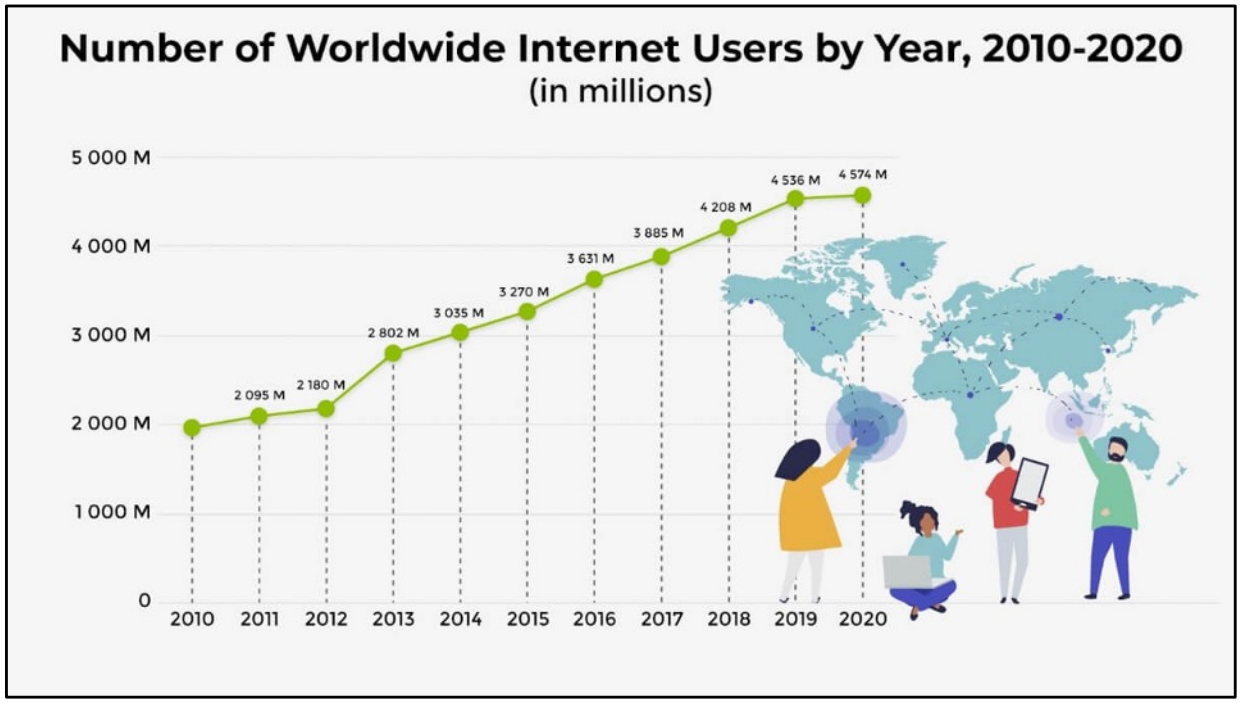
The Current State of Cybersecurity



Compared to other disciplines/fields. Take a guess, when was each of these fields discovered?

1. Math
2. Physics
3. Engineering
4. Economics
5. Sociology
6. Psychology
7. Linguistics
8. Computer Science

Math – 6th century BC
Physics – 4th century BC
Engineering – 1500s
Economics – later 1700s
Sociology – early 1800s
Psychology – late 1800s
Linguistics – early 1900s
Computer Science – 1960s

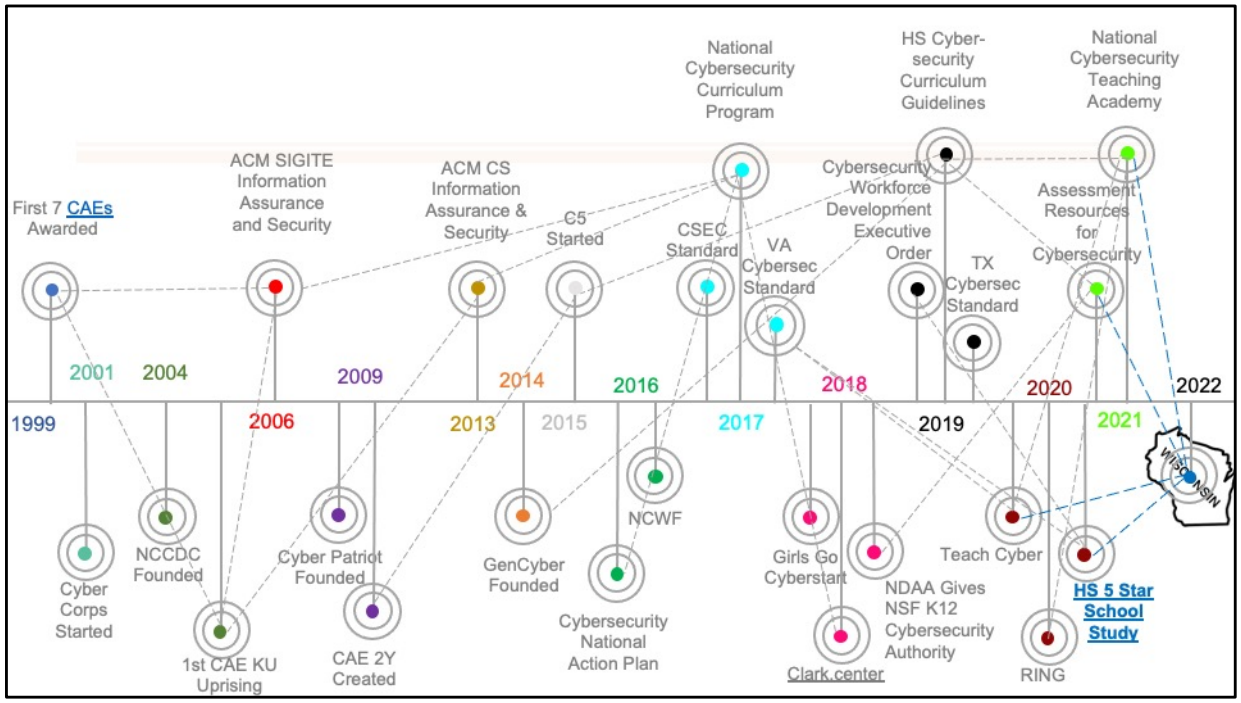

Number of Worldwide Internet Users by Year, 2010-2020
(in millions)
5 000 M
4 000 M
3 000 M
2 000 M
1 000 M
0
2 095 M
2 180 M
2 802 M
3 035 M
3 270 M
3 631 M
3 885 M
4 208 M
4 536 M
4 574 M
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

What

- National Security
- Economic Security
- Domestic Law and Order
- Welfare of Citizenry
- Confidence in a Legitimate Government

EVERYTHING


A Human Capital Crisis in Cybersecurity
Technical Proficiency Matters
A Report of the
CSIS Commission on Cybersecurity for the 44th Presidency
AUTHORS
Karen Evans
Franklin Reeder
COCHAIRS
Representative James R. Langevin
Representative Michael T. McCaul
Scott Charney
Lt. General Harry Raduege, USAF (ret.)
PROJECT DIRECTOR
James A. Lewis
➢ In November 2021, there were an estimated 464,420 active job openings for cybersecurity jobs in the United States, according to CyberSeek.
➢ Projected 31% growth -> 609,390 unfilled jobs by 2029
➢ Current college production is ~25,000
➢ Labor demand is outpacing supply



NCCDC was founded in 2004 by a group of educators, students, government and industry representatives gathered in San Antonio, Texas, to discuss the feasibility and desirability of establishing regular cyber security exercises with a uniform structure for post-secondary level students. Teams are scored based on their ability to detect and respond to outside threats, maintain availability of existing services such as mail servers and web servers, respond to business requests such as the addition or removal of additional services, and balance security needs against business needs.

Cyber Patriot started as a proof of concept in 2009 by the Air Force Association. In 2009 9 high school civil air patrol squadrons competed. By 2015, five years later, this had grown to 2100 teams. In 2019 it is expected that more than 5000 teams will compete.

Dr. Melissa Dark has worked in cybersecurity education for the past 20 years where she has been fortunate to lead a number of creative and impactful projects ranging from studying the effect of various representational forms on cryptography learning and neural connections to developing cybersecurity concepts lessons for integration into the Advanced Placement Computer Science Principles high school course. Her early work in cybersecurity education focused on the graduate level and has progressively grown down to community college, and now high school, in response to two needs: robust cybersecurity literacy among all cyber-citizens and closing the cybersecurity workforce gap. In 2015, she founded DARK Enterprises, Inc., a non-profit which advances the mission of developing, supporting, and stewarding cybersecurity education initiatives in the United States. Teach Cyber is a subsidiary of DARK Enterprises, Inc. Teach Cyber's mission (teachcyber.org) is to provide resources, training, and support to secondary school educators teaching cybersecurity.

Jenny Daugherty is a Research and Curriculum Lead for DARK Enterprises, Inc. I have over 15 years of experience in K-12 STEM education with expertise in curriculum development, teacher professional development, and educational research and evaluation. Jenny began working in cybersecurity education as a GenCyber site visitor

and was a member of the team who developed the High School Cybersecurity Curriculum Guidelines (available on National Cryptologic Foundation websiteyt).

HS Study

- Team
  - Mark Loepker, National Cryptologic Foundation – Program Manager
  - Melissa Dark, DARK Enterprises – Study Design and Implementation Lead
  - Jenny Daugherty, DARK Enterprises – Researcher
  - John Sands, Moraine Valley Community College – Researcher
  - Tania Williams, University of Alabama Huntsville - Researcher
- Focus Groups
  - Qualitative Research Methodology
  - Theory of Change
  - Constraints
  - Stakeholders
  - Content Analysis
- Findings - Benefits
  - Build K-12 Teaching Capacity
  - Funding for K-12 Schools
  - Student Benefits (dual credit, career awareness and readiness, cyber safety for all)
  - HS -> College Pathways
  - Help college recruiting
  - Increased retention rates
  - Enhanced visibility
  - CoP
  - Model for other schools to emulate
- Findings - Constraints
  - Trying to solve a problem we don't understand
  - Asking too much and resourcing too little
  - Choice (or the lack thereof) and variation

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HS Study Work Underway