



National **Cybersecurity**
Teaching Academy

This presentation was given at the
National Cybersecurity Education Colloquium
2023

National Cybersecurity Education Colloquium
September 18, 2023

Agenda

- Introducing NCTA
- 1st Cohort
- Building NCTA
- Early College Credit
- Challenges
- Next Steps



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Introduction to NCTA

Dr. Philip Huff

University of Arkansas at Little Rock

NCTA From the Teachers

“I now have a more focused approach when it come to lesson plans and core content.”

“My increased knowledge in cybersecurity will be very beneficial for my students. Not only do I have I have the ability and knowledge level to offer Cybersecurity for concurrent credit, I can apply what I have learned to the content for my introductory computer science courses as well.”

“Through this experience, I am equipped to effectively mentor my students by illustrating real-world examples, and in doing so, provide them with the chance to tackle genuine real-world challenges.”

“Students can earn college credit while taking our course. The network of professionals will be of tremendous benefit as we navigate through the evolution of cybersecurity academic and industry standards delivered to our students.”

“This certificate program will allow me to offer concurrent credit to my students and will help me better inform them of the world of cybersecurity.”



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NCTA Program

- One of the first graduate-level cybersecurity education certification for high school teachers
- Prepare 90+ high school teachers to teach a stand-alone cybersecurity course(s)
- 18 graduate-level credit hours for teachers from across the country over a period of two years
- First cohort will complete in the summer of 2024
- Teachers can readily utilize the TeachCyber curriculum, RING curriculum or other curriculum based on the HSCCG



**National Cybersecurity
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Participating
Institutions



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Curriculum

Year 1

Foundations of Cybersecurity

Adversarial mindset, human psychology, system security, cryptography, software security, network security, risk management, legal and ethical foundations, privacy

3 hours

Teaching Cybersecurity

Curriculum guidelines/models, pedagogical strategies, and utilization of instructional tools and technologies. Pedagogical transfer of cybersecurity KSA to students with diverse backgrounds

3 Hours

6 hours

Year 2

Cybersecurity Operations

3 Hours

Cryptography

3 Hours

Advanced Topics in Cybersecurity

3 Hours

Cybersecurity Practicum

3 Hours

Database Security

3 Hours

Digital Forensics

3 Hours

6 hours with minor differences in each institution

Year 3

Cybersecurity Data Analytics

3 Hours

Advanced Digital Forensics & Incident Response

3 Hours

Cybersecurity Data Analytics

3 Hours

Cybersecurity Law & Policy

3 Hours

Social Engineering

3 Hours

Minformation Operations on Social Media

3 Hours

6 hours of electives

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1st Cohort

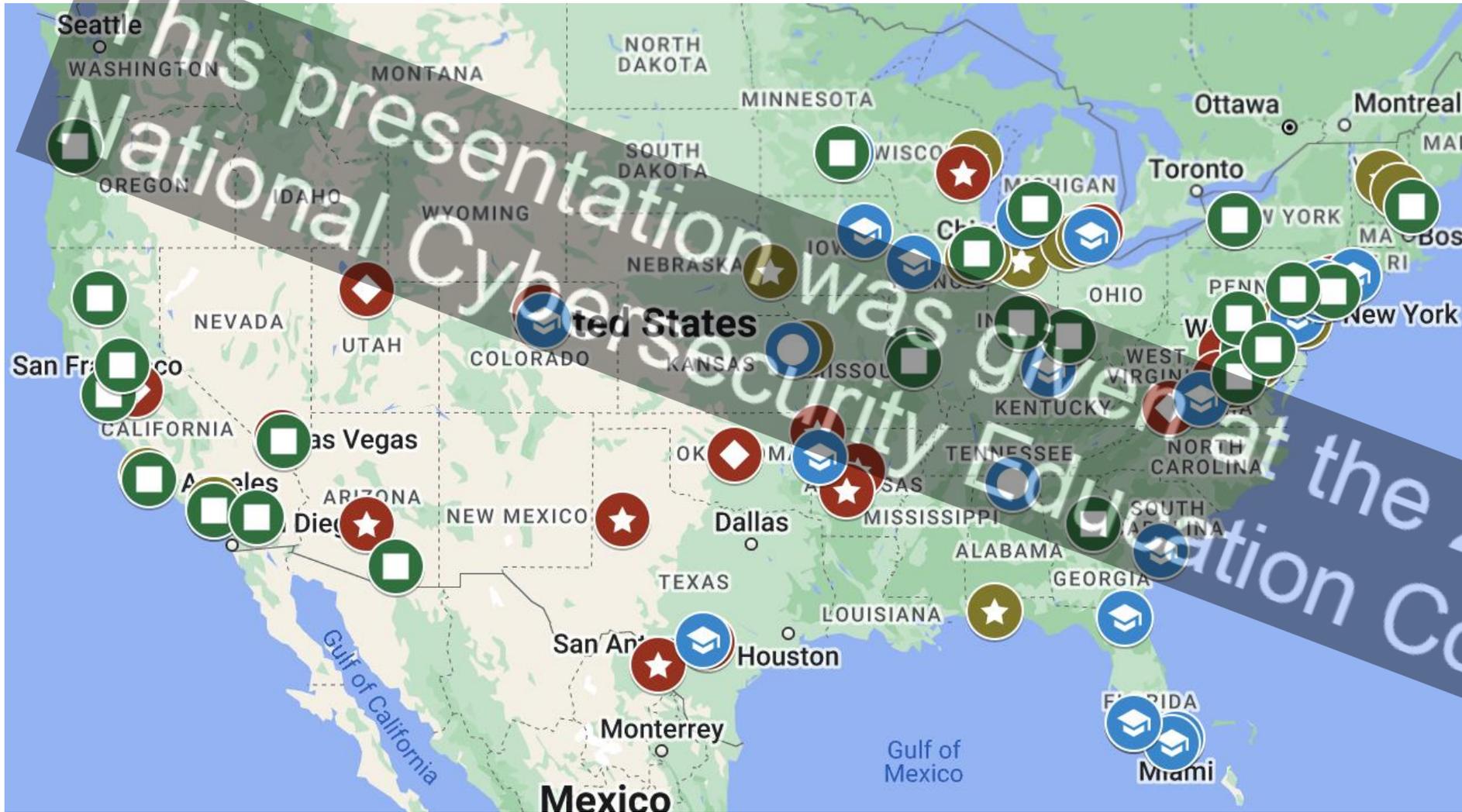
Dr. Jun Dai

WPI

NCTA Impact: Teachers, Credits, Achievements

Universities	Program Start Year	Number of Scholarship Applicants	Number of Accepted Participants	Number of Current Enrollees	Number of Graduates
DePaul	2021	40	30	23	N/A
UALR	2021	57	33	24	N/A
UL	2021	45	31	3	20
CSUS	2022	37	29	26	N/A

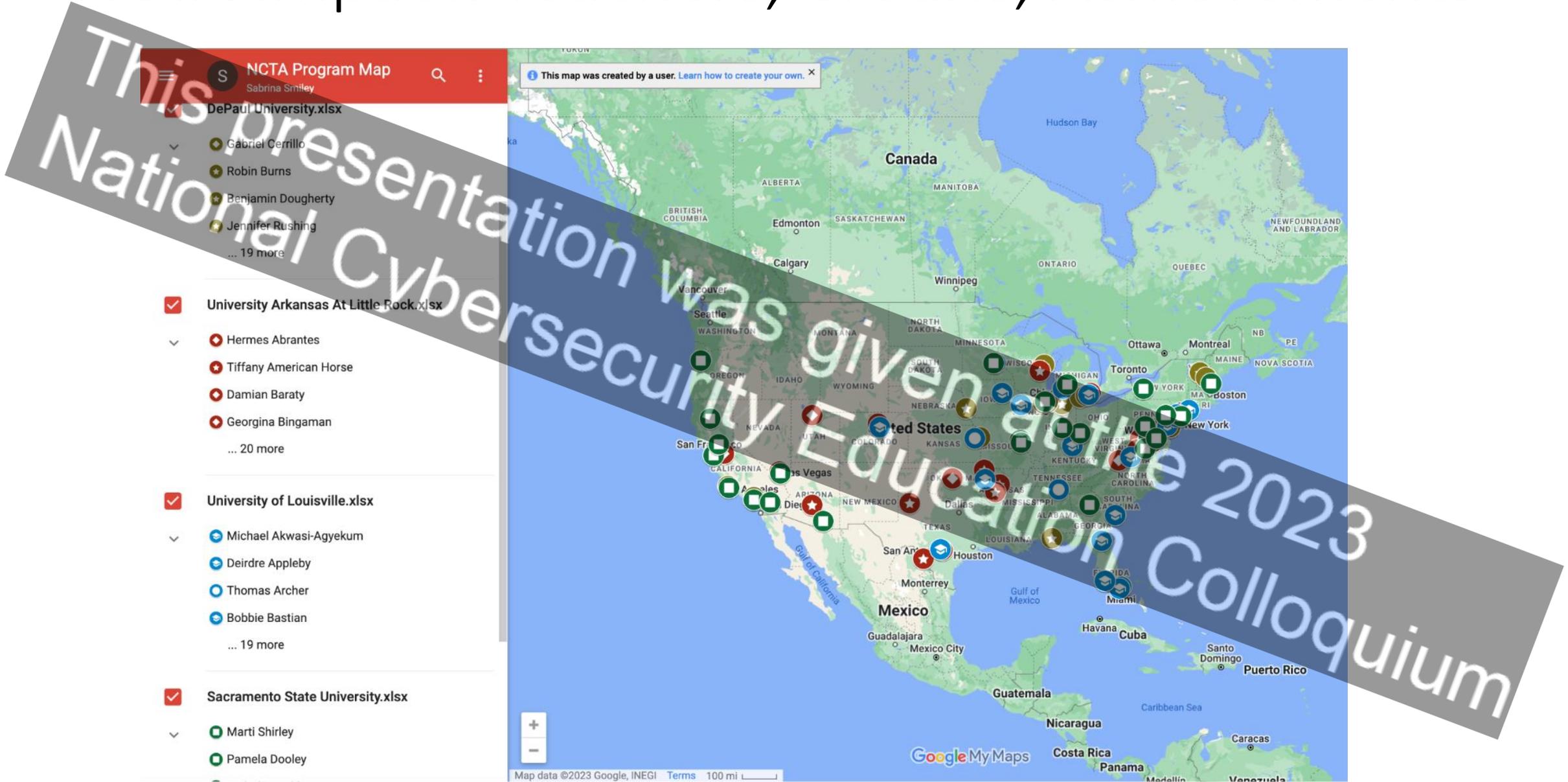
NCTA Impact: Teachers, Credits, Achievements



Universities	Colors
DePaul	Gold
UALR	Red
UL	Blue
CSUS	Green

Credit Hours	Shape
6 hours	square
12 hours, will complete program in Fall 2023	star
6 hours and will complete program in Fall 2023	circle
Moving onto Master's	diamond
12 hours, completed program	grad hat
Hasn't decided for moving forward	small square

NCTA Impact: Teachers, Credits, Achievements



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Building NCTA

Dr. Jenny Daugherty

Dark Enterprises

NCTA PD – Foundations of Cybersecurity Course

- Goal – design and deliver a fully async Canvas course that:
 - Introduces the foundations of cybersecurity to high school teachers
 - Provides 3 graduate credit hours as bridge to the NCTA
 - Provides professional development to teachers
- 6 course developers and 1 instructional designer
- 7 modules created



Module 6: Individual and Societal Implications of Cybersecurity



Module 1: What is Cybersecurity?



Module 2: Risk and Adversity



Module 5: System Security



Module 7: Putting it all Together



Module 3: Data Security



Module 4: Network Security

Foundations of Cybersecurity

- 103 enrolled in the Canvas course
- 102 teachers completed the pre-survey
- 136 post-module surveys submitted

- Current status:
 - Pilot implementation completed
 - Team has analyzed and discussed teachers' feedback
 - Developing plan to make modifications to course to serve goal of providing PD to teachers



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Early College Credit

Dr. Melissa Dark

Dark Enterprises

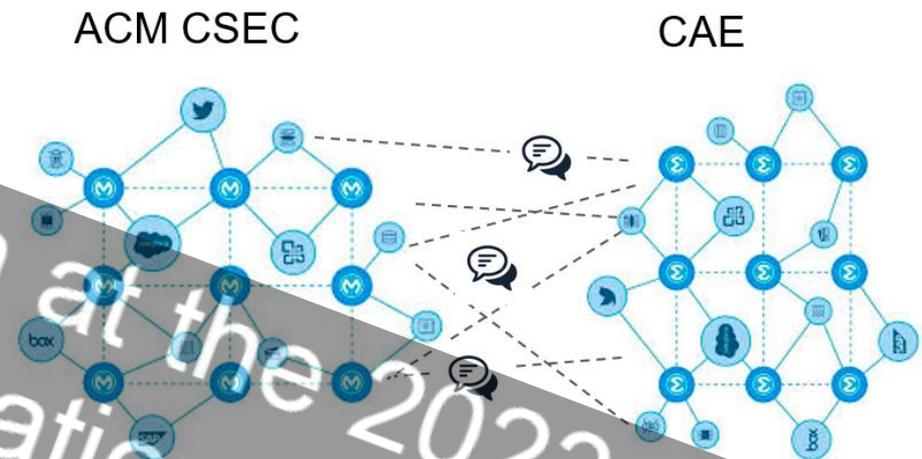
Early Cybersecurity College Credit

What we said in the proposal:

The second goal of this project will be to build community buy-in and support for the Cyber I standards as the basis for a Cyber I dual/concurrent/placement credit course. As mentioned earlier, the Cyber I standards will be produced by an ACM Joint Task Force to be launched in July 2022 to extend the CSEC Curricular Guidelines issued by ACM in late 2017. While Cyber I standards work will be done under the imprimatur of ACM/IEEE, our team believes it is essential that the standards, and the Cyber I course based on them, are endorsed by the CAE community and its respective members and 2) endorsed by a subset of State Departments of Education.

Objectives to recognize Cyber I include:

- Establish a steering committee of CAE members, selected State Department of Education representatives, and co-chairs of the ACM/IEEE Cyber I standards task force.
- Hold regular steering committee meetings to ensure that a course based on developing standards will be dual/concurrent/placement credit eligible at CAE institutions.
- Outreach to other state depts of education not on the steering committee, specifically those in the NCAE Northeast Region, and
- Establish a dual/concurrent/placement credit clearinghouse where a) high schools using the Cyber I course (based on the Cyber I standards) can submit their course for review for dual/concurrent/placement credit, and b) participating CAE institutions can review for approval/recommendations.



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Early Cybersecurity College Credit

ACM Committee Formed & Approved

2022–Jan. 2023

Spring 2023

Early Cybersecurity College Credit
Workshop Held - Linthicum MD, 44
Attendees (mostly CAE schools)

May 2023

Delayed Start to ACM Committee

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Early Cybersecurity College Credit

Types of ECC

AP - 71%

IB - 37%

Dual Credit - 68%

28 of the 44 schools (64%) have a Cyber 1 course that they would hope to give credit for.

5 of the 44 schools would want to give credit for a sophomore or higher course

11 of the 44 schools do not have a course in mind. To meet foundational KUs, they pull from several courses to make up the CAE Foundational KUs. Therefore ECC for a Cyber 1 class that aligns to Foundational KUs is less possible.

For schools that have a Cyber 1 course, there are variations in what is included in it. This also makes scalable ECC credit challenging.



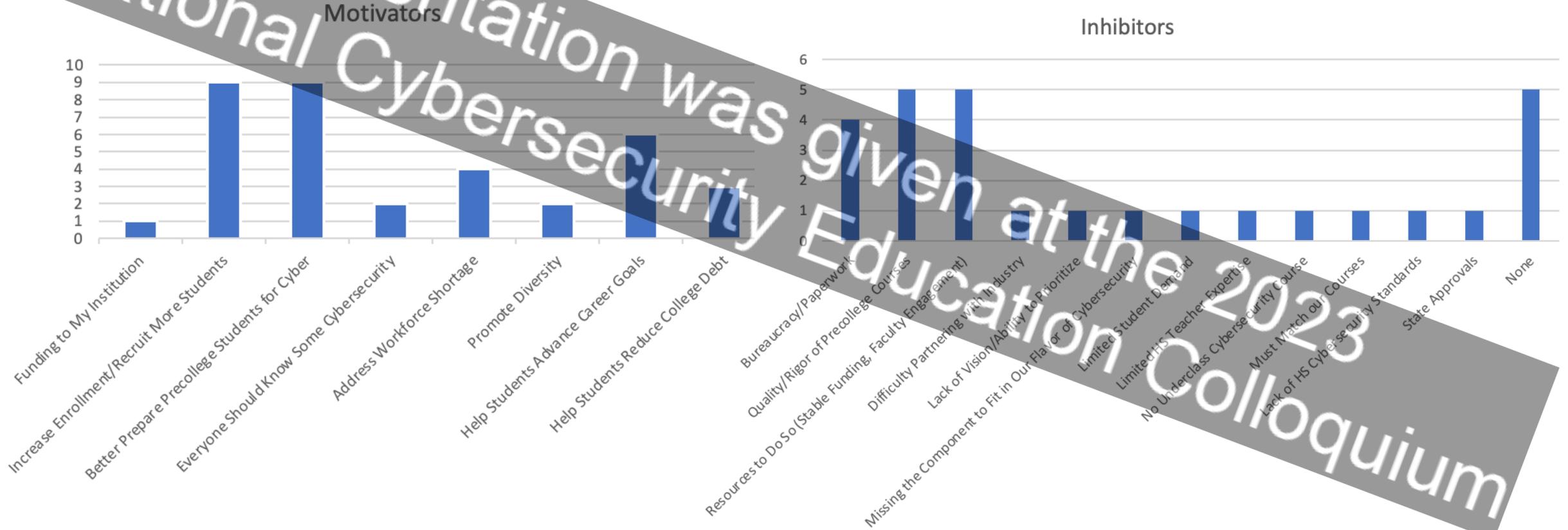
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Early Cybersecurity College Credit

- CYB 611 Introduction To Cybersecurity
- There are several options here.
- BUS 220 Fundamentals of Cybersecurity Junior Cybersecurity is the state of being protected against the criminal or unauthorized use of electronic data, and the measures taken to achieve this goal. This course enables students to analyze realistic case scenarios and identify the depth and breadth of the cybersecurity challenge from multiple perspectives.
- INT-1010 - Intro to information technology INT-1620 - Security+ Preparation INT-1450 - CCNA 1: Intro to Networks.
- I don't know. With the current course structure, there isn't really an entry level course that high school students could get credit for.
- DCOM 101 Introduction to Data Security DCOM 217,218,219 Cisco CCNA.
- Not currently available.
- C programming for engineering.
- ICS 169 - Introduction to Information Security - Freshman Provides the basic foundation to information security, including identifying threats, planning for business continuity, and preparing for various security attacks. Focus will be given to threats to financial security such as attacks on banking and other related financial information. Special emphasis on ethics and legal issues that covers hacking and other cybersecurity techniques and tactics.
- CSEC 1310 - Introduction to Cybersecurity Freshman This course introduces the cybersecurity discipline and the crosscutting concepts related to cybersecurity thought, including design principles, cryptography basics, organizational risk management, and privacy concepts.
- CSCI 102, freshmen, Computer Science Principles for Cybersecurity Students will learn the technical details necessary to study cyber security. Topics include binary and hexadecimal, operating systems, hardware and software, networking, memory, storage management and databases.
- ITSY 1342 - Information Technology Security (approved dual credit) Instruction in security for network hardware, software, and data, including physical security; backup procedures; relevant tools; encryption; and protection from viruses.
- CSC 134 Freshman Intro to Cyber Operations This course will introduce students to cyber operations principles including, but not limited to, wireless communications, legal issues, applied cryptography, and user experience. Special attention will be paid to the legal authorities necessary when conducting a cyber operation from the military and government perspectives, and how they differ from consumer-level legal ramifications of cyber attacks.
- NT-100 - Computer Architecture & Construction Basic introduction to the design and construction of a current model PC including operating systems and some diagnostic software. Students build, configure, test and troubleshoot PCs in the laboratory.
- COSC-310 System Programming
- IT 263 Applied Networks and Security

Motivators and Inhibitors



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Challenges

Sandra Leiterman

University of Arkansas at Little Rock

APPLICATION PROCESS

- Survey Monkey for scholarship
- Applicants were unaware they'd have to apply for graduate school

SOCIAL/EMOTIONAL

- Lack of personal connection
- Technical Frustrations
- Lack of accountability
- Impersonal learning

LEADERSHIP - DEPARTMENTAL

- Leadership applies to implementation
- School of education collaborating with CS department
- Getting colleagues to understand

CHALLENGES

TEACHERS w/DIVERSE BACKGROUNDS

- Different fields of teaching and experience
- Pedagogy and Teaching methods
- Work life balance

CURRICULUM ADAPTATION

- Limited Resources for remedial support
- Teachers classroom needs are different
- Maintaining high standards

TIME CONSTRAINTS

- Timely feedback
- Assessment
- Accommodations
- Individual Learning



Next Steps

- 2nd Cohort Scholarships – 121 in progress, more than 20 completed
- State-Level Workshop for Early College Credit Exemplars
- Assisting other states in starting NCTA Programs

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