

The USNA Cyber Program

Turning Midshipmen into Cyber Warriors

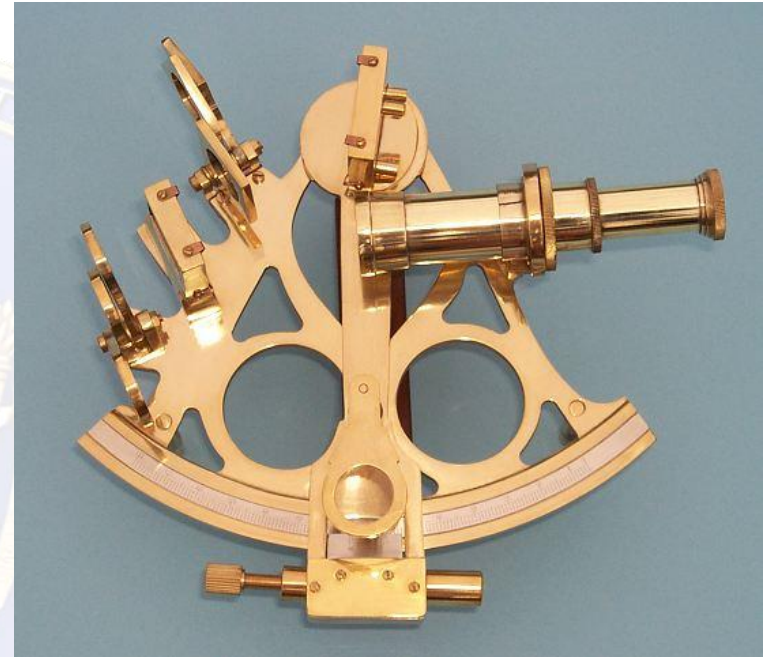


CAPT Paul Tortora, USN (ret)
Director, Center for Cyber
Security Studies

What are these and what do they have to do with Cyber Studies?



Commercially available GPS Jammers



What you will need if your GPS is jammed at sea



Global Presence,

Global Operations, Global Networks

Maintaining the Combat Edge across all Domains



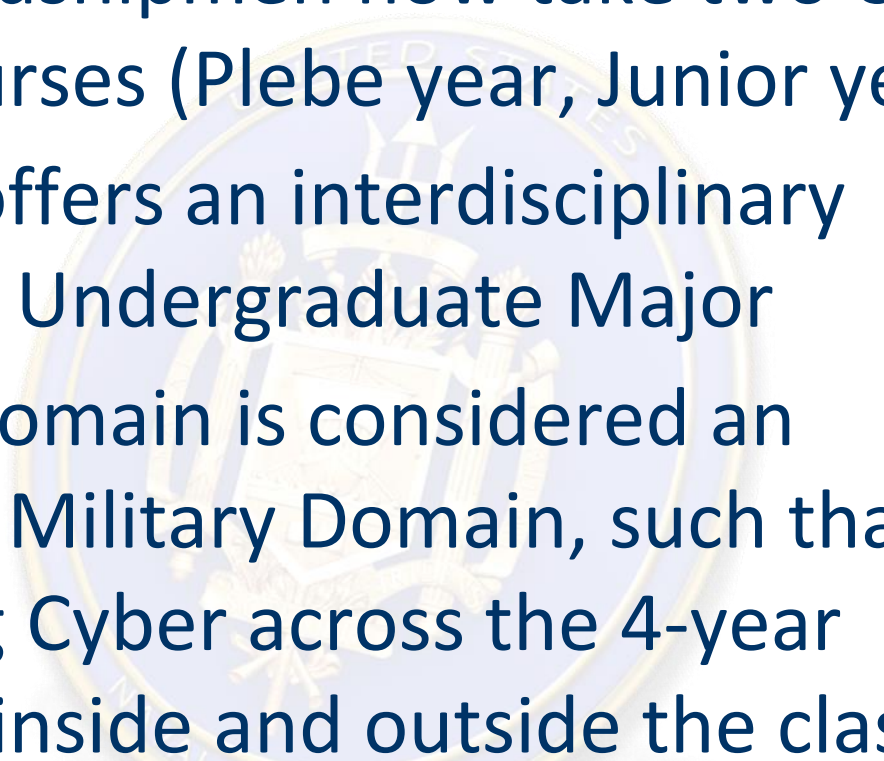
What's Next in the Battlespace?



Unmanned, Autonomous, Adaptive, & Wireless

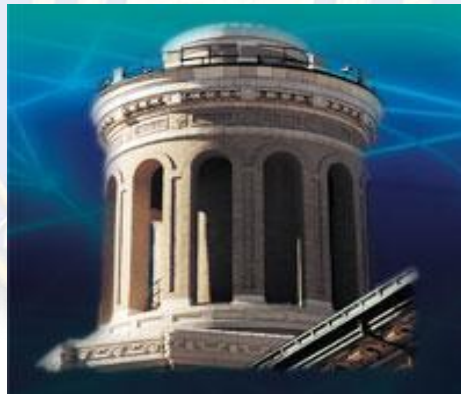


Bottom Line Up Front

- All USNA Midshipmen now take two Cyber Security Courses (Plebe year, Junior year)
 - USNA now offers an interdisciplinary “Cyber Operations” Undergraduate Major
 - The Cyber Domain is considered an Operational Military Domain, such that USNA is expanding Cyber across the 4-year curriculum, inside and outside the classroom
- 

USNA CCSS Mission

To enhance the **education of midshipmen** in all areas of cyber warfare, to facilitate the **sharing of expertise and perspective in cyber warfare** from across the Yard, and to enhance **inter-disciplinary research** in cyber warfare at USNA.



Transforming the Navy 1,100 Midshipmen at a time

Overview of Cyber Education at USNA

Programs and Facilities

Cyber Internships
Cyber Competitions

Cyber Warfare Club
Cyber Lecture series

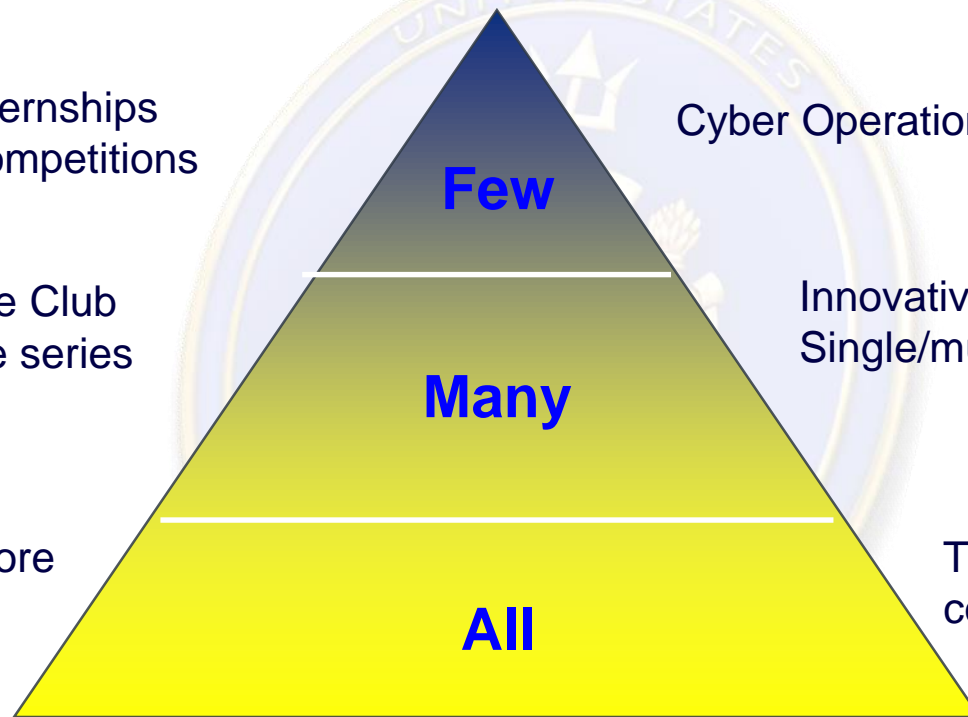
Professional Core
Competencies

Curricular Elements

Cyber Operations major

Innovative Design projects
Single/multi-disciplinary electives

Two required Cyber core
courses



Goal: Prepare Graduates to Lead in an Evolving Cyber Domain



Cyber 1 – All Plebe Year

- Mandatory for all USNA students starting with the Class of 2015, recently graduated, the “*bow-wave*” of enhanced Cyber awareness into the Fleet
- Course focuses on cyber operations
 - Context motivated by current events, with almost weekly examples to use in the classroom
 - Technical emphasis; non-technical related to *context*
 - Fundamentals of risks and threats
 - Hands-on experiences
 - Tie-in topics to Fleet operations when possible

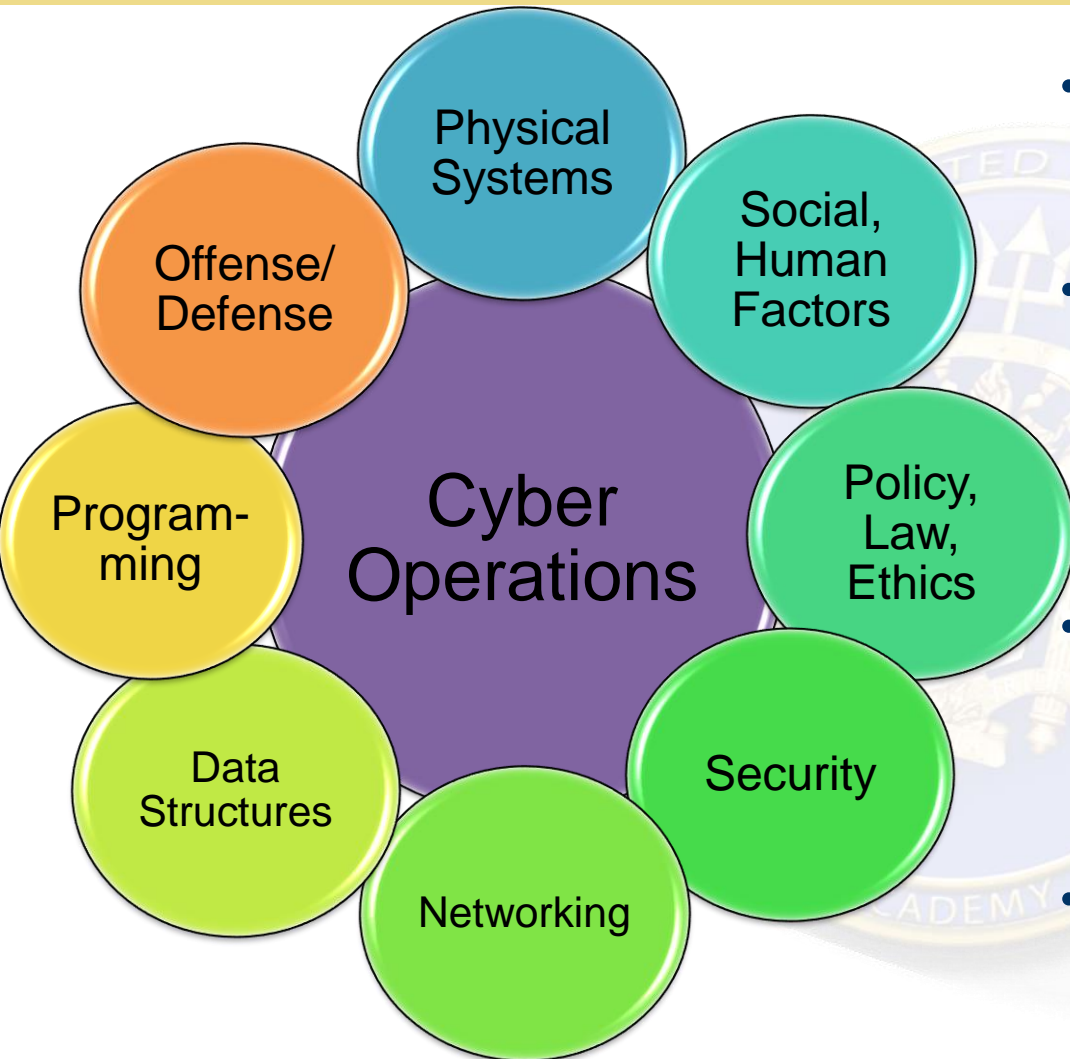


Cyber 2 – All Junior Year


- Started last year (Class of 2015)
 - Technical focus; non-technical context
 - Emphasize networks and electrical/electronics applications
 - Deeper awareness and understanding of the cyber realm
- Project Based Learning focus
 - Initially based on required EE course, modified to provide Cyber/IW/EW context
 - Requires laptops and lab equipment
- Topics that directly relate to Communications and use of the Electro-Magnetic Spectrum in the Fleet



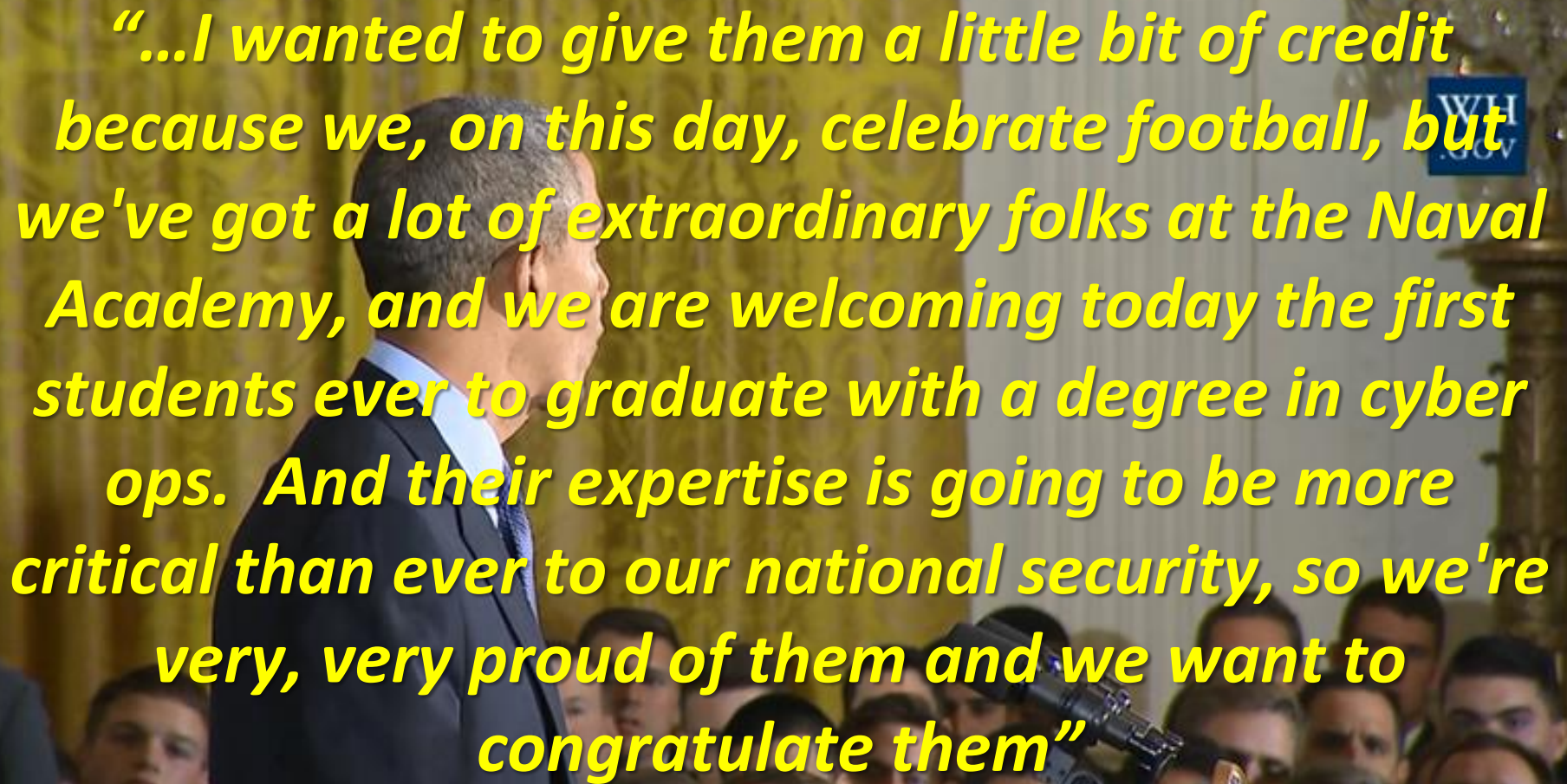
New Cyber Operations Major



- Initiated with Class of 2016
 - 27 MIDN from Class of 2016, 46 from Class 2017, 25 from 2018, 51 of 2019
- Interdisciplinary approach in its inception and execution
 - 50 credits for major, 142 total credits
 - Professors & Military faculty from across academic departments
- Cyber context drives each course
 - Courses distinct from existing ones
 - Technical (STEM) major, but has non-technical required courses
- Seeking ABET Accreditation with similar programs nationwide



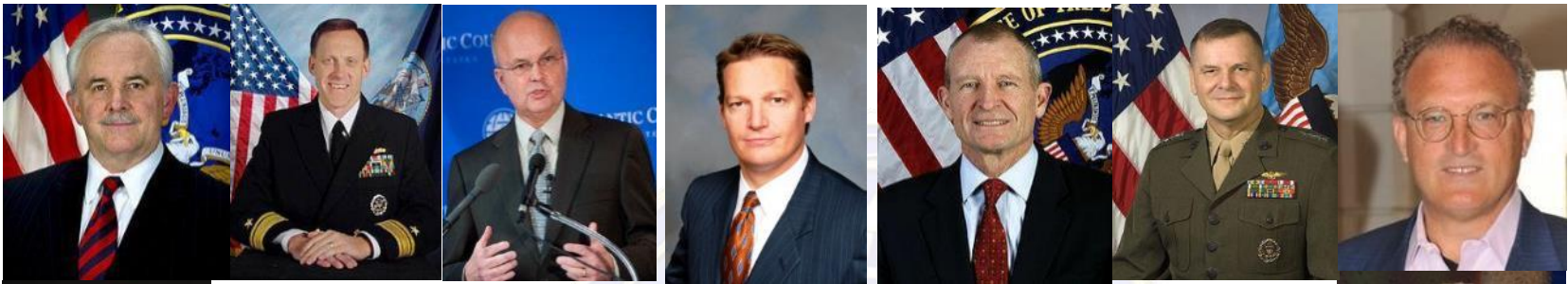
2016 Cyber Operations Majors Presidential Recognition



“...I wanted to give them a little bit of credit because we, on this day, celebrate football, but we've got a lot of extraordinary folks at the Naval Academy, and we are welcoming today the first students ever to graduate with a degree in cyber ops. And their expertise is going to be more critical than ever to our national security, so we're very, very proud of them and we want to congratulate them”


*- President Barack Obama
April 27, 2016*

The Many: CCSS Lecture Series



- **ADM Dennis Blair**
- **ADM Mike Rogers**
- **Kevin Mandia**
- **Dr. Martin Libicki**
- **GEN James Cartwright**
- **GEN Mike Hayden**
- **GEN Keith Alexander**
- **Mr. David Gompert**
- **Jane Holl Lute, DHS**
- **Mark Bowden**
- **Richard Clarke**
- **Kevin Mitnick**





USNA New Cyber Building Advancing Multidisciplinary Cyber Education & Awareness



- \$120M construction, break ground October 2016, target completion Summer 2019
- Will co-locate similarly focused academic majors:
 - Cyber Operations, Computer Science, Information Technology, Computer Engineering, Systems Engineering and Electrical Engineering
 - Collaborative use of new and innovative spaces
- First of its kind at USNA SCIF, with classrooms, labs, and secure lecture space

Cyber Security Studies Building



Cyber Security Studies Building



Cyber Security Studies Building

Primary Occupants:

- Cyber Center
- Cyber Science Department
- Electrical and Computer Engineering (partial requirements)
- Weapons and Systems Engineering (partial requirements)
- Computer Science
- Naval Architecture and Ocean Engineering (PBL and Research Space)

Key Talking Points:

- 206,000 Gross Square Feet of new academic space
- Funded from FY2015 Military Construction Program (MILCON)
- \$120.1M for Building and Garage
- Building is currently in design

Planning Schedules:

Garage: Currently in Construction:

Design Complete: October 2014

Award Construction Contract: April 2015

Construction Start: June 2015

Substantial Completion: October 2016

Building: Currently in Design:

Award Design-Build Contract: March 31, 2016

Groundbreaking: October 21, 2016

Design Complete: Spring 2017

Substantial Completion: September 1, 2019

Occupy Building: Fall 2019



Questions?



Cyber Operations Major

Sophomore Year		Junior Year		Senior Year	
Fall	Spring	Fall	Spring	Fall	Spring
<div>SY201 Cyber Fundamentals (CCSS)</div>	<div>SM286 Cyber Ops Math</div> <div>SY202 Cyber Engineering (WSE)</div> <div>SY204 Programming & Op Systems (CCSS)</div>	<div>SY301 Data Structures (CS)</div> <div>SY303 Applied Cyber Systems Architect. (CCSS/ECE)</div>	<div>SY304 Social Eng, Human Factors (CCSS)</div> <div>SY306 Web & Database (CS)</div> <div>SY308 Security Principles (CS)</div> <div>SY310 Network & Wireless Comms (ECE)</div>	<div>SY403 Cyber Policy & Planning (CCSS)</div> <div>SY401 Cyber Ops I (All)</div> <div>SY4XX Elective (All)</div>	<div>SY406 Law & Ethics (CCSS)</div> <div>SY402 Cyber Ops II (All)</div> <div>SY4XX Elective (All)</div>

Completed at least once



CCSS Staff & Faculty

- A desired blend of
 - Operational Fleet and Interagency experience
 - Technical experts (CS, EE, WSE)
 - Experts on attack and defense techniques
 - Policy / law experts
 - World-class thought leaders who are helping to create the nation's policy and law
 - Currently heavily reliant on other USNA departments, but we are seeking to hire full-time cyber faculty
- Goal: LEAD the nation in undergraduate cyber operations education and beyond



Academic
Dean

CCSS
Director //
Deputy Director

Math &
Sciences
Division

Cyber Center

- Outreach
- Research
- Lecture Series
- Conferences
- Publications
- Internships
- Fleet/NSA Liaison
- Professional Development
- USNA IDC Lead/Liaison

Cyber
Science

- SCY Responsibility
- SI110 Responsibility
- Tenure Track Faculty
- Research
- Faculty Senate Rep
- Accreditation
- Course/SCY Assessment
- MIDN Advising

Physic

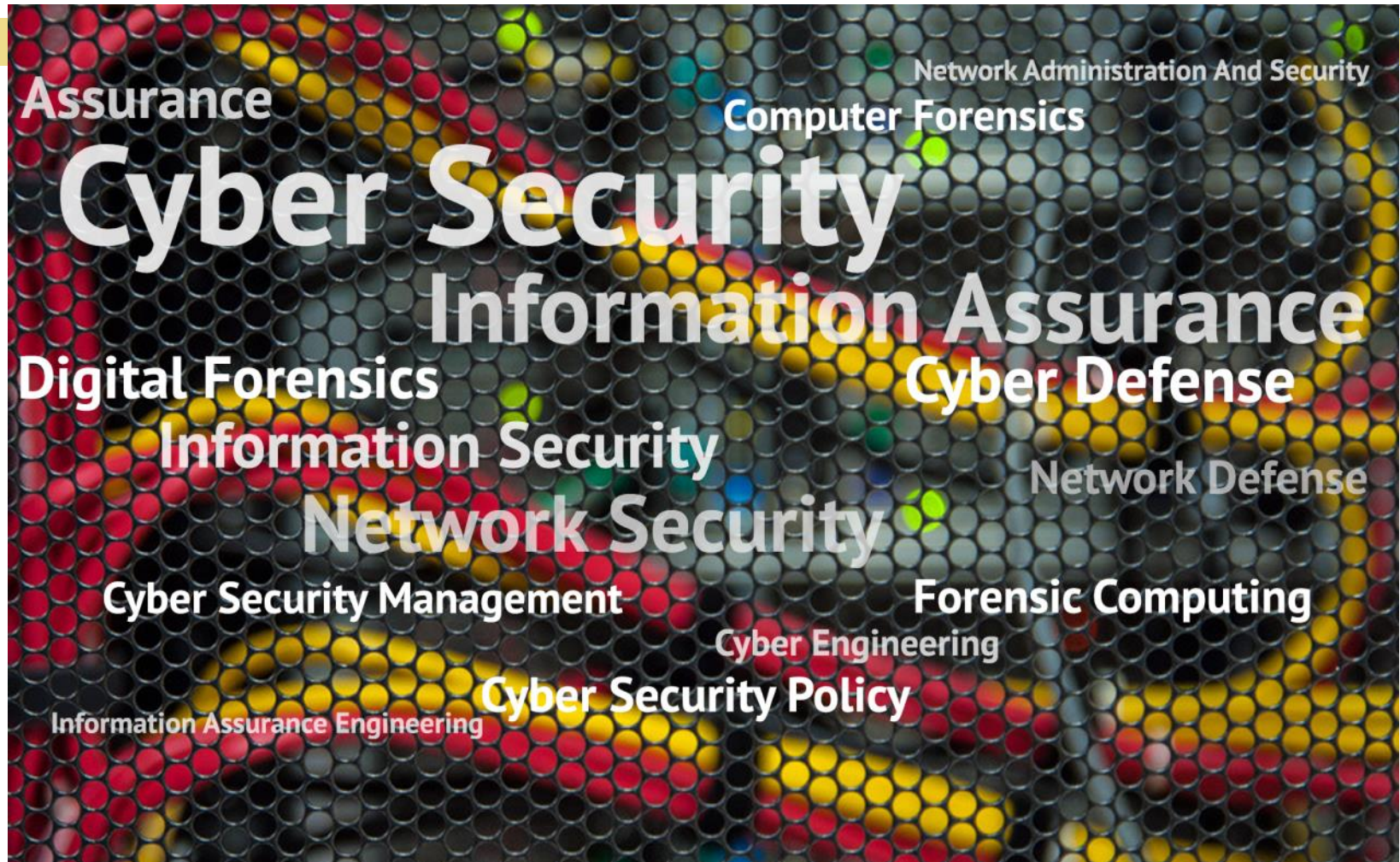
Mat

Chem

Oce

Comp Sci

What is “Cyber Sciences”



Cyber Education Project:
<http://cybereducationproject.org/>