



# Cybersecurity Education and Initiatives

A briefing for MN Legislative  
Commission on Cybersecurity

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NOVEMBER 8, 2023



# Metro State University

- An accredited, comprehensive, urban university that provides accessible, affordable, high-quality student-centric educational programs to the citizens and communities of the twin-cities Metropolitan area, with continued emphasis on underserved groups, including adults and communities of color.
- An NSA designated Center of Academic Excellence in Cyber Defense Education (NCAE-CD).
- A **Beyond the Yellow Ribbon University**, serving the most veterans and active-duty military members in the Minnesota State System.



DHS/NSA designated CAE-CD Institution

# MN Cyber

- A statewide education, research, and training center for cybersecurity, forensics, and IoT.
- The main goal is to position Minnesota as a national leader in cybersecurity and its related workforce through education, legislative and community engagement, and innovative public-private partnerships.
- Advisory Board members include
  - CISOs from major twin-cities organizations including MN.IT
  - National Guards
  - State Legislators



**MN CYBER**

**Train. Test. Detect. Protect.**

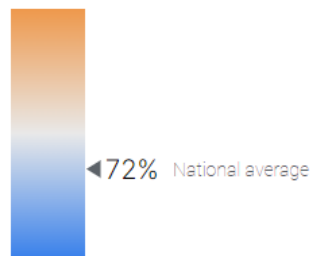
# Metro State and MN Nat'l Guards

- Both institutions enjoys a powerful working relationship
  - MN NG always provided support whenever needed
  - Metro State provided various training to MN NG
    - Cyber Range Training
    - Industry Cyber Certification training
  - Metro and MNNG will develop an articulation agreement to provide a cyber degree pathway for the Guards
  - MG (ret'd) Sandra Best is a Metro alumna
    - She also serves as a Metro State's Alumni Board member
  - Metro Faculty traveled to Croatia to provide cyber training
  - Croatian MoD toured Metro State and attended a briefing
-

# Cybersecurity Skill Shortage

## National Level

SUPPLY/DEMAND RATIO ⓘ



TOTAL CYBERSECURITY JOB OPENINGS ⓘ

NATIONAL, 2023

572,392

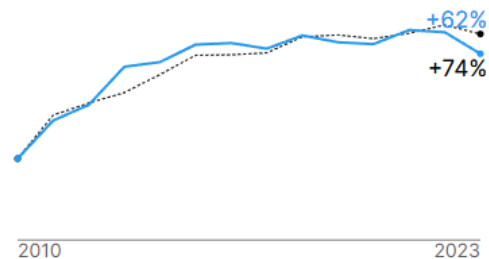
TOTAL EMPLOYED CYBERSECURITY WORKFORCE ⓘ

NATIONAL, 2023

1,178,662

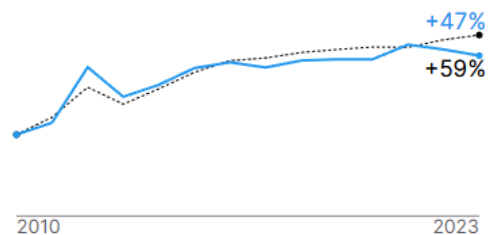
HISTORICAL CYBERSECURITY JOB OPENINGS ⓘ

NATIONAL AVG



HISTORICAL EMPLOYED CYBERSECURITY WORKFORCE ⓘ

NATIONAL AVG



HISTORICAL SUPPLY/DEMAND FOR CYBERSECURITY [BETA] ⓘ

NATIONAL AVG

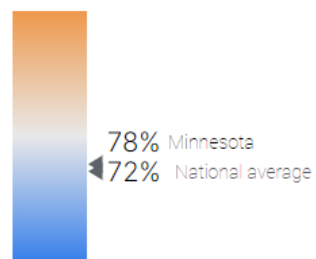


# Cybersecurity Skill Shortage

## Minnesota

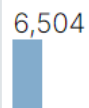
### SUPPLY/DEMAND RATIO ⓘ

MINNESOTA, 2023



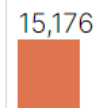
### TOTAL CYBERSECURITY JOB OPENINGS ⓘ

MINNESOTA, 2023



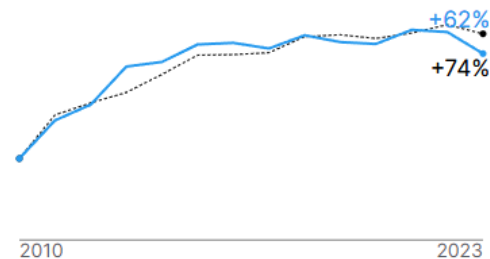
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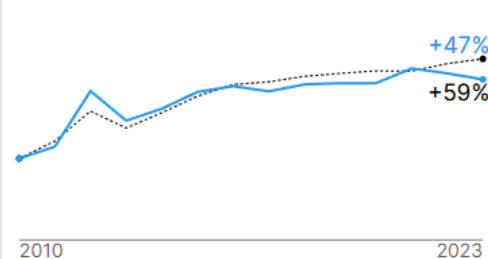
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NATIONAL AVG  
MINNESOTA



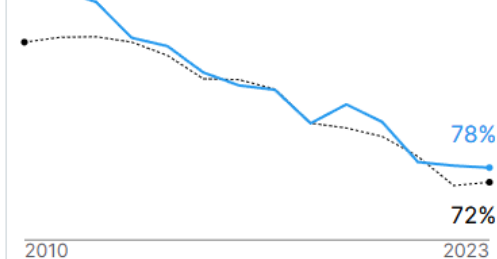
### HISTORICAL EMPLOYED CYBERSECURITY WORKFORCE ⓘ

NATIONAL AVG  
MINNESOTA



### HISTORICAL SUPPLY/DEMAND FOR CYBERSECURITY [BETA] ⓘ

NATIONAL AVG  
MINNESOTA



# Cybersecurity Skill Shortage



# Cyber@Metro

- BS in Cybersecurity
  - <https://www.metrostate.edu/academics/programs/cybersecurity-bs#about>
- MS in Cyber Operations
  - <https://www.metrostate.edu/academics/programs/cyber-operations-ms>
- Combined (BS + MS) program in Cybersecurity Operations
  - <https://www.metrostate.edu/academics/programs/cybersecurity-operations>
- Undergraduate minor/certificate in Cybersecurity
  - <https://www.metrostate.edu/academics/programs/cybersecurity-minor>



# Other Cyber Related Programs

- Undergraduate

- **Bachelors of Applied Science (BAS) in Computer Forensics**
- BS in Computer Science and Computer Information Technology
- BAS in Information Assurance (offered through MIS)
- **An undergraduate minor/certificate in Computer Forensics**
- **An undergraduate Minor/certificate in E-Discovery**

- Graduate

- MS in Computer Science with a concentration in Cybersecurity
- Professional Science Master (PSM) in Computer Science with a concentration in Cybersecurity
- **A Graduate Certificate in Cyber Operations (approved and coming soon)**
- **A Graduate Certificate in Digital Forensics and Investigations (approved and coming soon)**
- A Graduate Certificate in Information Assurance (offered through MIS)



# Some Highlights

- Program Enrollment

- 250+ in pre-majors and majors as of Fall 2023 in the BS program
- Currently offering the fourth Cohort for MS program (average 16 students)

- Cybersecurity and Forensics Student Club

- <https://engage.metrostate.edu/organization/cfso>
- Cyber Competitions and Metro team standings
- K12 mentoring (Summer JROTC program)
- Visionary Student Leadership Award from the MN Cybersecurity Summit
- Signature “Think Safe! Be Safe! annual community event

- Available Scholarships

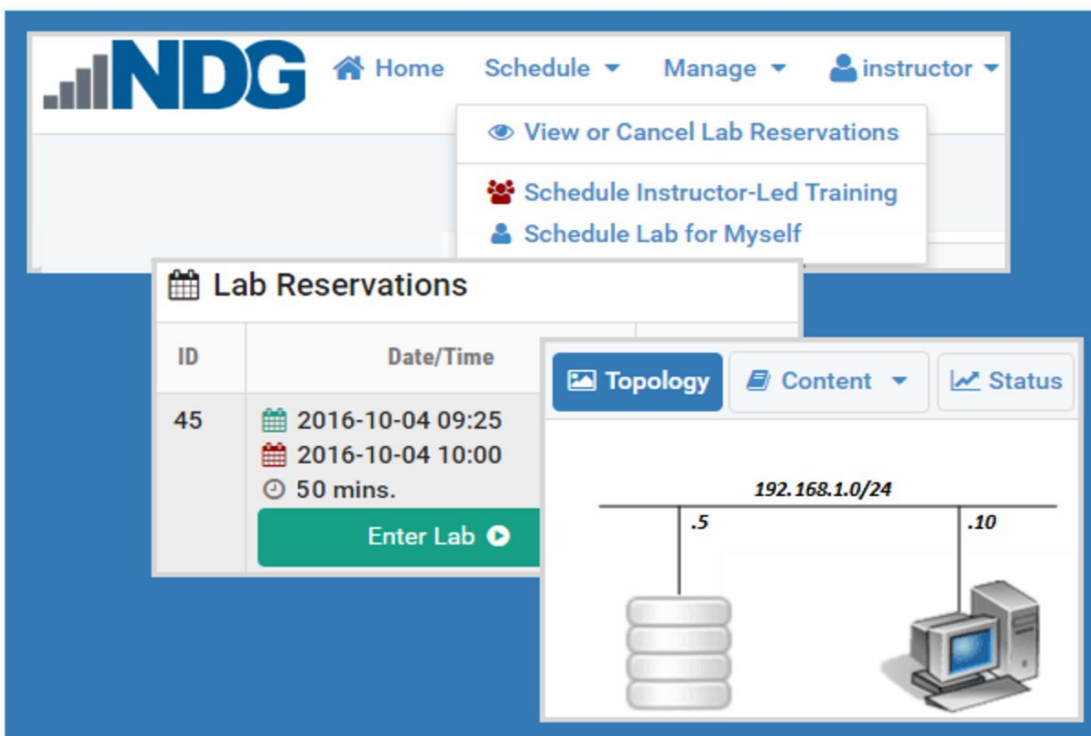
- MN Cyber Defenders Scholarship (<http://bit.ly/metro-cybdef>)
- Department of Defense Cybersecurity Scholarship (<http://bit.ly/metro-dodcysp>)



# Shared Virtual Lab Infrastructure

- NSA sponsored project
  - Largest in MN - 128 Pods NetLab environment to provide hands-on learning to various stakeholders
  - Fast and easy access to the environment requiring only a web browser.
  - Pre-designed IT training labs in the area of networking, cybersecurity, virtualization, and storage.
  - Flexible and scheduled access to virtual machines.
  - Provides flexible access to the frequently used tools for administrators and instructors to manage communities, classes, and accounts.
-

# Shared Virtual Lab Infrastructure



**NDG** Home Schedule Manage instructor

- View or Cancel Lab Reservations
- Schedule Instructor-Led Training
- Schedule Lab for Myself

**Lab Reservations**

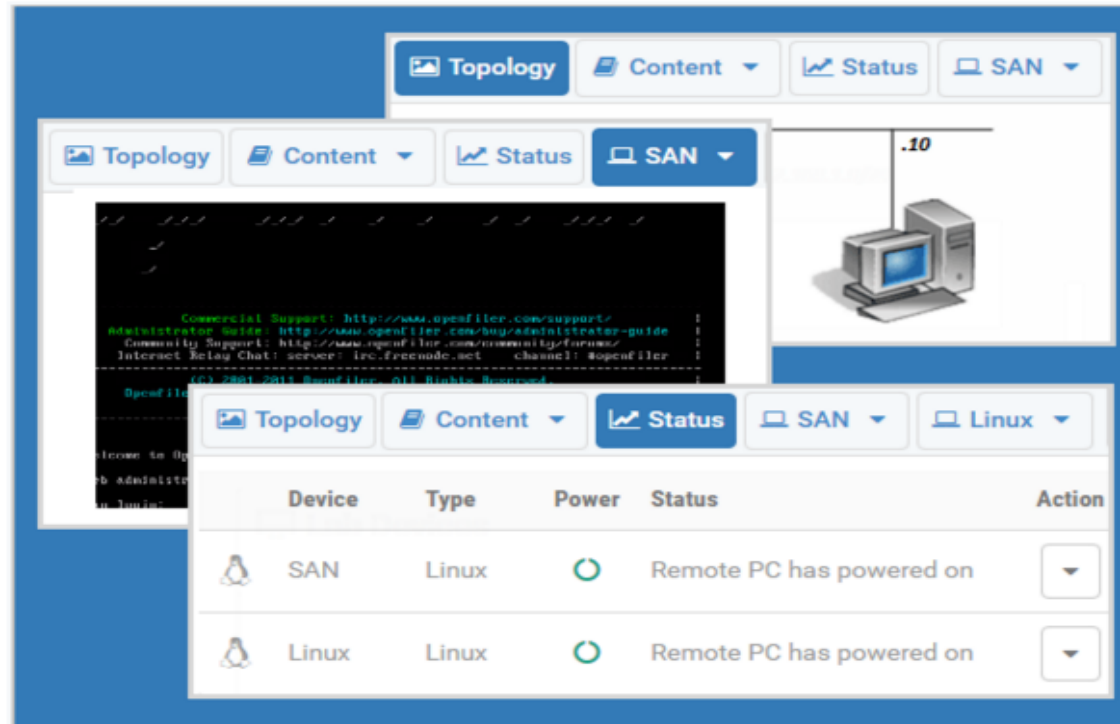
ID	Date/Time
45	2016-10-04 09:25 2016-10-04 10:00 50 mins.

Enter Lab

Topology Content Status

192.168.1.0/24

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Topology Content Status SAN

Topology Content Status SAN

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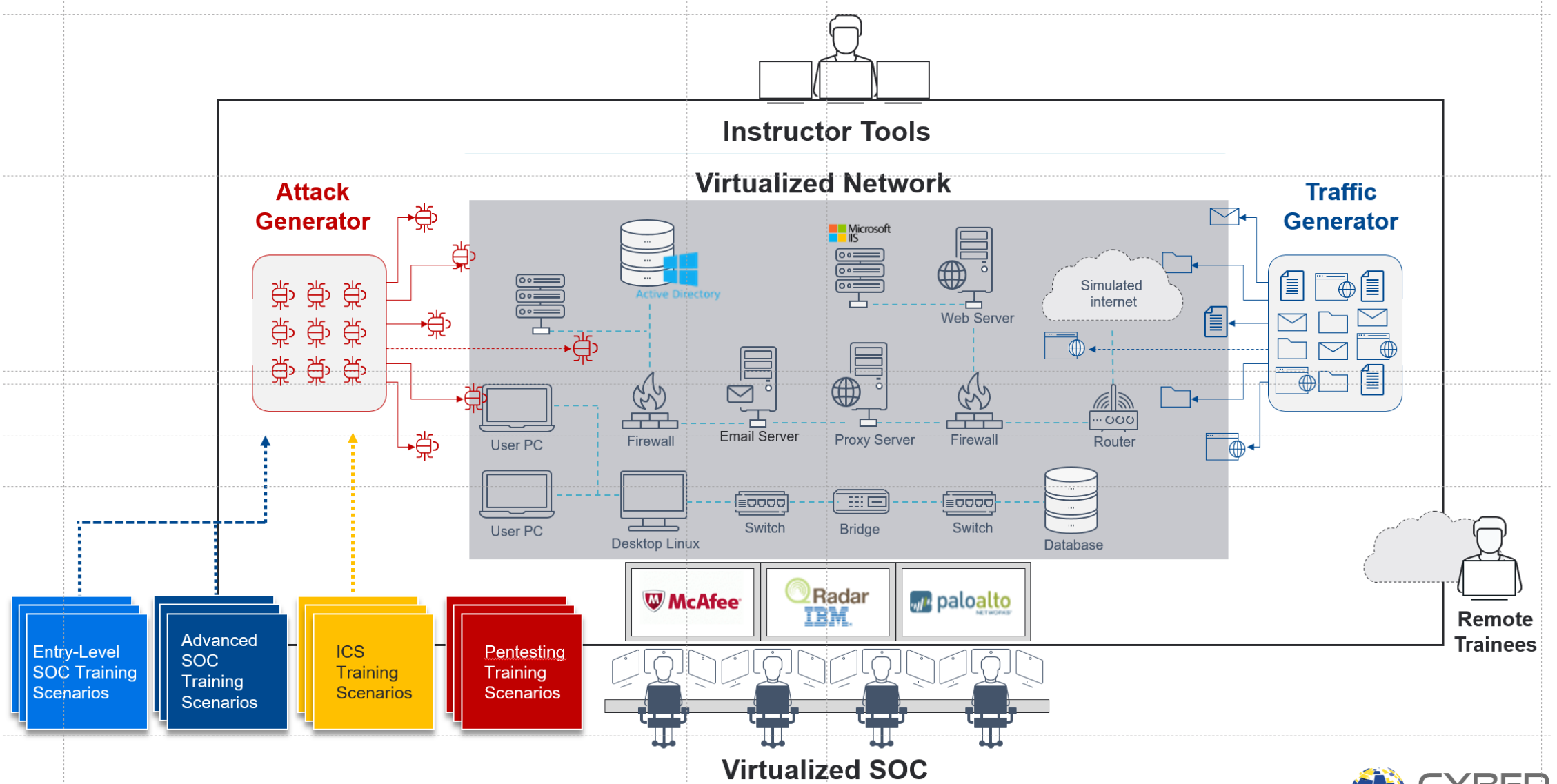
Commercial Support: http://www.openfiler.com/support/
Administrator Guide: http://www.openfiler.com/doc/administrator-guide
Community Support: http://www.openfiler.com/community/forums/
Internet Relay Chat: server: irc.freemove.net channel: #openfiler
(©) 2001-2011 Openfiler, All Rights Reserved.
Open File

```

Topology Content Status SAN Linux

Device	Type	Power	Status	Action
SAN	Linux	⏻	Remote PC has powered on	▼
Linux	Linux	⏻	Remote PC has powered on	▼

# The Cyber Range Platform



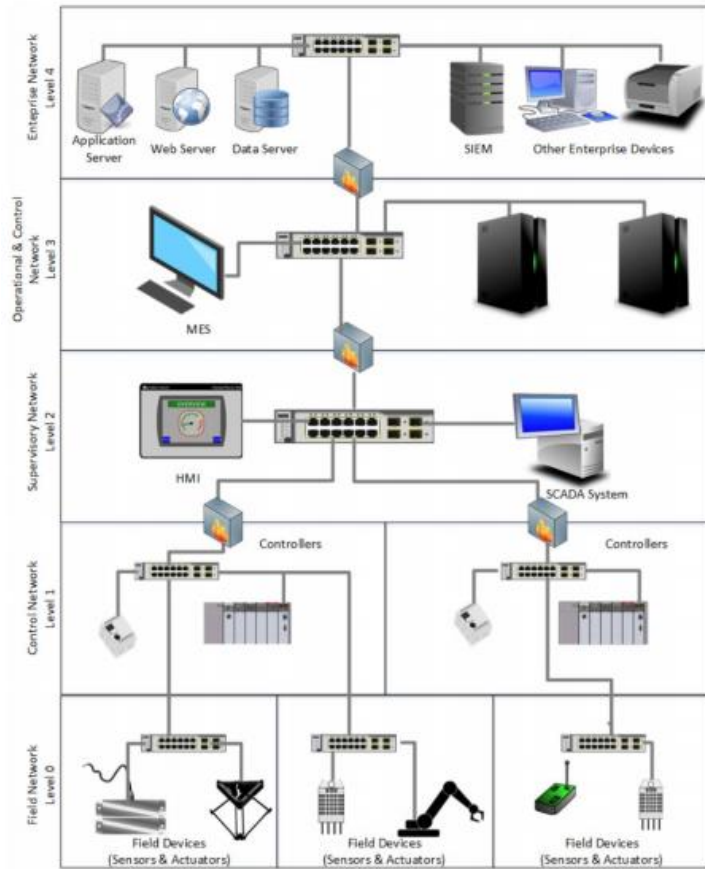
# Industrial Control System Range

- NSA funded ICS Range to:
  - Provide a lab-based ICS environment for Red Teams to challenge their defensive capabilities by assuming an adversarial role while finding vulnerabilities in the system.
  - Provide a lab-based ICS environment for Blue Teams to learn how to improve their defensive methods, including intrusion detection and prevention systems, server configurations, connections, access policies, and response and mitigation actions.
  - Provide a Research environment for testing and validating advanced methodologies for securing ICS networks.
  - Provide a platform to develop proactive risk mitigation plans for Industrial Control System through the simulation of SCADA processes.





# Industrial Control System Range



# Other Available Resources

Nationally recognized faculty & Researchers

Access to industry experts in the form of community faculty

Dedicated labs and equipment for cybersecurity, forensics, IoT research and training

Powerful Virtual Infrastructure





# Institutional Support and Partnerships

Regionally/Nationally recognized Institute for Community Engagement and Scholarship (ICES)

Center for Game Design and New Media Studies

Veterans and Military Student Services

Minnesota State IT Center of Excellence

Strong Legislative Outreach and Support

MN Department of Employment and Economic Development (DEED)

MN National Guard and Cyber Protect Team (CPT)

Upper Midwest Security Alliance (UMSA)

Cyber Security Summit

Minnesota Cyber Careers Consortium (MNC3)

American Israel Chamber of Commerce of MN

MS-ISAC/DHS HSIN

Science Museum of Minnesota

MN IT Services

Workforce Centers

AWS Academy

VMWare Academy

CompTIA Academy

Palo Alto Network Academy

Checkpoint Secure Academy

CISCO Networking Academy

IBM Academic Alliance

EMC2 Academic Alliance

Cellebrite Academic Partnership

Microsoft Academy

Oracle Academy

Red Hat Academy

# Cyber Initiatives

- Cyber4Heroes Program

- An NSA-funded Nationally recognized program, which provides free cyber training and other perks to Veterans, Transitioning Military, Active-Duty Military, First Responders, and minorities

- Provided training to 300+ participants since inception

- Includes training for many industry certifications, practice exam, exam vouchers, power skills, career fair, and job placement assistance

CompTIA A+, Network+, Security+, CySA+, Pentest+, CASP+, EC-Council CEH, CIH, and ISACA CISM certification

Courses on Cyber Threat Intelligence and ICS/SCADA Security

- Next training starting in January 2024

- Cyber4Immigrants

- Cyber4Hmong Americans



# Cyber Initiatives

## MN Cyber Center

- **Sponsor:** MN State
- **Funding:** \$5.2M Capital Bonds
- **Description:**
  - State-of-the-art cybersecurity learning and research facility
  - Active learning classroom housing the cyber range
  - Dedicated research space for graduate students and faculty
  - Educational Security Operations Center (eSOC)



# Cyber Initiatives

## Cybersecurity Clinic

- **Sponsor:** National Security Agency (NSA)
  - **Funding:** \$1.45M for two years with an additional \$750,000 possible for the 3<sup>rd</sup> year
  - **Partner:** MN.IT
  - **Target Market:** K12 School System, Underserved Counties and Cities, Small Businesses, and Nonprofits.
  - **Description:** Address the growing need for cybersecurity awareness and protection in our community, while developing student talent pipeline.
-

# Cyber Initiatives

- **Cyber Futures Center (Security Monitoring/ Triage Center)**
  - **Sponsor:** Federal Community Project Funding
  - **Funding:** \$1.6M for 3 years
  - **Organizational Partner:** Neighborhood Development Center
  - **Operational Partner:** MN.IT
  - **Description:** Provide low-cost subscription-based services to monitor and manage security incidents for clients.

# Monitoring Center

## 809 E 7<sup>th</sup> Street





# Cyber Initiatives

## • Cyber Futures Center (Entrepreneurship)

- **Sponsor:** Federal Community Funded Project
- **Funding:** \$1.6M for two years
- **Partner:** Neighborhood Development Center
- **Description:** Foster innovation and entrepreneurship within the cybersecurity domain, including promoting Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs with the federal government



# Cyber Initiatives

## Cybersecurity Center of Excellence

- **Sponsor:** US Air Force Digital Transformation Office (DTO)
- **Funding:** \$10.5M (pending approval of FY24 Federal Defense Authorization)
- **Description:** Serve as an elite post-secondary cybersecurity center for innovation, research, and workforce development.
- **Focus:**
  - Pathways to Cyber Careers:** Energizing Minnesota's Cybersecurity workforce, from K-12 to higher education to re-skilling
  - Community Business Development:** Expand Clinic concept, foster small business/entrepreneurship
  - Cyber research:** Expand monitoring center capacity/mission, expand research portfolio (virtualization, AI, machine learning), and deploy advanced cloud services





# Cyber SBIR/STTR

- Preferred educational partner with AFWERX
  - Small Businesses applying for STTR are required to work with an educational institution.
  - Match Metro with small businesses applying for these grants
  - Partnership with 20+ Phase I and a few Phase II STTRs
  - Benefits:
    - Revenue generation for Metro (a portion of each award goes to the educational institution)
    - Increased Internship Opportunities for Metro Students
    - Increased Research Opportunities for Students and Faculty



# Gaps/Opportunities

- Cyber Hygiene/Awareness for Community at large
  - Risk Assessment and Reporting for target clients
  - Foundational Cyber Practices
    - Policies / Standards /Best Practices
    - Inventories
    - Backups
  - Security Monitoring /Triaging /Escalation
  - Incident Response
  - MN ISAC for Information/Intel Sharing and Analysis
  - Cyber Training
    - State Employees
    - Educators, Students
    - IT / Security Teams
    - Community at Large
  - Cyber Range Exercises
  - Tabletop Exercises
  - SCIF
  - Real Email Addresses (.gov domain) for all Govt. Employees
-

# How Legislators can help?

- Allocate adequate funding towards cybersecurity education and initiatives
    - Cyber Workforce Development Program
    - State Employees Training and Certifications (Florida Model)
    - K12 Teachers Training during Summer
    - Support and expand existing technological resources and subscriptions
  - Ideally, legislate to include explicit Cyber curriculum at the K12 level-(North Dakota model)
  - Implement State level Scholarship for Service Program to retain the talent
-

# Cyber @ Metro Summary

- Born in 1971, Metro State is an accredited, comprehensive, urban Minnesota State University that provides accessible, affordable, high-quality, student-centric educational programs to the citizens and communities of the twin-cities Metropolitan area, with continued emphasis on underserved groups, including adults and communities of color. The following highlights key attributes:
- Serves **9,000+** students with **50+** undergraduate and **25+** graduate programs.
- An **NSA-designated** Center of Academic Excellence in Cyber Defense Education (NCAE-CD) institution.
- Hosts BS Cybersecurity, MS in Cyber Operations, and a combined BS+MS program in Cyber.
- Hosts a powerful technical infrastructure that includes **NDG Netlab+ environment, ICS/SCADA Cyber Range**, and other devices.
- Hosts **MN Cyber**, a statewide education, research, and training center for cybersecurity, forensics, and IoT. Advisory Board members include CISOs from major twin-cities organizations, including MN.IT, National Guards, and State Legislators.
- A **Beyond the Yellow Ribbon University**, serving the most veterans and active-duty military members in the Minnesota State System.
- Received **\$15M+** in cyber grant funding from federal, state, and private sectors to do innovative work like establishing an Incubator to foster **Cyber Entrepreneurship, a real-world SOC** to provide low-cost monitoring services, and a **Cybersecurity clinic** to help small businesses, K-12, non-profits, and underserved municipalities.
- **\$10.5M** has been earmarked under the FY24 federal budget to work with the **USAF Digital Transformation office** and to establish the first-ever MN Cyber Center of Excellence
- Hosts the **Cyber4Heroes**, a nationally recognized program, which provides free cyber training to Veterans, Transitioning Military, Active-Duty Military, First Responders, and minorities and provides job placement assistance.
- Educational partner of many small businesses applying/applied for **SBIR/STTR**



# Thank You



DHS/NSA designated CAE-CD Institution



## MN CYBER

Train. Test. Detect. Protect.