CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

CYBERSECURITY CENTER

A Word from the Executive Director

The Cybersecurity Center at California State University, San Bernardino is focused on human capital transformation in the Inland Empire region of Southern California; creating an educational program that not only provides hope and opportunity for San Bernardino, but also fulfilling a rapidly growing employment gap in the cybersecurity field.

The best practices developed at the CSUSB Cybersecurity Center are nationally recognized. Working with key federal agencies and industries, CSUSB Cybersecurity has become a critical catalyst for developing national workforce programs, leading efforts with over 400 colleges and universities through our efforts as the Centers of Academic Excellence in Cybersecurity Community.

Our partnerships and grant funded programs with government and industry are critical for student success. While we work locally, many of our successful programs are deployed nationally.

It is my hope our cybersecurity leadership and innovations can help be a critical force in solving the 750,000+ person deficit within the United States.

> *CSUSB Cybersecurity has become a critical catalyst for developing national workforce programs.*

Dr. Tony Coulson, Executive Director, CSUSB Cybersecurity Center

5 Pillars
of the CSUSB Cybersecurity Center

Student Excellence

We listen to and react to the needs within the industry and then create projects that teach our graduates what they need to know to succeed right away.

Outreach

CSUSB actively engages in local community by hosting campus, cybersecurity center, and lab tours for schools of all levels. Visitors are provided the opportunity to explore the distinguished CISO Cybersecurity Lab, discuss cyber topics, receive guidance from passionate students and faculty leaders, and network with other members in the growing cyber network.

Workforce

Using our position as a national leader in cybersecurity education, our program at CSUSB has had a strong impact on the national shortage of cybersecurity professionals in the U.S. workforce. What we develop, we share for the benefit of our region and the Nation.

Opportunity

Cybersecurity jobs have become one of many pathways for social mobility and the cybersecurity programs at CSUSB serves as the ideal opportunity for students to showcase their talents and cyber acumen.

Research

CSUSB is an R2 university which helps facilitate local and national cybersecurity research projects including infrastructure for the Information Security Research and Education (INSuRE) collaborative. Other partners include Argonne National Labs, Pacific Northwest National Labs, and Google.

History

2008
- Receives NSA designation as CAE in Information Assurance and Cyber Defense
- Cyber Intelligence and Security Organization (CISO) starts at CSUSB

2009
- The official Cyber Lab opens
- CyberCorps®: Scholarship for Service (SFS) program begins at CSUSB

2010
- First cohort of students debuts at SFS job fair in Washington, D.C.

2011
- First CAE in Cybersecurity Symposium in Gaithersburg, MD

2012
- The Cybersecurity Center at CSUSB officially opens

2015
- CSUSB GenCyber camp debuts partnering with the Girl Scouts
- Receives NSA designation as a CAE National Resource Center (CNRC)

2016
- DoD CySP Scholarship Program resumes

2017
- Women in Cyber Security (WiCyS) CSUSB Chapter charters
- The National Cybersecurity Virtual Career Fair debuts

2018
- Girl Scouts of the USA announces new STEM-oriented badges, including three cybersecurity challenges stemming from the first GenCyber camp in 2015

2019
- National Science Foundation awards CSC $4.3 million to create a scholarship program for veterans and reskilling workers

2020
- CSC named the CAE in Cybersecurity Community National Center

2021
- CSUSB is redesignated as a CAE - CD
- Inland Empire Cybersecurity Initiative (IECI) launches

2022
- CHIRP tuition assistance program with Pacific Northwest National Laboratory and Space Systems Command

2023
- 8th GenCyber Camp hosted by CSUSB
- 10th CAE in Cybersecurity Symposium in Seattle, WA with 400+ attendees

Highlights

The Cybersecurity Center (CSC) at California State University, San Bernardino (CSUSB) is a pioneer in cybersecurity education. In 2008, the National Security Agency (NSA) and the Department of Homeland Security (DHS) designated CSUSB as a Center of Academic Excellence (CAE) in Information Assurance. A CAE designation is a coveted recognition for cyber schools as it demonstrates the standard of excellence for cyber education in the Nation. As a reflection of our excellence, in 2021, CSUSB was redesignated as a CAE in Cyber Defense Education (CAE -CD) through 2028, recognized for our specialty areas in Cyber Investigations and Network Security Administration.

$75,000,000 in grants and contracts since 2010

In 2020, the CSC was recognized as the CAE in Cybersecurity (CAE -C) Community National Center. Focused on the development of a robust cybersecurity workforce, the CAE -C Community National Center provides support to the 400+ CAE institutions and projects across the Nation. CSUSB is the lead institution for the nationally renowned INSuRE program, sponsored by the NSA, and is co-lead with Whatcom Community College (WCC) on the launch of the Community College Cybersecurity Pilot (C3P) program, sponsored by and modeled after the National Science Foundation (NSF) CyberCorps®: Scholarship for Service.

Annually, the center participates in several local, regional, and national events that boost the profile of CSUSB and our talented students.

Student Excellence

We offer four undergraduate degrees and five master's degrees in cybersecurity. We offer AACSB and ABET accredited cybersecurity focused degrees.

- B.S. Computer Science (Cybersecurity Certificate)
- B.S. Information Systems and Technology, Cybersecurity
- B.S. Information Systems and Technology, National Security
- B.S. Intelligence and Crime Analysis, Cyber Security
- M.A. Computer Science (Cybersecurity Certificate)
- M.B.A. Cybersecurity Concentration
- M.P.A. Cybersecurity Concentration
- M.S. Information Systems Technology, Cybersecurity
- M.S. National Cybersecurity Studies

CISO Lab

Focuses include: forensics, competitions, ethical hacking, and enterprise networking

12 Student-Led Projects running on average each semester

Employers report project involvement has been a key reason students interview well and secure excellent jobs upon graduation

The CISO Research Lab is where much of the magic happens! Evolving a project based culture, the lab is a safe space for students to work, research, explore, and socialize.

Dr. Vincent Nestler, Director, CSUSB Cybersecurity Center

NICE Challenge Project

The NICE Challenge Project uses work role-based real world scenarios within virtualized business environments that bring students with the appropriate experience before entering the workforce. Our goal is to bring the most realistic experiences to students, at scale year round, while also generating useful assessment data about their knowledge, skills, and abilities for educators.

100+ Unique Challenges

550+ Schools

1000+ Educators

How We Do It:

Platform
- Powerful cross platform web application with no downloads required
- Launch challenges, access VM consoles, manage user accounts, and review results
- Manage hardware, hypervisors, and software at no cost to U.S. EDU

Challenges
- Competency based assessments focused on real world problems and context
- Maps to NICE Framework Tasks, Work Roles, KSAs, and CAE KUs
- Designed to capture useful data for actionable metrics and analytics

Environments
- Rich business environments tailored around NICE Framework Categories
- Full scale context, fictional organizations, and employees
- Virtualized networks, servers, desktops, and specialized equipment

CAE in CYBERSECURITY COMMUNITY

As a result of our continued excellence in the community, in 2020 the Cybersecurity Center became the CAE in Cybersecurity CAE -C Community National Center and the lead institution for the CAE Community. Focused on the development of a robust cybersecurity workforce, the CAE -C Community National Center offers three primary functions to the 400+ CAE institutions and projects:

- **Provide technical and logistical support for CAE events, activities, and curriculum**
- **Provide a portal of CAE resources for the community, geographic regions, and the Nation as a whole**
- **Engage and facilitate strategic initiatives for the Nation in the areas of research, student and faculty development, diversity, and other workforce development activities**

The community provides a number of services, including the National Cybersecurity Virtual Career Fair, event management, travel assistance, and knowledge management. We work closely with the CAE -C Program Office to produce materials, resources, and tools for the CAE -C Community.

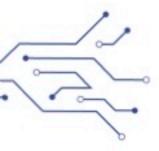## CAE in Cybersecurity Virtual Career Fair
Sponsored by NCyTE and CAE Community

The CAE Community and the National Cybersecurity Training and Education Center (NCyTE) hosts the annual National Cybersecurity Virtual Career Fair for students, alumni, and faculty from CAE designated institutions across the nation. As the CAE in Cybersecurity program continues to designate new CAE institutions, the number of eligible students grows each year. Since 2017, over 7,000 students have participated in the virtual career fair.
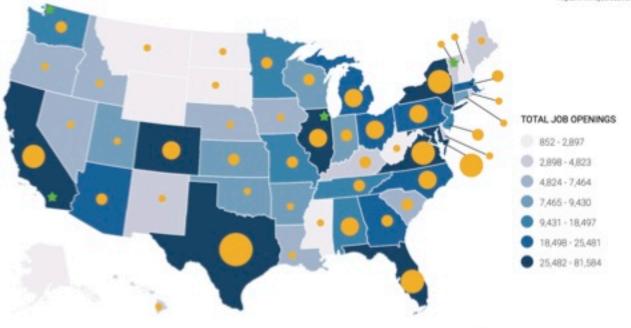

CAE in Cybersecurity SYMPOSIUM

The CAE Symposium is designed to provide CAE Community members and applicants the opportunity to network, receive community updates, and present their research to the community. The symposium is open to all existing CAE -CD, CAE -R, CAE -CO institutions and applicants.

National Reach

2023 National Cybersecurity Workforce Gap
https://www.cyberseek.org

TOTAL JOB OPENINGS

- 852 - 2,897
- 2,898 - 4,823
- 4,824 - 7,464
- 7,465 - 9,430
- 9,431 - 18,497
- 18,498 - 25,481
- 25,482 - 81,584

CAE-C National Community

The mission of the Centers of Academic Excellence in Cybersecurity (CAE-C) Community is to provide a constructive exchange of relevant information, ideas, and events by CAE Institutions including critical resources, research, and workforce development. Designated colleges and universities in each state create the associated partnerships of the CAE-C National Community collaborative efforts.

CAE-C DESIGNATED FACILITIES GROWTH

1 - 6   7 - 13   14 - 20   21 - 27   28 - 33

NCAE-C National Centers

- ★ **CAE-C National Center:** California State University, San Bernardino, CA
- ★ **Candidates National Center:** Whatcom Community College, WA
- ★ **Career Preparation National Center:** Norwich University, VT
- ★ **Education Pathways National Center:** Moraine Valley Community College, IL

Cyber Squad

The Cybersecurity Center supports community outreach through the Cybersecurity Awareness Squad (Cyber Squad), a group made up of Cyber Intelligence & Security Organization (CISO) and Women in Cybersecurity (WiCyS) CSUSB student chapter members. Cyber Squad demonstrates the latest technology projects for the community to promote their goal of outreach and cybersecurity awareness, impacting more than 30,000 students since inception.

PROJECTS

Drones
Car Hacking
Virtual Reality Secure Operations Center
Digital Forensics
SCADA/ICS Operations

Purple team experience
Emergency Communications
Network Engineering
Open-source intelligence
Ethical hacking

GenCyber

Each year, CSUSB provides a week-long immersive summer camp for middle and high school girls as an introduction and opportunity to practice cybersecurity concepts. GenCyber, an NSA and NSF sponsored program, is designed to ignite, sustain, and increase K12 awareness of cybersecurity content and career opportunities. As of 2020, GenCyber has over 154 camps hosted across the nation.

SPONSORS

Naval Surface Warfare Center (NAVSEA)
Cybersecurity and Infrastructure Security Agency (CISA)
Idaho National Lab
Google
IBM

Facebook
ConvergeOne
CISCO
Tomorrow's Talent
Mitre

Community Colleges

Notable collaborations between CSUSB and community colleges in the Inland Empire include annual Cyber Squad presentations at San Bernardino County's STEMapalooza and the Riverside Community College (RCC) annual Business and IST Transfer Fairs. These events exhibit the importance of cybersecurity principles and practices, National Cybersecurity Awareness Month, and STEM education.

Resources and Opportunities

The Workforce and Apprenticeship Tech Hub serves as the place where students can meet with industry partner mentors, prosepctive employers, counselors, faculty, staff, and peers for technical advancement and workforce preparation as they transition into full-time employment.

RESEARCH

Collaborative research spaces and flexible spaces for career preparation

Student access to advanced broadband Pacific Research Platform nodes which provides unparalleled tech training and infrastructure for the Inland Empire

Specialized training equipment for Cybersecurity Operations Centers

Secure Operation Center (SOC) to practice augmented and virtual reality tools towards maintaining and securing Dev ops and other cybersecurity services

Outreach

K12 Education Outreach

The Cybersecurity Center's heavy focus in community outreach has led to a more inclusive form of development serving as a cybersecurity pipeline for K12 education. The results are based on the establishment of student success and talented cybersecurity structured organizations in the Inland Empire including Tomorrow's Talent and the San Bernardino County Superintendent of Schools' Alliance for Education.

These partnerships have increased youth interest in cybersecurity careers, enhanced community support services, and promoted regular aptitude evaluation to reinforce quality understanding and experiences.

CSUSB, Tomorrow's Talent, and the Alliance for Education coordinate cybersecurity exploration activities for middle school and high school students which include:

- **Micro-Internships:** 90-minute interactions between industry partners and small student groups to develop industry-specific workplace technical and essential skills.

- **Competitions:** High schools deliver preliminary or foundational coursework and cyber occupational readiness exercises (applied learning) to prepare students for competitions that include the California Mayor's Cyber Cup, NSA ENIGMA Cyber competition, and CyberPatriot.

- **GenCyber:** Collaboration of industry workforce partners, local schools, and the CSUSB's cybersecurity program work together to host annual cyber camps and year-round engagement activities to build youth interest and competency in cyber content and career development.

- **RING:** Part of the NSA national K12 effort, provides curricular resources for our partner schools, including the Alliance's Cyber/STEM program and schools without established cybersecurity programs. RING provides online cybersecurity learning experiences for high school students, who earn high school credit, participate in extracurricular activities, and possibly earn college credit through select CAE -C institutions.

- **TeachCyber.Org:** Leverages CSUSB's NSA CAE Community–funded K12 CAE exploration study, provides instructional materials to educators engaged, and ready to teach high school cybersecurity.

Initiatives

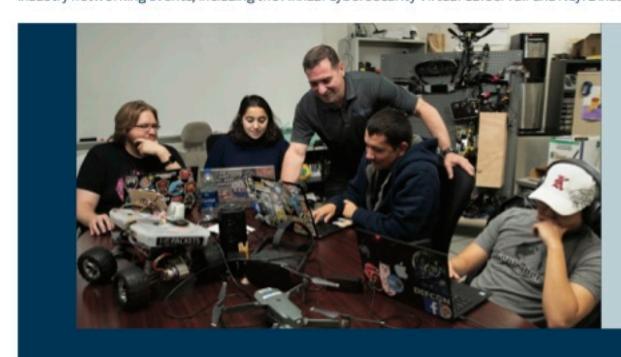## National Leaders in Cybersecurity Education

Since 2020, the CSUSB has served as the CAE in Cybersecurity CAE -C Community National Center. This community of over 400 colleges and universities is the backbone of cybersecurity higher education in the United States. Our initiatives include programs and projects that leverage the expertise of CAE -C schools to advance the cybersecurity workforce at the national, state, and local levels.

NCyTE

The National Cybersecurity Training and Education Center (NCyTE) is an Advanced Technological Education (ATE) National Center, grant-funded by the National Science Foundation (NSF) and hosted at Whatcom Community College (WCC). NCyTE works to advance cybersecurity education in the United States to build a stronger, more diverse cybersecurity workforce, and address the growing shortage of qualified cybersecurity professionals.

Membership is free, and includes benefits such as:

- Access to professional development academies and program development workshops.
- Eligibility for travel support and stipends to attend professional development events.
- A monthly newsletter containing new educational resources, updates to curricular materials, recent studies, upcoming events, and more.
- Industry networking events, including the Annual Cybersecurity Virtual Career Fair and NCyTE Industry Nights.

Workforce and Apprenticeship

The Workforce and Apprenticeship Tech Hub serves as the place where students can meet with industry partner mentors, prospective employers, counselors, faculty, staff, and peers for technical advancement and workforce preparation as they transition into full-time employment.

Career-Building

- Apprenticeship and training
- Tailored 1:1 counseling
- Direct job placement in well-paying fulfilling careers

Key Participating Employers

- Space Systems Command
- Pacific Northwest National Labs
- Robert Half International
- ESRI
- Microsoft
- East Valley Water District

Tech Hub

SPACE SYSTEMS COMMAND

CHIRP

CYBER HALO INNOVATION RESEARCH PROGRAM

Education and Experience for the Cybersecurity Roles of the Future

The Space Systems Command (SSC) Cyber Halo Innovation Research Program (CHIRP) was established as a partnership between colleges, universities, and industry to drive innovation and create a diverse cybersecurity talent pool to fill the positions at SSC and beyond.

CHIRP is a collaboration between Space Systems Command (SSC), Pacific Northwest National Laboratory (PNNL), and California State University, San Bernardino (CSUSB), and industry partners that offers students a two-year college to career program opportunity.

Competitive fellowship appointment for candidates with outstanding academic record, evident leadership potential, and a stong commitment to community.

THE WORLD IS CHANGING.
ARE YOU READY?

CyberCorps®: Scholarship for Service

The CyberCorps®: Scholarship for Service (SFS) program at CSUSB started in 2009. Sponsored by the National Science Foundation (NSF), the SFS program provides students tuition, books, and a monthly stipend. Upon graduation, these students must work in federal, state, local, or tribal government for two years (or equivalent to the length of the scholarship).

$700,000 given annually to scholarship recipients

$50k - $80k awarded to each student

100% go into government employment

~$7 million given to scholarship recipients since 2009

119 total scholarship recipients since 2009

Department of Defense
Cybersecurity Scholarship Program

The Department of Defense Cybersecurity Scholarship Program (DoD CySP) at CSUSB began in 2016. With the help of Congressman Pete Aguilar (CA District 33), the DoD CySP program was restarted and provides schools designated as Centers of Academic Excellence CAE in Cybersecurity the opportunity to develop this grant-funded scholarship program. Students selected to participate in the program receive tuition, books, and a stipend to cover room and board. Since 2016, we've awarded nearly $500,000 in scholarships.

Inland Empire Cybersecurity

IECI Partners

The National Security Agency has sponsored an economic growth project in Southern California called the Inland Empire Cybersecurity Initiative (IECI). IECI's development of a long-term talent pipeline with near-term apprenticeship placement is composed of four phases that support students attainment of stackable Department of Labor and Division of Apprenticeship Standards Cybersecurity Specialist and Cybersecurity Professional Apprenticeship certifications. The four phases are:

Exploration

Youth-oriented, early-talent identification and K-12 activities involving camps, competitions and aptitude services.

Pre-Apprenticeship

Identifying and developing talent in the community colleges and CSUSB's first-time freshman class.

Apprenticeship

Selected students experience paid apprenticeships with employers as they progress toward a cybersecurity bachelor's or master's degree from CSUSB.

Talent and Employer Coordination

Recruiting and developing relationships among students, academia, government, and employers to ensure the success of the project.

Competitions

Cybersecurity competitions take complex concepts and make it fun for students to test themselves against practical cybersecurity challenges in individual- or team-based approaches.

Cyber competitions inspire students to:

- Learn cutting-edge cybersecurity content from experts
- Promotes out of the box thinking, and problem-solving skills
- Enable students to grow their leadership skills
- Confidently learn which cyber roles suit them best

Some competitions include:

NCAE CYBER GAMES
PLAY | LEARN | PROTECT

- National Cyber League (NCL)
- NICE Challenge
- CyberPatriot

INSuRE

The Information Security Research and Education project (INSuRE) aims to build research skills and experience for undergraduate students through a research network between CAE institutions and technical directors from the government and national labs. Through the project, students engage in team research on real world problems in the national information security domain. The students learn research by doing; building skills, expertise, and connections that will enable them to hit the ground running on cybersecurity research projects later in their careers. Projects have been presented at national conferences, published, and won awards.

Google

Google provided students at CSUSB with $5,000 to work on a Google Cloud project involving an emergency security operations center (ESOC). Students presented the virtual ESOC to Google while attending a summer conference. The Cloud Rover research project demonstrates the possibilities of the latest cloud technology to help prepare students to obtain cloud engineering certifications. Students get hands-on practice by exploring voice commands and a variety of topics, including: IoT (Internet of Things), AI and machine learning, programming, NoSQL database construction, cloud networking, and cloud security. The student team was invited by Google to showcase this project at Google's Cloud Next 2018.

Space Systems Command (SSC) Expo

CSUSB is a participant and exhibitor at SSC's Annual Expo. At the expo, students share the results of their applied research and give demonstrations on cybersecurity as it relates to robots and critical infrastructure. CHIRP students are diligently working side by side with PNNL and Space Force to address hard questions that challenge Space Force's missions. The main focus for these efforts is the concept of "Zero Trust." Their theoretical approach and demonstrations of the practical application of Zero Trust was presented at the SSC Expo in November 2022.

Research

Pacific Northwest National Laboratory

In 2020, Dr. Nestler and a team of students were selected for the Visiting Faculty Program (VFP) to collaborate with PNNL scientists and engineers to develop an augmented virtual reality based, hands-on scenario for protecting and defending an electric grid substation. The project successfully created a prototype that was a model for other scenarios later created for CISA.

Cybersecurity and Infrastructure Security Agency

For the last 8 years, the NICE Challenge Project (NCP) has been developing cyber based scenarios that provide students workforce experience before entering the workforce. The NCP is currently collaborating with CISA to develop workforce scenarios in operational technology (OT) centered around the electrical grid. These scenarios will help prepare the current and next generation cybersecurity professionals to secure America's critical infrastructure.

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on getting started with your Cybersecurity Career,
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