

NICE | Conference and Expo 2022

JUNE 6 - 8, 2022 | WESTIN PEACHTREE PLAZA | ATLANTA, GA

DEMYSTIFYING CYBERSECURITY

Integrated Approaches to
Developing Career Pathways

FIU | FLORIDA
INTERNATIONAL
UNIVERSITY

 **NEW
AMERICA**

The Cybersecurity Education Diversity Initiative

Thaier Hayajneh

CEDI Co-Chair and Director of Fordham Center for
Cybersecurity,
Fordham University

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CEDI Co-Chair
Fordham University

Cybersecurity Education Diversity Initiative



CEDI (NCAEC-002-2020)

Co-Chairs: Dr. Thaier Hayajneh & Dr. Amelia Estwick

Administration Support: Angelina Zaccaria

Meeting Agenda

Session Outline:

- CEDI Introduction
- Challenges faced by MSIs developing cybersecurity programs
- CEDI services developed to address these issues
- Multidisciplinary nature of cybersecurity allows for multiple career pathways
- Closing remarks

Intended Learning Outcomes:

- Challenges and observations for MSI cybersecurity programs
- Best practices for addressing these issues through service oriented efforts
- How cybersecurity career pathways are different for MSI students compared to other institutions
- Shared experiences to strengthen public and private partnerships

Diversification of Cybersecurity

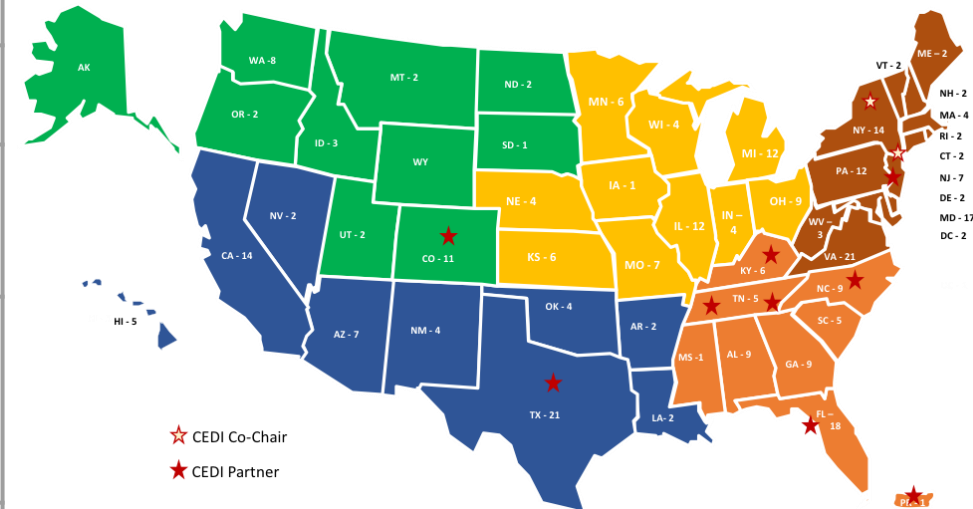
- Why is the diversification of cybersecurity important for the nation's well-being?
- What is the importance of establishing a cybersecurity program at a Minority-Serving Institution?
 - Multidisciplinary nature of cybersecurity allows for multiple career pathways
- How cybersecurity career pathways are different for MSI students compared to other institutions?

What is CEDI?

- The Cybersecurity Education Diversity Initiative is sponsored and managed by NSA's National Centers of Academic Excellence in Cybersecurity (NCAE-C) program office to provide consultation, advice, and assistance to Minority Serving Institutions (MSIs) desiring to establish cybersecurity education programs.
- This initiative is the precursor to the NCAE-C Candidates Program, which assists post-secondary academic institutions with degree granting or terminal certificate cybersecurity education programs, to prepare for NCAE-C designation.
- Intention to become a designated participant in the NCAE-C program is not a prerequisite for CEDI participation.

CEDI Partners

University of Tennessee at Chattanooga	Dr. Mengjun Xie & Dr. Hong Qin
North Carolina A&T State University	Dr. Dorothy Yuan & Dr. Jinsheng Xu
University of North Texas	Dr. Ram Dantu & Dr. Mark Thompson
New Jersey City University	Dr. Kutub Thakur & Dr. Abdullah Alhayajneh
University of North Florida	Dr. Swapnoneel Roy, Dr. Zornitza Prodanoff, Dr. Iman Vakilinia, and Dr. Patrick Kreidl
Metropolitan State University of Denver	Dr. Jeff London & Dr. Steve Beaty
Tennessee Technical University	Dr. Ambareen Siraj & Eric Brown
Bluegrass Community & Technical College	Robert Chirwa
Polytechnic University of Puerto Rico	Dr. Alfredo Cruz



Challenges & Observations

- ❖ **Lack of Infrastructure** - Issues building suitable infrastructure, proper methods to spend money
 - Software, hardware, labs, class materials, and cloud access
- ❖ **Lack of Resources**
 - Students do not have sufficient technological access.
- ❖ **Lack of Academic Administrator Awareness** - Support from higher up in the institutions
- ❖ **Lack of Qualified Faculty** - All types of instructors, with adequate training to teach any newly implemented classes or provided materials.
- ❖ **Lack of Inclusivity** - MSIs felt excluded from certain opportunities & Scholarships (ex: SFS) → requirements and the bar is set so high for these grants, feel like they don't have a change

CEDI Services

Faculty Development:

- ❖ Virtual and/or face-to-face trainings, workshops, and bootcamps
- ❖ Assistance with faculty hiring

Student Development:

- ❖ Cyber competitions/Capture-The-Flag (CTF) exposure
- ❖ Workforce development opportunities (e.g. internships, apprenticeships, talent pipeline)

Curricula Development:

- ❖ Assistance with course materials and labs using shared resources
- ❖ Offering bridge courses (virtual and/or Face-to-Face) to increase student learning opportunities
- ❖ Assistance with lab technologies (e.g. cloud services)
- ❖ Assistance with integration of NICE standard knowledge units (KUs) to promote possibility of CAE designation in future

Mentorship & Advisement:

- ❖ Continuous update meetings to discern new areas for assistance and support
- ❖ Arrange faculty sit-ins on classes, to learn new techniques and student teaching options
- ❖ Allocation of mentors to assist with processes and development as needed

Articulation Agreements:

- ❖ Foster regional and national relationships between universities to increase resources available to you and your institution
- ❖ Develop commitment to ensure support is continued and fits the needs of your institution

CEDI to CAE Candidacy Pipeline

MSIs

Minority Serving Institutions with no existing cybersecurity education program or a small program in its infancy.



CEDI Program

- CEDI Programmatic Steps
- CEDI Services
- Focused on tailoring MSI assistance to specific institutional needs.



NCAE in Cybersecurity Candidates Program

- Works with all institutions who have an existing cybersecurity program.
- Program must qualify for mentorship.
- Maturity and alignment of cybersecurity program is key.

Infrastructure & Outreach

Building Infrastructure:

- ❖ Creation of an informative website
- ❖ Implementation of a clear reporting process
- ❖ Hiring administrative support
- ❖ Development of two applications: one specifically for MSI institutions and one for CAE institutions

Apply for CEDI Support

Apply to be a CEDI Service Provider

Outreach:

- ❖ Established connections with the NCYTE Center and the CAE Regional Hubs
- ❖ Participation in various CAE events to assist in spreading awareness about CEDI opportunities
- ❖ Built partnerships with 38 MSIs
- ❖ Contacted 72 MSIs to grow awareness of CEDI opportunities
- ❖ Received several applications from both MSIs and CAE Institutions

Rutgers MSI Partnership

The Rutgers Center for Minority Serving Institutions

- Providing assistance toward further establishing and strengthening relationship between CEDI and MSIs at a minimal cost
- Serving CEDI Goals By:
 - Socializing CEDI with more than 8,000 MSI connections via email
 - Creating social media campaign across platforms for CEDI outreach
 - Creating a CEDI series of twitter chats, podcasts, and webinars to further strengthen MSI trust in CEDI
 - Promoting future CEDI projects and events to MSI contacts
 - Developing list of specific MSI contacts for CEDI



Rutgers Center for Minority Serving Institutions and Fordham Center for Cybersecurity Team Up to Support Cybersecurity at MSIs

FOR IMMEDIATE RELEASE:

Brandy Jones | brandy.jones@gse.rutgers.edu | 848-932-0788

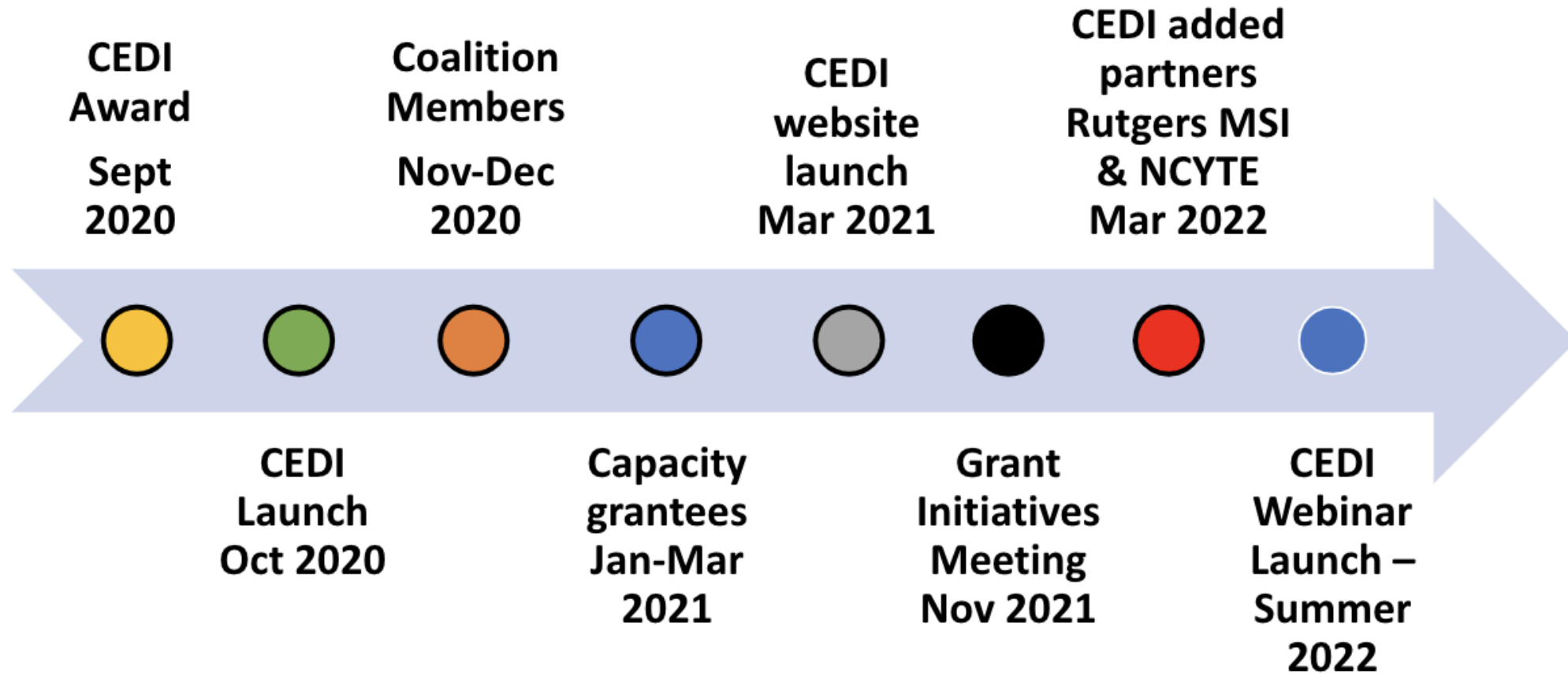
New York, NY., April 18, 2022 — The Rutgers Center for Minority Serving Institutions (**CMSI**) is proud to announce a new partnership with the Fordham Center for Cybersecurity (**FCC**) to increase diversity and equity in the field of cybersecurity at Minority Serving Institutions (MSIs).

“We are beyond excited to get to work,” shared Samuel DeWitt Proctor Endowed Chair in Education and CMSI Executive Director, Marybeth Gasman. “With the help of our FCC partners, we’ve realized just how much support cybersecurity programs need and we’re looking forward to contributing what we can to aid MSIs in their cybersecurity endeavors.”

The FCC leads the NCAE-C grant funded Cybersecurity Education Diversity Initiative (**CEDI**), which aims to connect MSIs who can benefit from developing or expanding cybersecurity-related offerings with the resources needed to further their institutions. CEDI’s research and programmatic support has helped promote the ever-expanding cybersecurity field and make it more accessible for MSIs. Through reaching programs that need help, guiding expansion, and encouraging the need for robust cybersecurity programs nationwide, CEDI and CMSI aim to enhance cybersecurity opportunities at MSIs and bring existing MSI cybersecurity programs into national conversations within the field.

<https://cmsi.gse.rutgers.edu/content/rutgers-center-minority-serving-institutions-and-fordham-center-cybersecurity-team-support>

Sep 2020 - June 2022



CEDI Partner Progress Highlights

- Bluegrass Community & Technical College
- Metropolitan State University of Denver
- New Jersey City University
- North Carolina A&T University
- Polytechnic University of Puerto Rico
- Tennessee Tech University
- University of North Florida
- University of North Texas
- University of Tennessee at Chattanooga

Bluegrass Community & Technical College

- Partnered with Kentucky State University, which has Computer Security as an option within the Computer Science degree. KySU is in the process of developing a cybersecurity degree and started CAE designation application several years ago but discontinued due to lack of funding, though they are still interested in CAE designation
- Guest lectured at a Cryptography class at KySU
- Held Cybersecurity Scavenger Hunt as part of Cybersecurity Awareness Month activities at Kentucky State University
- KySU student acted as a tech intern to raise cybersecurity awareness among students and show them how to perform computer security tasks
- Planning cybersecurity workshop for KySU students and staff as well as teachers from surrounding high schools to cover cybersecurity activities such as Capture-the-Flag and Cybersecurity curriculum implementation

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Bluegrass Community & Technical College Cybersecurity Scavenger Hunt student workers

MSU Denver

- MSU Denver has partnered with Trinidad State College - Alamosa Valley Satellite Campus to create new **System Administration** and **Cybersecurity** certifications at TSC
- MSU Denver worked with TSC Alamosa to successfully negotiate and align the Foundational and Technical Core knowledge units (KUs) used in the CAE designation process with the course learning outcomes of these certifications
- They also identified course equivalencies to industry-standard certifications that some students might hold or be pursuing to allow them to simultaneously test out of courses and build their professional resumes

New Jersey City University

- Signed a Cybersecurity partnership agreement with Bergen Community College, where NJCU is on the Advisory Board of their Cybersecurity program
- Supporting the creation of a new 2-year Cybersecurity Associate Degree Program and assisting with finding faculty candidates for this new program
- Signed an Official Cybersecurity Articulation Agreement with Hudson County Community College that will allow HCCC Cybersecurity students to join the NJCU Cybersecurity BS program to continue their undergraduate studies
- Organized cybersecurity bootcamps and workshops for Bergen Community College and Hudson County Community College students

CEDI Partner Progress Highlights



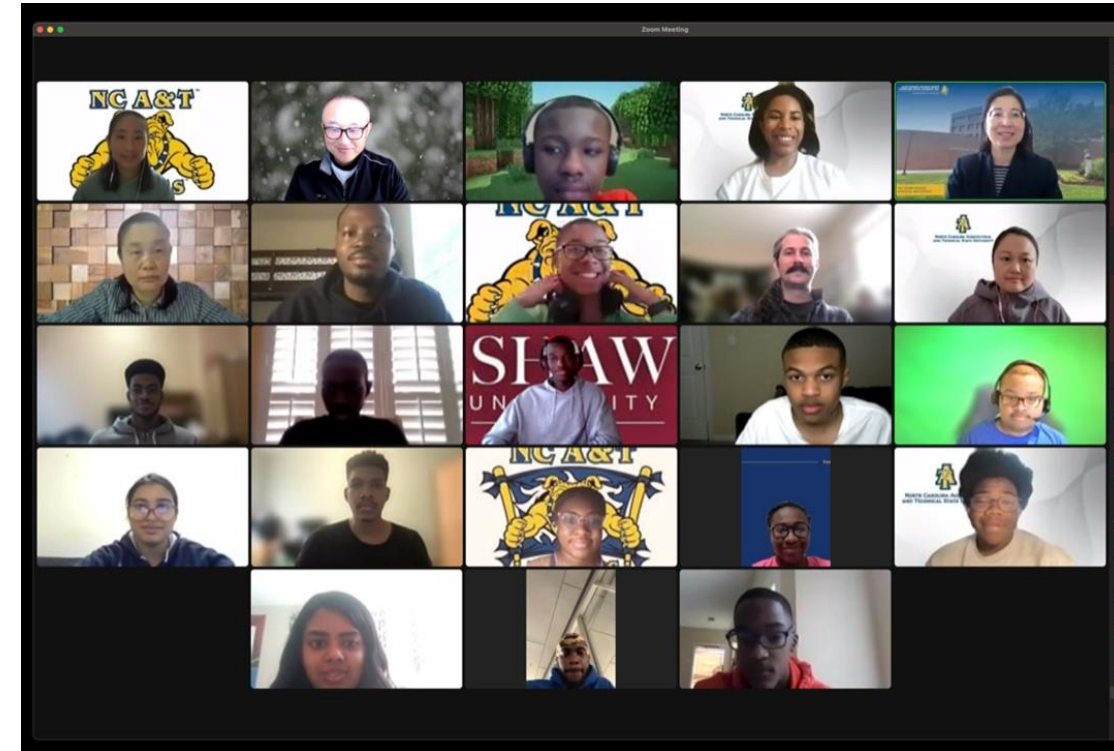
NJCU signed an Official Cybersecurity
Articulation Agreement with Hudson
County Community College



NJCU Cybersecurity Lab Workshops

North Carolina A&T University

- Held Virtual Faculty Workshop on Cybersecurity Curriculum with 10 faculty participants from four HBCUs
- Held workshop with VSU to discuss CAE KUs and mapping to courses with the goal of CAE designation. VSU plans to create an undergraduate certificate in cybersecurity.
- Held faculty workshop with FSU on cybersecurity curriculum, presented course materials and lab modules from NCA&T, and reviewed CAE KUs. FSU has submitted their application for BS in Cybersecurity degree.
- Shared course materials with NCCU for two courses
- Shared hands-on labs and CAE-CDE application resources with WSSU
- Capture the Flag event attended by students from Shaw University, VSU, and NCA&T



NCA&T Capture the Flag Event with students from Shaw University, VSU, and NCA&T

Polytechnic University of Puerto Rico

- Graduated 16 faculty, teachers, graduate students, first responders and veterans in mid-change careers with **Graduate Certificates in Cybersecurity**
- Participants have signed an agreement to collaborate with PUPR and pass on the knowledge to students at their schools
- Some of them have already integrated modules or courses in cybersecurity in their workplaces
- CEDI-PUPR has held 3 well-attended Capture the Flag workshops for students from local MSI universities to provide hands-on learning and experience

Tennessee Tech

- Held student organization seminars and provided resources for advisement and mentoring to establish and expand local cybersecurity student cohorts for HBCU and MSI students
 - \$500 seed fund for creating and sustaining student organizations
- Expanded hands-on skill training opportunities for HBCU and MSI students through student training with offense, defense, and CTF workshops and held a Cyber Range-based student CTF competition with the support of pre-competition training and resources
- Expanded professional opportunities for HBCU and MSI faculty through a Cyber Range-based faculty training with security integration modules and exercises
- Provided faculty with training and resources for integrating security into their CS classroom instruction
- Provided CAE designation support for Fisk University and Tennessee State University, including site visits and advisement

University of North Florida

- Partnered with Edward Waters University
 - Faculty development workshop on Forensics
 - Development of a Cyber Crime course in the Criminal Justice department
 - KU mapping for a Forensics Minor program
- Recently brought in Delaware State University and Elizabeth City State College by working contacts

University of North Texas

- Identified and working closely with 2 MSIs to move towards CAE designation - Angelo State University and UNT-Dallas
- Providing process and curriculum support
- Development of CAE Readiness Tool that assists in identifying needed topics/courses and hiring faculty to quantify CAE readiness and move towards designation

University of Tennessee at Chattanooga

- Recurring meetings with Stillman College to prepare for CAE designation application, map CAE KUs, share curriculum resources, determine practical approaches to enhancing Stillman cybersecurity capacity, and identify training topics
- Developed a training curriculum and held workshops in Secure Python Scripting and Secure Shell Scripting to align with CAE Basic Scripting KU
- Organized two workshops on cybersecurity faculty development, hands-on labs, and capture-the-flag games for faculty from Stillman College and many other HBCUs
- Hosted workshops on CTF games and coding bootcamps on Python and R for faculty and students from several HBCUs including Stillman College

Other Partners

- **Outreach**
 - Google
 - CISA
 - DOD Small Business Program
 - MISI (Cyber Mission Accelerator)
 - Small Businesses searching for diverse cyber talent

How to get involved with CEDI?

CEDI Website: www.fordham.edu/fcc/cedi

- If you are an MSI
 - Submit an application: [Apply for CEDI Support](#)
- If you are a CAE
 - Become service provider/partner: [Apply to be a CEDI Service Provider](#)
- If you are public/private sector (CISA, Google, small businesses, etc.)
 - Contact us: cedi@fordham.edu

Questions?

CEDI Website: www.fordham.edu/fcc/cedi

We would love to hear from you!

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Birds of a Feather: NICE Framework Users Group

Karen Wetzel

Manager of the NICE Framework

National Initiative for Cybersecurity Education (NICE)

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Defining Diversity in Cybersecurity within the Spectrum of Career Categories

Amanda Joyce

Group Leader, Strategic Cybersecurity
Analysis & Research
Argonne National Laboratory

Nate Evans

Program Lead, Cybersecurity Research
Argonne National Laboratory

Kenneth Kass

Senior Technology Leader and Researcher
Argonne National Laboratory

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