

Establishing a Large-scale, Dynamic Consortium in Support of Cybersecurity Education

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Director, Institute for Cybersecurity

Professor, Computer Science at IUP

CAE in Cybersecurity Symposium – June 8-9, 2023



CAE
IN CYBERSECURITY
COMMUNITY

PC4A

**PA Community College
Consortium Cooperative Agreement**

Outline



- 1 University & PI Backgrounds
- 2 PC4A Overview & Objectives
- 3 Challenges Hindering STEM Advancement at Community Colleges
- 4 Innovative Solutions to Challenges
- 5 Highlights & Lessons Learned (thus far)
- 6 Conclusion & Questions

Indiana University of Pennsylvania

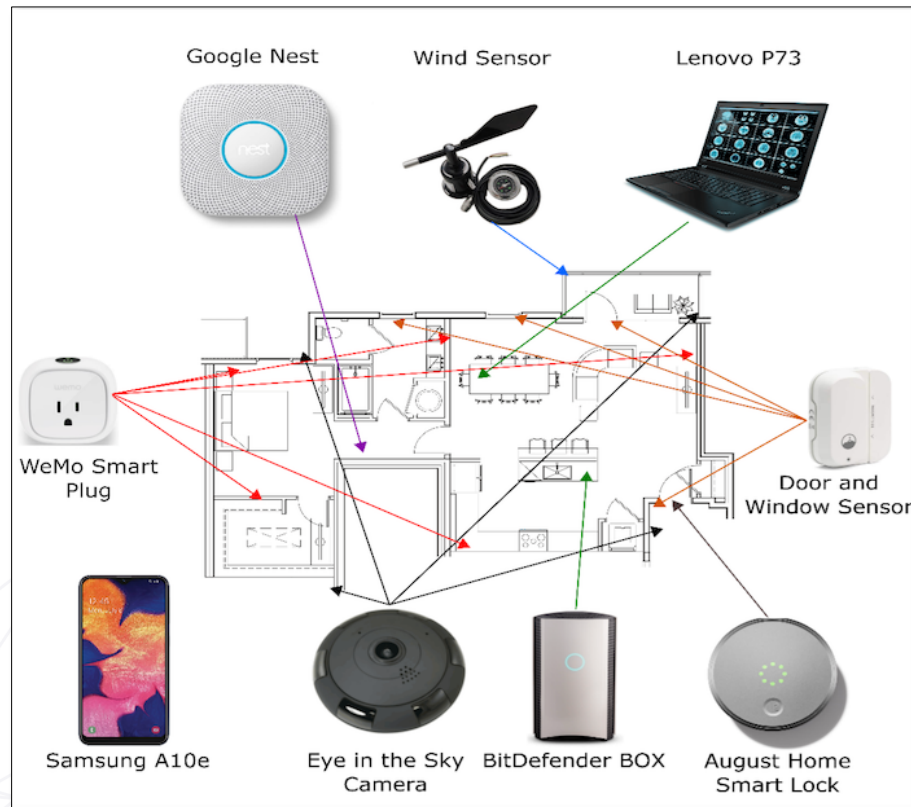
- One of four public research universities and part of the PA State System of Higher Education (PASSHE).
- One of the first schools to be designated by the NSA as a National Center of Academic Excellence.
- IUP Institute for Cybersecurity (ICS) is the entity responsible for coordinating all cybersecurity education and research activities.



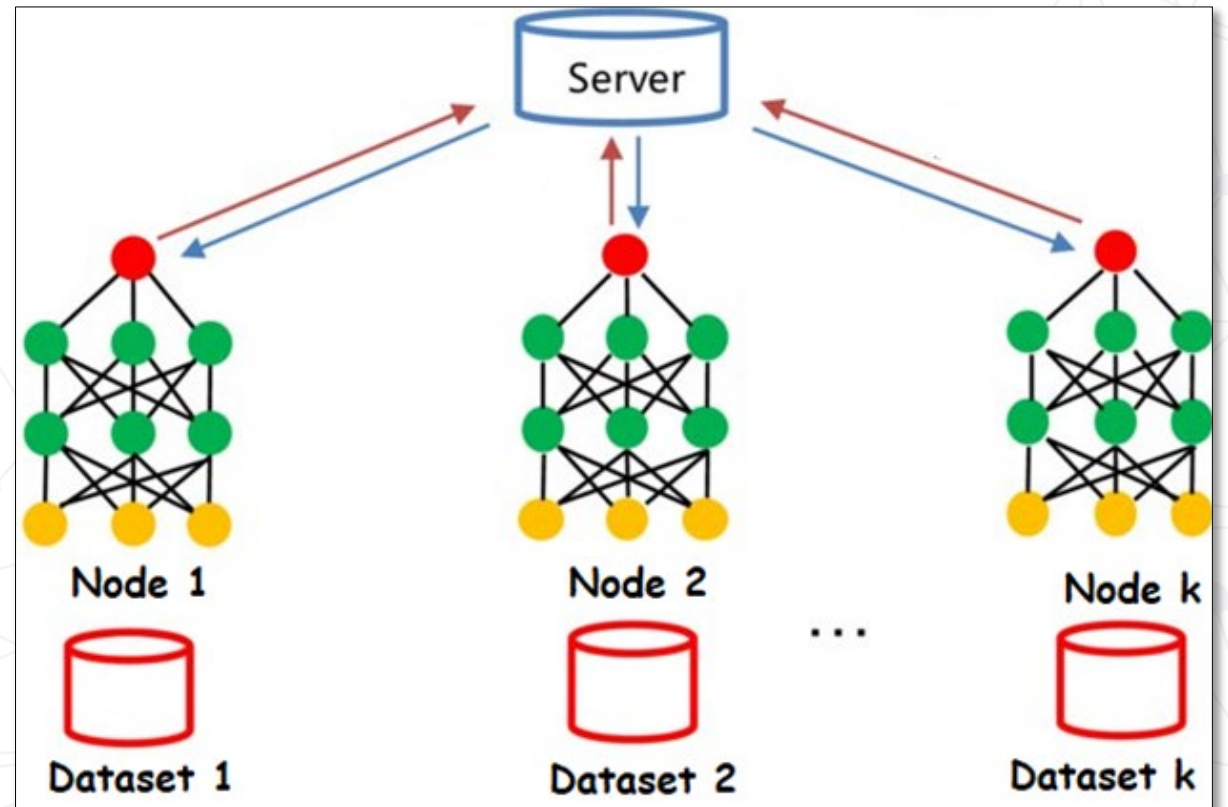
Dr. Waleed Farag

- Professor of Computer Science at IUP and director of the ICS since 2012, securing over \$10M in federal funds to support research and the work of the ICS.
- Founder and current PI of several major initiatives that contribute to the enhancement of cybersecurity research and education across the region.

- These initiatives include [PC4A project](#), [IoT Anomaly Detection](#), [ARMZTA](#), [CAE-C Expansion](#), [Cyber Scholarship Program \(CySP\)](#), [GenCyber](#), [NCAE-C PhD Scholarship](#), and [Cybersecurity Outreach](#).



IOT Anomaly Detection



ARMZTA

Institute for Cybersecurity Initiatives

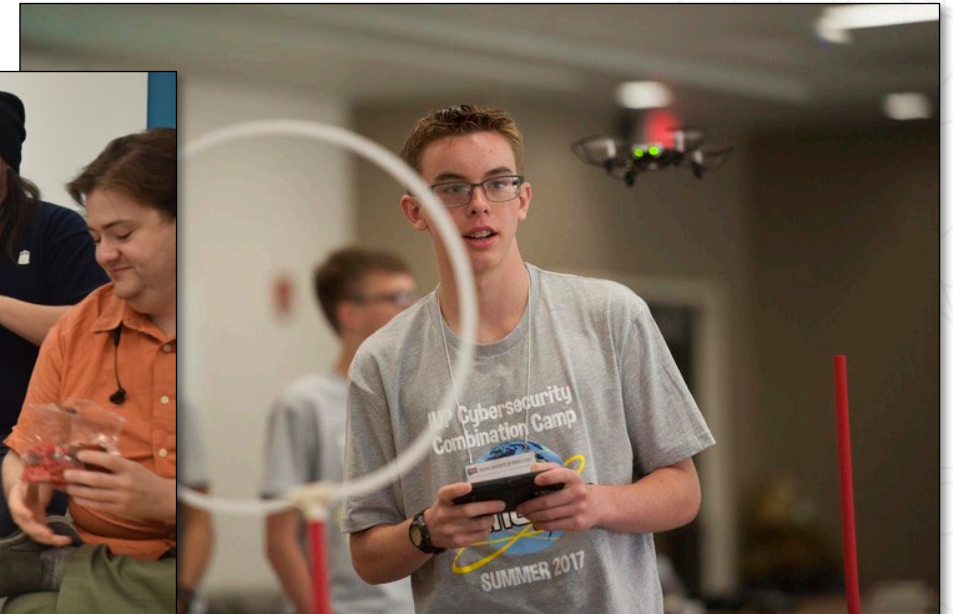
- These initiatives include [PC4A project](#), [IoT Anomaly Detection](#), [ARMZTA](#), [CAE-C Expansion](#), [Cyber Scholarship Program \(CySP\)](#), [GenCyber](#), [NCAE-C PhD Scholarship](#), and [Cybersecurity Outreach](#).



CAE-C Expansion



Cybersecurity Outreach



GenCyber



WARM-UP

QUESTION!



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or simply scan the QR code with your camera

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ID: 168-148-247



**POLL
OPEN**

Roughly how many community colleges are in the Commonwealth of Pennsylvania?

1. 5 to 7
2. 8 to 11
3. 12 to 16
4. 17 to 22
5. 23-29
6. 29-36
7. 37+

Pennsylvania Community College Consortium Cooperative Agreement (PC4A) is a large-scale project funded by the DoD National Defense Education Program (NDEP), www.pc4a.org.

- One of only five national cooperative agreements funded in Sep. 2022.
- The consortium represents roughly half of the Community Colleges (CCs) in Pennsylvania.

Focus

Establish a dynamic, collaborative consortium led by IUP (LO) and work together to enhance cybersecurity and STEM education in PA.

- The main vision is to build strong community college programs in STEM and serve as a model for others.

Project Members

- Bucks County CC
- Butler County CC
- Indiana University of PA (LO)
- Montgomery County CC
- Northampton CC
- Penn Highlands CC
- Westmoreland County CC





1

INCREASE CERTIFICATION RATES



2

**INCREASE TRANSFER RATES TO
FOUR-YEAR INSTITUTIONS**



3

**INCREASE INTEREST IN EMPLOYMENT
IN DOD, DIB AGENCIES**



Discussion Activity

- Members of each table/group are asked to take 3-4 minutes to discuss and identify three key challenges that STEM education is facing at the community college level.
- Please enter your three identified challenges into the word cloud (please enter phrases of two words or less).



DISCUSSION

ACTIVITY!



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or simply scan the QR code with your camera

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Enter Text
and Press
Send

Enter your identified challenges that STEM education is facing at the community college level. Please enter phrases of two words or less.

- Our project began with a large-scale brain-storming session.
- It is impossible to effectively solve a problem without clearly and accurately identifying its causes.





MARKETING

Effective marketing for community college programs and the ability to recruit students, particularly in STEM and cybersecurity.



RETENTION

Ability to retain students, particularly those from underrepresented groups including veterans. The average time for a typical student to complete her/his associate degree is three and a half years.



FINANCIAL/PERSONAL

CC students are at a higher risk of facing academic, personal, and financial challenges that inhibit their ability to succeed in college.

To address challenges, the LO and CC partners are implementing proposed initiatives. Some are offered through the LO to maximize efficiency, minimize resources, and promote collaboration. Each CC partner offers other initiatives to address local challenges and target specific audiences.

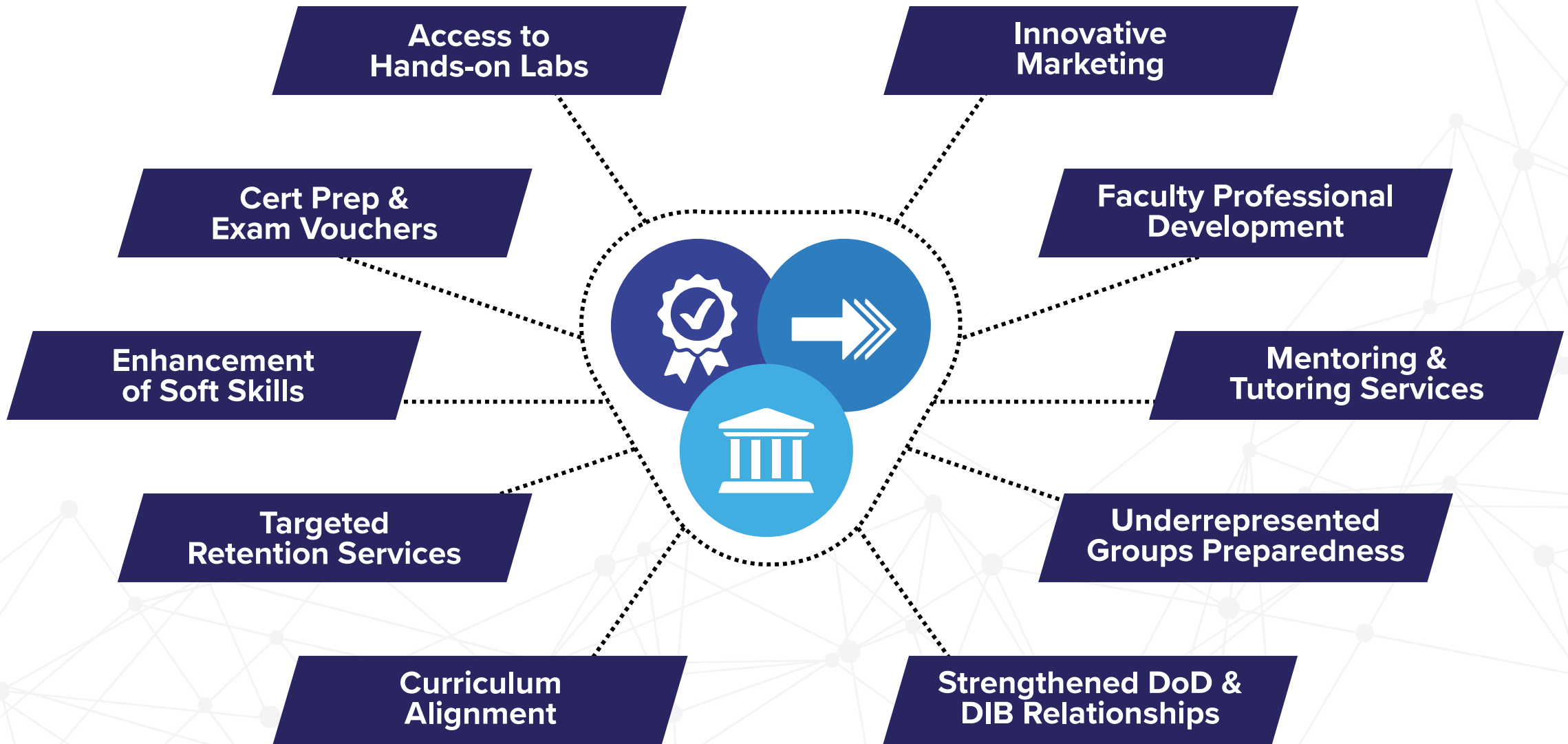
Initiatives Offered by LO

- Soft skills tutoring
- Assessments
- IRB Management
- Hands-on Labs
- Professional Development
- DoD/DIB Agency Outreach

Initiatives Offered by CC's

- Mentorships
- Certification Training
- Technical Tutoring
- K-12 Outreach
- Curriculum Alignment
- DoD/DIB Agency Outreach

Innovative Solutions Overview



Extensive Access to Hands-on Labs

Obj. 1

- Provide a consortium-wide platform so CC students can obtain state-of-the-art hands-on training in cybersecurity and other STEM fields.
- Providing these services also promotes collaboration among members of the consortium.

TestOut Bench

Scenario

Based on a review of physical security at your office, you have recommended several improvements. Your plan includes installing smart card readers, IP cameras, signs, and an access logbook.

In this lab, your task is to:

Implement your physical security plan by dragging the correct items from the shelf onto the various locations in the building. As you drag the items from the shelf, the possible drop locations are highlighted. To implement your plan, you must:

- Install two IP security cameras in the appropriate location to record which employees access the key infrastructure. The security cameras should operate over the TCP/IP network.
- Install the smart card key readers in the appropriate location to control access to key infrastructure. The key card

Workspace

Top

Shelf

IT Administration, Office 1, Office 2, Networking Closet, Executive Office, Lobby, Support Office

Certification Prep & Exam Vouchers Obj. 1

- Offer free certification exams and preparation workshops so that students can overcome financial obstacles.

CERT ALERT!



PC4A and Butler County Community College
are proud to congratulate

Michael Hinchberger

on becoming


Network+ Certified!

Visit www.pc4a.org to learn more about vital industry certifications

The PC4A Project is proudly funded by the US Department of Defense



Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Office of Naval Research.



US Department of Defense Recognized Certifications

(ISC)²

CAP	SSCP	CISSP	CISSP ^{ISSAP}	CISSP ^{ISSEP}	CISSP ^{ISSMP}	CSSLP	HCISPP	CCSP
IAM Level I	IAT Level I	IAT Level III	IASAE Level III	IASAE Level III	CSSP Manager	IASAE Level I	IAM Level I	IAT Level III
IAM Level II	IAT Level III	IAM Level II				IASAE Level II	IAM Level II	IASAE Level III
	CSSP Infrastructure Support	IAM Level III						
		IASAE Level I						
		IASAE Level II						

CompTIA

A+	CASP+	Cloud+	CySA+	Network+	PentTest+	Security+
IAT Level I	IAT Level III	IAM Level I	IAT Level II	IAT Level I	CSSP Analyst	IAT Level II
	IAM Level II	CSSP Analyst	CSSP Analyst		CSSP Incident Responder	IAM Level I
	IASAE Level I	CSSP Infrastructure Support	CSSP Infrastructure Support		CSSP Auditor	
	IASAE Level II	CSSP Incident Responder	CSSP Incident Responder			
		CSSP Auditor	CSSP Auditor			

CERTNEXUS

CYBERSEC FIRST RESPONDER
CSSP Analyst
CSSP Infrastructure Support
CSSP Incident Responder
CSSP Auditor

GIAC
CERTIFICATIONS

GCED	GCFA	GCIA	GCIH	GISCP	GSEC	GSLC	GSNA
IAT Level III	CSSP Incident Responder	CSSP Analyst	IAT Level III	IAT Level II	IAT Level II	IAM Level I	CSSP Auditor
		CSSP Analyst	CSSP Analyst	CSSP Infrastructure Support		IAM Level II	
		CSSP Incident Responder	CSSP Incident Responder	CSSP Infrastructure Support		IAM Level III	

ISACA

CISA	CISM
IAT Level III	IAM Level II
CSSP Auditor	IAM Level III
	CSSP Manager

CISCO

CCNP	CCNA	CCNA
IAT Level III	CSSP Analyst	IAT Level I
	CSSP Incident Responder	IAT Level II
	CSSP Analyst	CSSP Incident Responder

EC-Council

CCISO	CEH	CHFI	CND
IAM Level II	CSSP Analyst	CSSP Infrastructure Support	IAT Level I
IAM Level III	CSSP Infrastructure Support	CSSP Incident Responder	IAT Level II
CSSP Manager	CSSP Incident Responder		IAM Level I
	CSSP Auditor	CSSP Infrastructure Support	

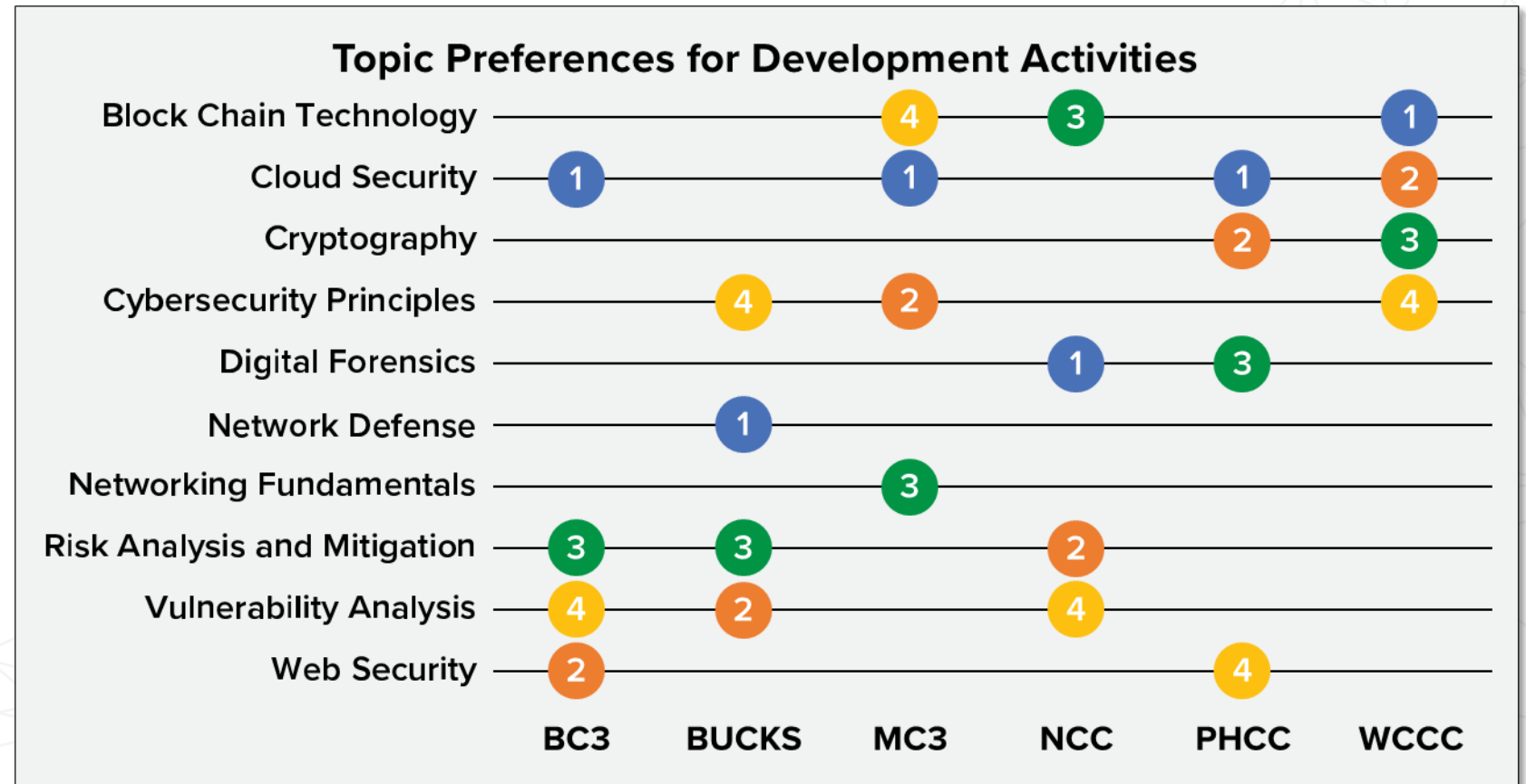
DoD CYBER EXCHANGE PUBLIC

Certification information provided by DoD Cyber Exchange

Faculty Professional Development

Obj. 1, 2, 3

- Building on the established expertise of the LO in this area, we planned one annual development workshop for faculty at each of the participating CCs.
- The graph on the left shows results of the Development Activity Survey completed by all CC partners.



Supporting Preparedness of Underrepresented Groups

Obj. 1, 2, 3

- Create an intentional approach to shift underrepresented students into STEM pathways through STEM appreciation, engagement, onboarding, and college-readiness programs.

Targeted Retention Services

Obj. 1, 2

- Implement programs at each CC to help retain students from underrepresented groups including veterans and their spouses. Examples of planned programs include job shadows, paid internships, and supportive services.
 - NCC is currently building program support that improves the retention of underrepresented students in cybersecurity and related programs.

Are you interested in a career in



NORTHAMPTON
COMMUNITY COLLEGE
can help you **SUCCEED!**

Through a U.S. Department of Defense grant, Northampton Community College will help you earn a degree to start your career or help with a seamless transfer to a four-year college by providing

- Variety of STEM Degrees Including Cybersecurity
- Dual Enrollment Opportunity
- Student Success Coach
- Free Bridge Program
- Peer Mentoring
- Free Tutoring
- Paid Internships

Priority given to BIPOC and girls to increase underserved groups in STEM fields.

Contact Dr. Farah Bennani, School of STEM Dean
at fbennani@northampton.edu

Innovative Marketing

Obj. 1, 2, 3

- Create a focused marketing campaign hosted by the LO and designed to promote STEM and cybersecurity programs at all participating CCs.
- CC's will devise a custom recruitment plan adapted to their target audiences and local demographics.
- Social media accounts have been created to promote all LO and CC partner activities and offer a method of engaging with younger generations.

Follow us on Social Media!



Twitter
[@pc4a-stem](https://twitter.com/pc4a-stem)



LinkedIn
[/pc4a](https://www.linkedin.com/company/pc4a)



Facebook
[/pc4astem](https://www.facebook.com/pc4astem)

Women In Science and Technology (W.I.S.T.)

Welcomes **ALL** Students to skill up on coding at



2023 Winter Break Coding Camp

Weeknights 7:00 - 8:00 PM

January 2 - January 13

Join us on Discord: <https://discord.gg/EsD6G3R7>



<http://bit.ly/3UxyEk8>

GAMES | MISSIONS | PRIZES

Questions/Info? Email WIST@mc3.edu

Innovative Solutions



Innovative Marketing / Obj. 1, 2, 3

A focused and persistent social media marketing campaign was launched on March 27, 2023. With a goal of posting daily, content will consist of promoting/highlighting collaborations, encouraging students to obtain certification, and marketing of partner events, activities, and PC4A provided student benefits.



PC4A
@PC4ASTEM

Interested in a career in cybersecurity? Learn how to build and secure computer networks with a degree from our PC4A Partner @mccc! Visit mc3.edu for more information, Summer 2023 registration is now open! [#DoDSTEM](#) [#Cybersecurity](#)



PC4A
38 followers
3w • 🌐

One of the goals of the PC4A project is promote collaboration among PA Community Colleges, which is why all our partners meet virtually every other week to discuss ideas, progress, and upcoming activities. It's truly special to see educators from all over the state collaborating to strengthen our nation's cybersecurity and STEM workforce! A big thank you to [DoD STEM](#), [Waleed Farag](#), and [Indiana University of Pennsylvania](#) for bringing us all together!

April-May Social Media Posting Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
3/27/2023 Twitter Program Promo Bucks	3/28/2023 Facebook Program Promo Bucks	3/29/2023 Twitter Saturday Stats Annual Salary	3/30/2023 LinkedIn Career Spotlight Data Scientist	3/31/2023 Facebook Career Spotlight Data Scientist
4/3/2023 Twitter Misc WCCC FPD Event	4/4/2023 Twitter Transfer Info Cost Savings	4/5/2023 LinkedIn Transfer Info Cost Savings	4/6/2023 Twitter Misc PHCC FPD Event	4/7/2023 LinkedIn Misc PHCC FPD Event
4/10/2023 LinkedIn Collaboration PC4A Meeting	4/11/2023 Facebook Misc PHCC FPD Event	4/12/2023 Twitter Program Promo BC3	4/13/2023 Facebook Program Promo BC3	4/14/2023 Twitter Saturday Stats Comptia Certs Stats
4/17/2023 Twitter Misc PHCC FPD Event	4/18/2023 LinkedIn Misc PHCC FPD Event	4/19/2023 Facebook Misc PHCC FPD Event	4/20/2023 Twitter Transfer Info Earning Potential	4/21/2023 LinkedIn Career Spotlight TBD
4/24/2023 LinkedIn Collaboration PC4A Meeting	4/25/2023 Facebook Program Promo MCCC	4/26/2023 Twitter Program Promo MCCC	4/27/2023 LinkedIn Transfer Info Earning Potential	4/28/2023 Twitter Saturday Stats Workforce Gap
5/1/2023 Twitter Program Promo NCC	5/2/2023 LinkedIn Career Spotlight TBD	5/3/2023 Twitter Transfer Info Auto Admissions	5/4/2023 Twitter Saturday Stats Open STEM Jobs	5/5/2023 Facebook Career Spotlight TBD
5/8/2023 LinkedIn Collaboration PC4A Meeting	5/9/2023 Twitter Program Promo PHCC	5/10/2023 LinkedIn Transfer Info Auto Admissions	5/11/2023 Twitter Transfer Info Road to Bachelors	5/12/2023 Facebook Program Promo NCC
5/15/2023 LinkedIn Career Spotlight TBD	5/16/2023 Facebook Career Spotlight TBD	5/17/2023 Twitter Program Promo WCCC	5/18/2023 Facebook Program Promo WCCC	5/19/2023 Twitter Career Spotlight TBD
5/22/2023 Twitter Transfer Info Top 5 Benefits	5/23/2023 LinkedIn Transfer Info Top 5 Benefits	5/24/2023 Facebook Saturday Stats Required Cert Jobs	5/25/2023 Twitter Saturday Stats Required Cert Jobs	5/26/2023 LinkedIn Career Spotlight TBD
5/29/2023 Facebook Career Spotlight TBD	5/30/2023 Twitter Program Promo Bucks	5/31/2023 Facebook Program Promo Bucks		

Follow us on Social Media!



Twitter
@pc4a-stem



LinkedIn
/pc4a



Facebook
/pc4astem

Curriculum Alignment

Obj. 2

- Collaborate to align the curricula at participating CCs in the areas of cybersecurity and STEM with those offered at various four-year schools including the LO.
- Create agreements between CC's and IUP to ensure implementation of the 2+2 model.

Effective Mentoring/Tutoring

Obj. 1, 2

- Provide needed resources and staff to implement focused mentoring/tutoring services in the areas of cybersecurity and STEM. This will enhance the chances of students successfully completing their degrees and ensure they are equipped with the skills and knowledge needed in these changing fields.

NORTHAMPTON
COMMUNITY COLLEGE

NOW HIRING!

- STEM Student Success Specialist
- Outreach Coordinator
- STEM Tutors

APPLY NOW!

Innovative Solutions

Soft Skills Enhancement Obj. 1, 2

- Implement a centralized service through the LO designed to enhance soft skills and provide trained peer tutors to assist students one-to-one as they practice and refine their skills.

PC4A
PA Community College
Consortium Cooperative Agreement

Welcome

Please complete this form to schedule a tutoring session with the IUP Writing Center.

START →

Kathleen Jones White Writing Center

BUSINESS WRITING & SOFT SKILLS WORKSHOPS

Expand your writing and soft skills by attending the free workshops offered by the Kathleen Jones White Writing Center!

Workshops are held via zoom from 7:00-8:00pm.

Scan the QR code to join a session, or contact w-center@iup.edu for more information

Month	Date	Workshop Title
FEBRUARY	8	Strategic Language for Professional Communication
FEBRUARY	22	Resume Writing Workshop
MARCH	1	Cover Letter Workshop
MARCH	22	Intro to Technical and Professional Writing
APRIL	12	Selling your Proposal in Professional Settings

PC4A **IUP**
PA Community College Consortium Cooperative Agreement

NEED HELP WITH WRITING, RESEARCH, OR PRESENTATIONS?

SCHEDULE A FREE SESSION WITH THE IUP WRITING CENTER

Sessions offered online via zoom, or request your assignments to be reviewed via email!

Visit tinyurl.com/pc4atutoring to schedule a session, and visit www.pc4a.org for more information.

The PC4A Project is funded by the U.S. Department of Defense

Students can schedule tutoring sessions through an [online form](#):

Please select your institution:*

- Bucks County Community College
- Butler County Community College
- Montgomery County Community College
- Northampton Community College
- Penn Highlands Community College
- Westmoreland County Community College

Tutoring Options

eTutoring

Select this option for tutoring if you're requesting feedback for a paper or assignment. Tutors will communicate with you via email to provide feedback and assistance. Please note: if you select this option for tutoring, there is no direct interaction between tutor and tutee. If you require direct interaction, please select Online Tutoring.

Online

Select this option for tutoring if you would like to schedule a one-on-one online tutoring session (offered via Zoom).

Would you like a copy of your session report emailed to your instructor?*

Yes No

← PREVIOUS NEXT →

Tuesday - 3:00PM*

02/21/2023 Tuesday, February 21 3:00 PM

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

← PREVIOUS NEXT →

What are your main concerns about this assignment?*

← PREVIOUS NEXT →

Next Steps:

Keep an eye on your inbox for a confirmation message from Indiana University of Pennsylvania (noreply@mywconline.com). Please do not hesitate to reach out to us if you have any questions in the meantime.

Lydia Taylor
PC4A Grant Manager
ltaylor@iup.edu
724-989-5355

Dana Minser
IUP Writing Center Administrative Support
dminser@iup.edu

Click Submit below to complete this form.

← PREVIOUS SUBMIT

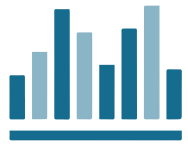
Strengthened Relationships with DoD and DIB Agencies

Obj. 3

- Build on the relationships between IUP and other DoD agencies as part of the CySP program.
 - For example, senior personnel from NAVSUP will visit IUP on April 11th to explore opportunities for collaboration and publicize employment opportunities to students.
- Work with local DIB entities such as the National Center for Defense Manufacturing and Machining (NCDMM) and Concurrent Technology Corporation to better understand their needs and customize our services accordingly.
- Recruit members from DIB entities to serve on advisory boards at various participating institutions to offer advice on updating curriculum to better equip CC students.



Project Highlights



Collection and
Analysis of
Baseline Data



Distribution of **100**
Virtual Lab
Software Vouchers



First Annual Public
Cybersecurity
Community Event



Distribution of
50+ Scholarships



200+ Tutoring Sessions Held for STEM Students



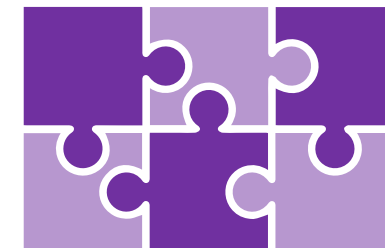
Four Faculty Development Workshops Offered



Five Certification
Prep Workshops Held



Distribution of **25**
Certification Vouchers



Collaborations with over **30**
k-12 Institutions, DoD
Agencies, and Private
Corporations

Lessons Learned Thus Far

1 Focus on Relationships

The experience of the LO working with CCs on previous projects has proven crucial for establishing a truly collaborative consortium. Establishing a connection to the K-12 ecosystem has also enabled a steady pipeline of students.

2 Plan Ahead

Allow plenty of time to secure IRB approvals for all partners and establish a baseline with partner data to properly assess various project performance metrics.

3 Utilize Social Media

Utilize social media to connect with younger generations. Create a posting schedule and engage with all related accounts including partners, collaborators, funding agency, etc.

4 Meet Regularly

Bi-weekly meetings have allowed all partners to stay on top of tasks, collaborate on projects, and overcome challenges.



KNOWLEDGE

CHECK!



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**POLL
OPEN**

How many community colleges are part of the PC4A project?

1. 2

2. 4

3. 6

4. 8

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**POLL
OPEN**

Which of the following is NOT one of the STEM education challenges identified by the PC4A team?

1. Marketing
2. Retention
3. Financial/Personal
4. Equipment

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**POLL
OPEN**

What is the main reason the PC4A Team is utilizing Social Media in their marketing efforts?

1. It's economical.
2. It offers a method of communication with younger generations.
3. It allows for collaboration between members, employers, and government agencies.
4. It is efficient.

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POLL
OPEN

Which of the following is NOT one of PC4A's main objectives?

1. Increase certification rates
2. Increase transfer rates to 4-YR institutions
3. Increase relationships with K-12 institutions
4. Increase interest in employment with DoD, DIB, and STEM

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**POLL
OPEN**

IUP (the LO) is offering which of the following centralized services?

1. Certification Training
2. Technical Tutoring
3. Mentorships
4. Soft Skills Tutoring

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**POLL
OPEN**

Hands-on labs will be provided to students using which of the following platforms?

1. TestOut
2. ACI Learning
3. JB Learning
4. Cyberbit

Focus

- The PC4A Project established a dynamic, collaborative consortium of six community colleges to enhance cybersecurity and STEM education.
- Proudly funded by the DoD National Defense Education Program.

Objectives



Activities/Solutions

- Project activities include innovative marketing, soft skills tutoring, certification preparation, faculty professional development, hands-on labs, and targeted retention services, among many others.

Questions?