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Hosting Undergraduate Collegiate Cyber Competitions For Hanscom AFB To Increase Interest In Air Force Cyber Civil Service

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University of Massachusetts Lowell Applied Research Corporation (UMLARC) Cyber Challenge Final Report for Grant No. FA9550-22-1-0443

Hosting Undergraduate Collegiate Cyber Challenges for Hanscom AFB to Increase Interest in Air Force Cyber Civil Service

Background

The University of Massachusetts Lowell Applied Research Corporation (UMLARC) proposed to host a half-day event targeted towards rising sophomores who are defined as cyber-curious. The intent was to reduce perceived barriers to the cyber field while promoting building of skills / experiences and building confidence and continued involvement / interest. A secondary goal was to promote government civil service positions and internships at Hanscom AFB to validate the potential for increased cybersecurity student engagement. This event was designed as a foundation to establish a collaborative relationship between the Air Force, University of Massachusetts Lowell (UML), and the Northeast Collegiate Cyber Defense League (NECCDL).

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Event Overview

UMass Lowell hosted the event at the Northstar Campus on October 29th, 2022. Over 141 participants from around New England signed up. Registered students came from a range of STEM programs including computer science, information technology and networking, management information systems, as well as digital forensics and cyber security. A supportive staff of Air Force volunteers and cybersecurity club students ensured that students were able to identify and complete challenges.

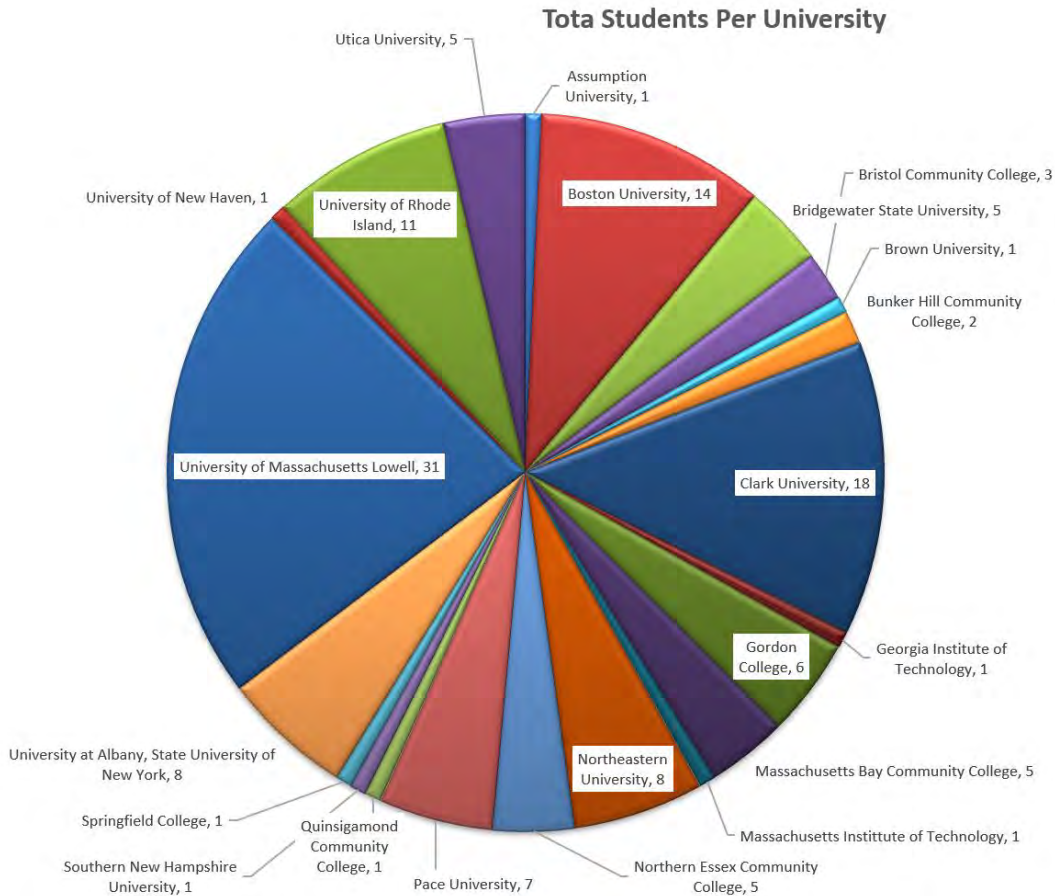


Figure 1 University Affiliation of Registered Students

The event was well attended by the Air Force, academia, and industry. Joseph F. Bradley, Jr, Director, Cyber Resiliency Office for Weapon Systems and Brian A. Kropa, Technical Advisor, Advanced Cyber Technology spoke about the importance of cybersecurity skills for the Air Force. Fred Martin, Associate Dean of UML Lowell Kennedy College of Sciences, and Rich Wissler, Director of Business Development for the US Air, Force Science Applications International Corporation (SAIC) spoke about opportunities for employment and internships in the defense sector.

Impacts and Lessons Learned

UMLARC sent a survey to all students after the event and 77 participants responded. The event was an overall success as participants gave a combined ranking of 4.5 out of 5. The key positive takeaways include:

- There is a significant demand for entry level “cyber challenge” events as an alternative to competitions
- Students from across New England and in many different disciplines are interested in engaging with the Air Force at specialized cyber recruiting events
- The challenge sets provided were engaging and meaningful for both entry-level and experience participants

Some of the lessons learned include:

- More preparatory work is required to structure challenge tutorial and pre-event materials
- Some of the event logistics, such as microphones and audio, could be improved
- Better and more detailed demographic data should have been collected

Overall, both UMLARC and NECCDL were pleased with the outcomes and plan on pursuing additional funding to continue the event. Hanscom AFB has expressed interest in funding future events through the Education Partnership Agreement (EPA) or Partnership Intermediary Agreement (PIA).

Participant Feedback

77 Student participants provided feedback and rated the cyber challenge highly with an average score of 4.5 out of 5.

Air Force Cyber Challenge 2022 Event Rating				
How would you rate the opening speaking program?	How would you rate the cyber challenge events?	Opportunities to network and socialize	How would you rate the quality of campus facilities?	How would you rate the event overall?
4.35	4.35	4.31	4.85	4.5

Select Student Comments

Select Competition Feedback				
#	What worked well?	Is there anything you'd want to see added to the cyber challenge?	What didn't work well or could be improved?	Is there anything else you would you like us to know?
1	challenges are from beginners to hard, really helpful to start the career in cyber security	I think the format is pretty good for a beginner competition. Even if it is not a competitive event it would be nice to have some kind of way to submit answers and get points/or just verify that they are correct.	The microphone situation could be improved. Maybe a stand mic and a central location. The onboarding could've been improved. Some communications regarding responsibilities should be discussed earlier.	I had an amazing time!!! I for sure will look into a career in cyber security after graduation, thank you so much for the opportunity!!!
2	The documentation was very helpful in leading us in the right direction. Staff were also very helpful, not giving us direct answers but helpful hints. I also like the progression of challenges like how it was a story.	More information on the jobs available. I was given a general pamphlet, but I would really like more concrete knowledge about how to get a job here.	the labs weren't stable and the guidance documentation wasn't helping a lot . The infrastructure wasn't stable only one user from the whole team was able to access and the others have to watch him. The challenge scope was depending on one technology which is Dockers. Even if when we read the solutions, it was little bit tricky, for example	This event made me more excited about cybersecurity and continuing to learn. Thank you for hosting a great event! Looking forward to it in the future!

			challenge 2. The system is actually fedora which won't have apt option and we have to use Yum. If the challenge for beginners then the solution sheet should be more clear.	
3	Challenges were good, I liked how they built on each other and provided a gentle introduction into containers. Also that the challenge machines were provided and each team member was able to login concurrently.	As someone who had zero experience in cyber security a walk through pdf would for sure be of help. Like something with terms and walk through as a little bit more in detail.	As a elementary cyber security person, it would have been helpful to have more context/information to start the exercise. I understood it from a 1000 foot view but really didn't understand it at all...especially going straight into Linux to code. For the "cyber curious" I was lost for a good bit of time. One suggestion would be to identify level in the registration process and team those that are beginners with those that are experts/higher level so a bunch of beginners don't get stuck together. Another idea would be to team a staff/faculty/student mentor with each group to guide the students in the activity. That way we don't have to wait for roamers to come help and we could progress a bit quicker. Additionally, maybe we could walk through an exercise together? It would also be helpful to know which activities could be done individually vs ones that can only be done by 1 person. My group sometimes stumbled upon each other because we all were executing the same code that should have only been done by one person.	This event is interesting. I want to come back again. Next time, I will be better prepared.
4	I think this was very well in terms of interactive, and I think with there not being a score it was a lot less stressful than other competitions	Maybe more challenges, maybe physical challenges would be interesting. (such as similar to real life scenario situation simulations.		I would like to thank you so much for providing such an opportunity to challenge our skills to learn new things within a small time frame. Big Thanks From Canada. Definitely , I will come again

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5	The welcoming was perfect and the into speech were very rich. Although the event needs more organizing from the technical perspective but the concept itself is something I really appreciate.	A walk through of an activity or a better explainer on what we were doing. We had the basic concept in a slide but it would have been helpful to see conceptionally what we were doing. The intro explainer was brief and could have been expanded on a bit more for the participants to have a greater understanding...especially those of us who are "cyber curious". If I didn't already have some cyber security classes under my belt, I would have been completely lost.		This was a REALLY great program and I really enjoyed it along with the opportunity to take part in this. I was able to put some of the things that I have read about/done labs on in classes to practice. Even though I didn't understand all of the details, some things clicked as we went through the different exercises.
6	The challenges were interesting, I especially appreciated how beginner friendly the competition was and I believe it will encourage more beginners to participate.	Pre information and steps for previous competitions provided to students.	More information beforehand	The competition went really well, and it was a lot different from other competition as most of them are high intensity, well this competition was extremely lay back. Which made it a different experience, but it was still fun

Event Photographs



Figure 2 Introduction from Joe Bradley, CROWS SES



Figure 3 Students Listening to Open Presentations



Figure 4 Students Working on the Cyber Challenge



Figure 5 Students Gathered Around Edward Lee, Hanscom Technical Recruiter

Select Senior Executive Feedback

Thank you for consolidating the LinkedIn posts!

Speaking just for myself, I believe it was a FANTASTIC event!! Well organized, great participation from around the region and an awesome opportunity for us to get the message out from the University, Commonwealth, Industry Partners and the Air Force.

I'm hopeful that many of the people that participated will consider a career with one of the partners they interacted with at the event.

joeB

Joseph F. Bradley, Jr., SES, CISSP, PMP

Director, Cyber Resiliency Office for Weapon Systems (CROWS)

Director of Engineering and Technical Management, Hanscom Air Force Base, Air Force Life-Cycle Management Center

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Top Social Media Posts

The event was mentioned on social media several times:

- Rich Wissler, SAIC, engaging with students - https://www.linkedin.com/posts/rich-wissler-pmp-3985493_cyber-uml-usaf-activity-6992142684811337728-NGCD?utm_source=share&utm_medium=member_desktop
- Students listening to introductory speeches - https://www.linkedin.com/posts/matthewmcswain_cyber-activity-6992138139511181313-GJV?utm_source=share&utm_medium=member_desktop
- Students working on challenges - https://www.linkedin.com/posts/matthewmcswain_cyber-research-uml-activity-6992139668121124864-usPM?utm_source=share&utm_medium=member_desktop
- Students meeting with Mr. Ed Lee, Hanscom AFB Technical Recruiter - https://www.linkedin.com/posts/matthewmcswain_happening-at-northstar-camps-todaymr-ed-activity-6992154213153652736-pi T?utm_source=share&utm_medium=member_desktop

Attachments

- **Air Force 2022 Cyber Challenge Eventbrite** - Event registration details
- **Air Force 2022 Cyber Challenge Feedback** - Participant event feedback
- **Air Force 2022 Cyber Challenge Deck** – Deck used for managing cyber challenge
- **AF-2022-Materials** - Cyber challenge materials completed by students