QUARTERLY REPORT #6

(FINAL PROJECT REPORT)

HAMPTON ROADS CYBERSECURITY EDUCATION, WORKFORCE, AND ECONOMIC DEVELOPMENT ALLIANCE (HRCYBER)

"BRIDGING THE CYBERSECURITY TALENT GAP IN HAMPTON ROADS"

April 2018

Hampton Roads Cybersecurity Education, Workforce and Economic Development Alliance

Hampton Roads Cybersecurity Education, Workforce, and Economic Development Alliance (HRCyber)

Quarterly Report #6

April 2018

Program Lead(s):

Principle Investigators – Dr. Brian Payne (PI) and Dr. Mary Sandy (Co-PI)

Project Manager – John Costanzo

Partners

College of William and Mary
ECPI University
Norfolk State University
Old Dominion University
Thomas Nelson Community College
Tidewater Community College
City of Virginia Beach Public Schools
Hampton City Public Schools
Newport News Public Schools

City of Hampton Economic Development
Cyber Protection Resources
Hampton Roads Economic Development Alliance
ISSA-HR
Jefferson Lab
Office of Commonwealth of Virginia
House of Delegate Ron Villanueva
Opportunity, Inc.
Reinvent Hampton Roads
United States Navy
Virginia Space Grant Consortium
Virginia Beach Economic Development
Virginia Beach Hotel Association
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360IT
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CRTN Solutions (LLC)
G2-Ops
Hunting Ingalls, Newport News Shipbuilding
Klett Consulting
Obsidian Technology Group
Packet Forensics
Peregrine Technical Solutions, LLC.
Port of Virginia
SAIC
Sentara Healthcare
Sera-Brynn
StratasCorp Technologies
Towne Bank
Vostrum Holdings, Inc.
VNG Consulting

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Hampton Roads Profile

Graphic courtesy of Hampton Roads region map produced for HREDA by Seventh Point Advertising, Marketing and Public Relations

Located in a state with the second highest number of cybersecurity job advertisements in 2015, Hampton Roads (HR) covers the 14-locality Virginia Beach-Norfolk Metropolitan Statistical Area (MSA) in southeast Virginia. Hampton Roads stretches from Williamsburg to Virginia Beach, and includes Ft. Eustis, NASA-Langley, the Norfolk Naval Base, the Port of Virginia, and Naval Air Station Oceana.

The Virginia Economic Development Partnership, *Community Profile: VA Beach-Norfolk-Newport News MSA, Virginia,* states that the region's combined labor force is over 800,000 and it is home to Newport News Shipbuilding, which is the Commonwealth of Virginia's second largest employer after the Department of Defense. The region has over 120,000 students enrolled in community colleges and public and private universities; there are over 20,000 graduates annually.

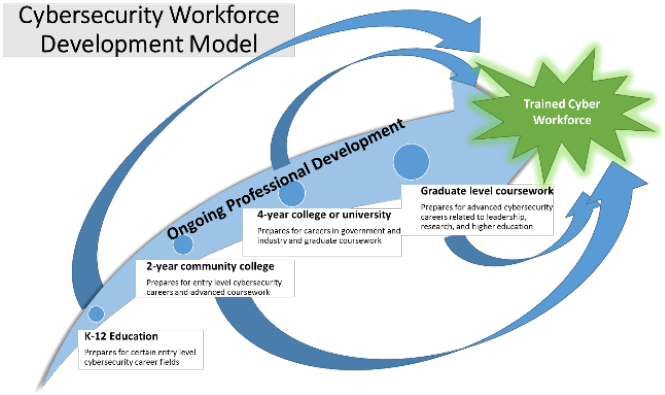
According to the Virginia Beach Economic Development Defense Profile (https://www.yesvirginiabeach.com/Key-Industries/defense/Pages/default.aspx) there are over 130,000 active duty and Department of Defense civilians working in the multiple military facilities spread across the region. Hampton Roads is also home to approximately 214,000 veterans, 43,000 of whom are retired military. Finally, over 12,000 active duty personnel transition out of the military annually in the region. This presents opportunities for employers and educational institutions to move transitioning personnel and veterans into the cybersecurity field.

The Hampton Roads Cybersecurity Education, Workforce, and Economic Development Alliance (HRCyber) offers an exciting opportunity to bring regional community assets together, an impressive group of organizations, including the region's community colleges, three large public school districts, universities, the largest private employer, several small businesses, non-profit organizations, and the advocacy and support of local government economic development offices.

Project Background

In October 2016, Old Dominion University was awarded a grant by the U.S. Department of Commerce as one of five regional alliances and multi-stakeholder partnerships (RAMPS) to stimulate cybersecurity education and workforce development under the National Initiative for Cybersecurity Education (NICE) objectives. This grant established the Hampton Roads Cybersecurity Education, Workforce and Economic Development Alliance (HRCyber).

Project Mission and Objective



Hampton Roads Cybersecurity Education, Workforce and Economic Development Alliance (HRCyber) is a partnership among educational institutions, government agencies, non-profit organizations, and private employers focused on developing educational pathways from high school through community college to four year institutions and continued professional development providing a capable and fully trained cybersecurity workforce for the region.

HRCyber aligns regional educational and skills development offerings to the workforce practices and activities of business and non-profit organizations within the Hampton Roads region with the specific goal of supporting local economic development and job growth via establishment of a multi-stakeholder alliance. This is achieved by addressing the workforce needs of cybersecurity employers by increasing the pipeline of students pursuing cybersecurity careers from high schools, community colleges and universities.

Project Goals

HRCyber four goals are aligned with the NICE strategic goals of accelerate learning and skills development, nurture a diverse learning community and guide career development and workforce planning.

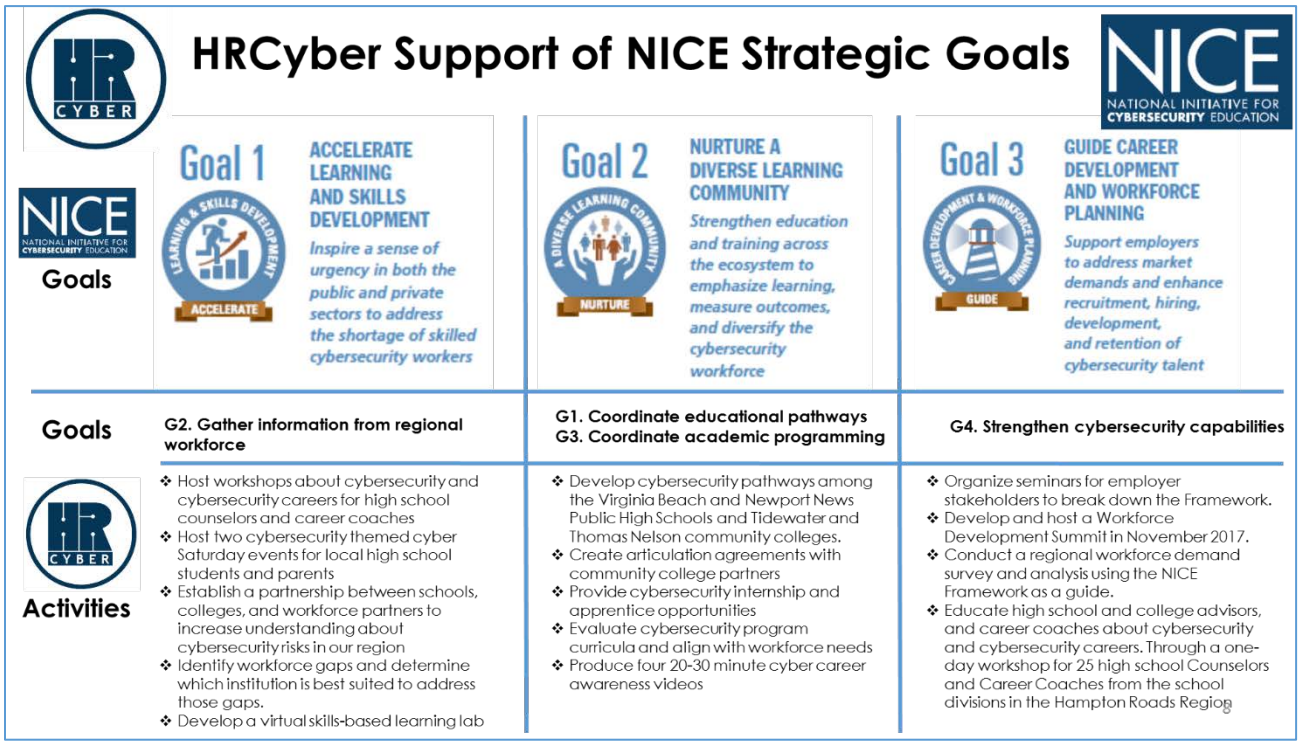
The four HRCyber goals are;

Goal 1: Coordinate educational pathways among public high schools, community colleges, and four year institutions

Goal 2: Gather information from the regional workforce about the knowledge and skills needed in cybersecurity programs and revise curricula as needed.

Goal 3: Coordinate academic programming among educational institutions and workforce

Goal 4: Strengthen the cybersecurity capabilities of the regional workforce



Project Status Report

Goal 1: Coordinate educational pathways between public high schools, community colleges, and four year institutions

Associated Activities with Goal 1	Status
Conduct monthly steering committee meetings	
Develop at least two articulation agreements (TCC-ODU agreement completed Dec 2016) (TNCC-ODU agreement completed April 2017)	
Identify curricula revisions (1st meeting held April 7, 2017)	
Create virtual lab	
Review and/or revise articulation agreements	

Goal 2: Gather information from the regional workforce about the knowledge units taught in cybersecurity programs and revise those curricula where needed.

Associated Activities with Goal 2	Status
Conduct two focus groups with employers to determine their views on cybersecurity (Completed October 2016)	
Complete cybersecurity workforce survey	
Conduct DACUM workshop and chart (Completed February 2017)	
Assess curricula revisions	
Complete cybersecurity educational survey	

Goal 3: Coordinate academic programming between educational institutions and workforce.

Associated Activities with Goal 3	Status
Conduct cybersecurity counselor workshop (completed Feb 23, 2017)	
Create HRCyber homepage (Completed October 2016)	
Train faculty on virtual lab (ODU trained TNCC faculty on virtual lab)	
Train college counselors/academic on cybersecurity programs (ODAN conference September 2017)	

Goal 4: Strengthen the cybersecurity capabilities of the regional workforce.

Associated Activities with Goal 4	Status
Develop and produce at least four cybersecurity career awareness videos	
Conduct cybersecurity Saturday series for high school students and parents (March 2017)	
Host a cybersecurity workforce development summit in fall 2017 – October 27, 2017	
Develop marketing material (HRCyber Brochure completed April 2017)	
Participate in regional cybersecurity summits and conferences	
Attend NICE conferences (2016/2017) (Attended 2016 NICE Conference)	
Provide Virginia Beach high school Interns to regional cybersecurity employers	
Provide internships and apprenticeships to regional cybersecurity employers	

Goal 1 Activities:

A central goal of this project is to coordinate cybersecurity educational pathways among those educational institutions participating in HRCyber. The primary activities associated with this goal are:

- Conduct monthly steering committee meetings.
- Develop at least two articulation agreements between the community colleges and ODU and other partner institutions.
- Create a virtual lab.
- Identify curricula revisions.

Monthly HRCyber meetings.

Since receiving this grant in October 2016, HRCyber has hosted a monthly meeting of partners and stakeholders to review the progress of the project and to highlight various accomplishments. Each month a teleconference was conducted for the steering committee with an average of 18 participants. Once a quarter a larger face-to-face meeting was held which was open to all HRCyber members or those interested in learning more about this project. An average of 40 attended these quarterly meetings. Please visit the HRCyber webpage to view all of the meeting presentations under the Documents section.

Articulation agreements.

Three articulation agreements were finalized, allowing the transfer of the Associate of Applied Science in Information Systems Technology-Cybersecurity at Tidewater Community College, Thomas Nelson Community College and Northern Virginia Community College to the Old Dominion University Bachelor of Science in Interdisciplinary Studies with a cybersecurity major. These agreements are a model that other four-year universities can use to partner with these and/or other community colleges.

These three agreements were worked out after a series of meetings with transfer advisors and administrators from each institution. The initial degree review showed that students would have needed to take approximately 170 hours to receive both the AAS and the BS in Interdisciplinary Studies with a cybersecurity major. After several meetings, faculty from the institutions crafted articulation agreements that would allow students to complete both degrees in 121-124 hours. In doing so, students will realize savings in credit hours (50), time (1.5 years) and tuition ($16,750).

The first articulation agreement was signed in February 2017 in a ceremony including the governor of Virginia, the secretaries of technology and education in Virginia, and state delegates from the Hampton Roads region. Using the same process, the articulation agreement between ODU and Thomas Nelson Community College was completed and signed in April 2017 with the Secretary of Technology. A third articulation agreement between ODU and Northern Virginia Community College was finalized and signed in November 2017.

For additional information on these articulation agreements please see the following links;

- TCC and ODU articulation agreement.
- TNCC and ODU Articulation agreement.
- NOVA and ODU articulation agreement.

Virtual Lab. The ODU cybersecurity virtual laboratory provides a secure and user-friendly environment for students to remotely engage in hands-on labs, which are a critical component of many cybersecurity courses. The enterprise Cisco routers, switches, and security appliances in the laboratory provide comprehensive protection for the laboratory as well as shield the campus network from accidental cyber-attacks. The high-end workstations, together with the Cisco networking gears, enables students to create not only virtual networks, but also real world network environments connected by physical routers and switches. Such processes emulate highly realistic cyber-attacks and defenses.

Various hands-on laboratories, from entry-level labs to advanced, comprehensive labs, have been developed and deployed in the virtual laboratory, supporting the cybersecurity courses currently offered by ODU. To provide seamless access to the ODU virtual lab for HRCyber Alliance partners, the ODU ITS (Information Technology Services) has upgraded the equipment in the lab. ODU guest accounts have been created for a list of faculty at TNCC and TCC. The partners are able to utilize web browsers to log in their ODU guest accounts, and seamlessly access the virtual lab from their guest accounts. A demonstration session was conducted in May for the faculty of TNCC, and a comparable session is planned for the TCC faculty. Feedback from all participants will be sought in order to expand the virtual lab and develop additional hands-on labs. Over 150 K-12 students used the lab as part of a series of cybersecurity summer camps and it was used by 100 ODU cybersecurity students to work on projects and other course work.

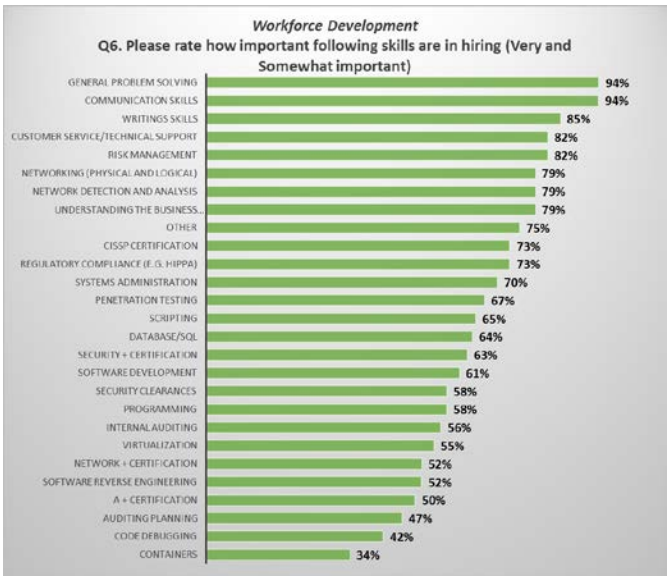
Identify curricula revisions. A workshop was held on April 7, 2017 with the educational partners to discuss tools available for reviewing their cybersecurity curricula to meet workforce needs. Information regarding the DACUM chart and the results of the cybersecurity surveys were provided for use in reviewing and revising curricula.

Goal 2 Activities:

The second goal of HRCyber is to generate an understanding about the types of knowledge cybersecurity professional need in the Hampton Roads region across the board swath of cybersecurity careers. The primary activities associated with this goal are:

- Conduct focus groups with employers to determine their views on cybersecurity knowledge units and required skills.
- Survey regional employers to assess their cybersecurity workforce needs.
- Conduct Developing a Curriculum (DACUM) workshop and develop a DACUM chart to create workforce-driven curricula.
- Survey cybersecurity educational partners.
- Assess curricular revisions.

Focus Groups. Two focus groups were conducted in October 2016 during two separate regional cybersecurity conferences with approximately 40 representatives from employers and educational institutions. The results of these focus groups were used to shape the cybersecurity employers survey.



Survey of Cybersecurity Employers. Using the results of the focus group as a guide, the ODU Social Science Research Center developed a draft survey and shared it with members of HRCyber. In November, 2016, after the survey was finalized, email invitations to complete the survey were sent to over 200 businesses, educational partners and other contacts. Those initial contacts were also asked to forward the survey link to others who might have hiring needs in cybersecurity.

Please use this link to see the complete survey results - http://securitybehavior.com/hrcyber/doc/2017_Final%20Data%20Report.pdf

Thirty-four completed surveys were returned with the following results:

- Two-thirds of the respondents came from for-profit companies.

- More than half of the respondents reported employing cybersecurity analysts, technicians, managers, engineers, and consultants, with most in the areas of consulting, cybercrime analysis, and technical support.
- Vacancies were primarily reported in the areas of consultants, analysts, and incident responders.
- Direct referrals and job seeker web services were the most effective recruitment methods.
- The positions that were most difficult to fill were engineering and analyst positions.
- Communication and problem solving skills were reported as the most critical in seeking cybersecurity personnel. Technological skills were not as important as these skills (or as important as writing skills and customer service).
- Communication skills were reported as those most difficult to find in an applicant, followed by problem solving skills, penetration testing skills, and CISSP certification.
- Only 15% percent of the respondents indicated they were very familiar with cybersecurity education programs in the region.
- More than a third of the respondents rated the community colleges and universities as fair or poor in their cybersecurity education.
- Internships, apprenticeships, and co-ops were rated favorably by respondents.
- Employers rated students' preparation in identification, protection, detection, responding, and recovery most often as fair or poor.
- New hires were rated as somewhat prepared in workplace competencies.
- Employers pointed to the need for communication skills, problem solving skills, and experiential learning.

Developing a Curriculum (DACUM).

The DACUM panel meeting was held on December 13-14, 2016 in Hampton. Coordinated by Virginia Space Grant Consortium (VSGC) and hosted by Thomas Nelson Community College, the panel identified the tasks and duties required for cybersecurity professionals in the Hampton Roads region. Ten currently working cybersecurity professionals from different employment sectors met and discussed their daily work and tasks. Led by a certified DACUM Facilitator, the deliverable from the panel discussion will be a DACUM chart for early career cybersecurity professionals. The DACUM chart was finalized in February. This DACUM chart will inform and serve as a guide to curriculum development and other project components. Use this link to view the DACUM chart - http://securitybehavior.com/hrcyber/doc/Cyber%20DACUM%20Chart%20final.pdf

Survey of Cybersecurity Educators.

To examine how educational partners viewed cybersecurity education, surveys were sent to 34 educators in February 2017, and 14 completed surveys were returned. In general, educators demonstrated the following

patterns: risk management, debugging, network detection, and writing skills were less often defined as "very important" as were problem solving and communication. Skills rated as somewhat important or unimportant most often included certification, customer service, containers, and internal auditing.

Areas most difficult to teach were software reverse engineering, penetration testing, and security clearances. Educators rated the quality of cybersecurity education as good or excellent most often for colleges. Educators were split in their ratings of public schools. In general, educators believed cyber students were prepared well for their jobs. Areas identified most often as "somewhat" or not prepared included incident response, information collection, risk management, threat investigation, security provision, business fundamentals, and oversight of cybersecurity work.

Goal 3 Activities:

The third goal of HRCyber is to improve the coordination of academic programming between educational institutions and the regional workforce. This involves developing stronger ties between each educational institution and connecting these institutions with the workforce.

The primary activities associated with this goal are;

- Conduct a Cybersecurity Counselor Workshop.
- Create the HRCyber homepage and informational brochure.
- Training faculty on the virtual lab.
- Train college counselors and academic advisors on cybersecurity programs.

Cybersecurity Counselors Workshop.

The Cyber Counselor Workshop sponsored by the Virginia Space Grant Consortium (VSGC) was held at the ODU Peninsula Center in Hampton, Va. on February 23, 2017. Twenty-seven school counselors, career coaches, Career and Technical Education (CTE) teachers from the Hampton Roads region attended. During the program, presenters representing our higher education academic partners (Thomas Nelson Community College, Tidewater Community College, Norfolk State University, and Old Dominion University) provided information specific to their academic settings on education pathways leading to a career in cybersecurity. In

addition, presenters from two of our industry partners (Sentara Healthcare and Newport News Shipyard) presented an excellent picture of the state of the cybersecurity job market in the local area. Local school partners from Newport News Public Schools, Hampton City Public Schools, and Virginia Beach Public Schools participated in a panel discussion outlining their school districts' current state of cybersecurity courses in secondary schools. Workshop participants also took part in an engaging hands-on, Dumpster Diving/Identity Theft activity. Finally, participants provided suggestions for improving the five-part cyber security career awareness video series that VSGC is developing.

Website Development. In our efforts to generate awareness about the alliance and its activities a website was created. The address of the website is: http://securitybehavior.com/hrcyber/. Material on the website was updated on an as needed basis over the past quarter. Information on the website includes current events, news stories, links to alliance partners, cybersecurity resources, and a link to our HRCyber Workforce Needs Survey. Future updates will be provided as accomplishments occur. There have been over 5600 hits on this site since launching in December 2016.

HRCyber Information Brochure. As a result of various requests from our partners an information brochure was created which provides information on HRCyber's mission and goals and it provides a detailed listing of the educational cybersecurity programs offered by several regional high schools, community colleges, and universities. Use this link to view the HRCyber information brochure - http://securitybehavior.com/hrcyber/doc/HRCyberPromobroFINAL.pdf

HRCyber Infographic. To highlight HRCyber's many achievements we developed an inforgraphic. This infographic is on the HRCyber website.

Train counselors & academic advisors on cybersecurity programs. Training for 30 college counselors and academic advisors was conducted during the Old Dominion University Advisor Network conference on September 29, 2017.

Goal 4 Activities:

The fourth goal of HRCyber is to strengthen the cybersecurity capabilities of the regional workforce. The primary activities associated with this goal are;

- Develop and produce cybersecurity career awareness videos.
- Conduct Cyber Saturday series for high school students and parents.

- Host a cybersecurity workforce development summit in fall 2017.
- Provide Virginia Beach high school interns to regional cybersecurity employers.
- Provide internships and apprenticeships to regional cybersecurity employers.
- Participate in regional cybersecurity summits and conferences.

Cyber Video Series.

The Virginia Space Grant Consortium (VSGC) developed five videos related to various cybersecurity career fields and workforce development. These videos are posted at www.vsgc.odu.edu/cyber and are available to the public. These videos were developed over several months and after 19 interviews were conducted with partners and key stakeholders. Partners interviewed for the video series included NIST, NASA Langley Research Center, Peregrine Technical Solutions, Packet Forensics, G2-Ops, AERMOR, Newport News Shipyard, Sentara Healthcare, and Langley Federal Credit Union. Each video is approximately 10 minutes in length. Topics include Cybersecurity – The Big Picture; Career Pathways; Accessing the Cybersecurity Job Field; The Cybersecurity of Things; and Protecting and Serving. Since this video series was launched it received over 4,000 visits.

Cyber Saturday at Thomas Nelson Community College

On March 11th 2017, the VSGC, in collaboration with Thomas Nelson Community College (TNCC), hosted the first Cyber Saturday program for high school students and their parents, drawing 43 students and 22 parents. Students participated in such activities as Raspberry Pi from scratch, Foot Printing and Port Scanning, Exploring LAN Technologies, Cyber Physical Systems, Wi-Fi Password Cracking, and a drone competition. While the students were engaged in those activities, parents attended sessions led by the FBI, Sentara Healthcare, TNCC, and VSGC. Parents also participated in the dumpster diving/identity theft activity led by TNCC.

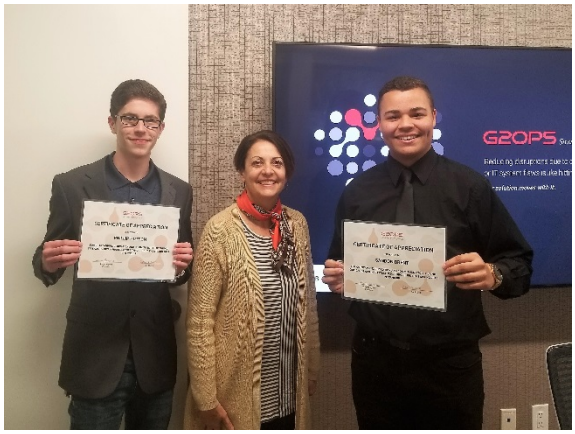
Cyber Saturday at Tidewater Community College

On March 25th, VSGC led a second Cyber Saturday event, hosted by Tidewater Community College (TCC) and held at the Advanced Technology Center (ATC) in Virginia Beach. Forty-nine high school students and nineteen parents attended the event. Industry partners (Packet Forensics and Newport News Shipyard) and academic partners (TCC, Old

Dominion University, and Virginia Beach Public Schools) led the students in such activities as Wi-Fi Password Cracking, Capture the Flag, Foot Printing, Port Scanning, and Cyber Physical Systems (including drones). Parents participated in a question-and-answer session with a representative from an industry partners (Sera-Brynn), and TCC representatives presented information about admissions procedures and cybersecurity programs at the community college. Afterwards, parents were able to join students in their classrooms. Volunteers from Virginia Beach Public Schools and the Computer Club at TCC, as well as others, helped with the event.

High School Internships.

Virginia Beach City Public Schools' Technical and Career Education department working to create industry internships for high school students enrolled in Advanced Technology Center (ATC) classes for Cybersecurity & Network Administration, CISCO Networking, Computer Systems Technology, and Software & Game Development. These internships are professionally and financially supported by HRCyber. HRCyber provided funds for 20 Virginia Beach City Public School high school students to participate in 30-hour cybersecurity internships in the cybersecurity field. Internship students are in their junior or senior year of high school; they have or are pursuing certification; and they come from one of three programs: Network Administration and Cyber Security, Cisco Network Engineering, and Computer Systems Technology.



Cybersecurity Apprenticeships.

HRCyber's partners, Peregrine Technical Solutions and Tidewater Community College, have developed the first cybersecurity apprenticeship program in Virginia. They have two cyber apprentices, one in Alaska and

one in Virginia, completing this program. They are completing their course work online with Tidewater Community College's Associate of Applied Science in Information Systems Technology. HRCyber is working with other employers to expand this apprenticeship program within the region.

"The internship has been a fantastic avenue of experience! I have learned so much in the six months I have been there and I have become very confident in the roles of a security analyst."
ODU Intern with Sentara

Industry Internships. Through the VSGC's Commonwealth STEM Industry Internship program (CSIIP), HRCyber is working with local cybersecurity employers to identify internship opportunities and to place interns within their companies. HRCyber is also assisting with CSIIP registrations and determining specific needs for targeted recruitment for ideal student candidates for the internships. A number of cyber security classroom and information sessions have been provided to students and faculty from Hampton Roads schools and others. Twenty-six interns were placed with various companies across the region, with eight students placed at Sentara Healthcare in a new internship partnership.

VBCPS 2017 STEM Robotics/Maker Expo/Cybersecurity Challenges.

HRCyber participated in the Virginia Beach City Public School (VBCPS) 2017 STEM Robotics/Maker Expo/Cybersecurity Challenges on June 8, 2017. The STEM Trifecta is an initiative created by the Office of Technical and Career Education (TCE) that allows elementary through high school students, teachers, mentors, administrators, and industry and community partners to join together to create and promote STEM and entrepreneurship awareness through project-based learning activities. Over 1000 elementary, middle school and high school students attended this year's event. HRCyber partners provided judges for various challenges and awarded $500 to the winning school of the cybersecurity challenge. Two teams tied for first place in this challenge – Advanced Technology Center and Ocean Lakes High School. To learn more about this event please visit the STEM Tri-fecta website - http://www.vbstemtrifecta.com/

Virginia Beach Economic Development Cybersecurity Round Table Discussions.

One positive outcome of this project is the linking of multiple cybersecurity stakeholders within the region together at various meetings and events. Starting in November 2016, HRCyber participated in a series of round table discussions related to growing the cybersecurity workforce in the region. These discussions are hosted by the City of Virginia Beach Economic Development and the office of State Delegate Ronald Villanueva. As a result of these meetings several new employers became involved with HRCyber.

2017 Regional Cybersecurity Conference.

HRCyber partnered with Thomas Nelson Community College to host a regional cybersecurity conference on October 13, 2017 in Hampton.

HRCyber Cybersecurity Workforce Summit.

HRCyber held a Cybersecurity workforce and economic development summit on October 27, 2017, in Virginia Beach with over 100 attendees representing K-12 school districts, community colleges and universities, local, state and federal organizations, non-profit organizations, and cybersecurity employers. The keynote speaker was State Senator Frank Wagner. The purpose of the summit was to highlight the achievements of HRCyber and its partners and to provide information to the public on cybersecurity education programs and employment in the region. A series of panels were held focusing on educational pathways, internships and apprenticeships, industry and educational survey results, Virginia Space Grant Consortium activities associated with HRCyber, and finally a workforce and economic development panel. The program for this summit can be viewed using this link - http://securitybehavior.com/hrcyber/doc/Summit%20Program.pdf

Other Highlights and Accomplishments:

Additional grant and funding opportunities. As result of the positive impact HRCyber Alliance is having across the region, over $3.2 million in additional grants funds were awarded to Old Dominion University and additional funding opportunities are being developed across all educational institutions.

A sub-group was merged with HRCyber to prepare a proposal for state funding via the Go Virginia Initiative. This group consists of HRCyber partners and is looking at partnering with Southwest Virginia to expand cybersecurity workforce development initiatives across the state. The proposal was approved by the Go Virginia Region 5 committee in November 2017 for full funding, $1.28 million for two years, and was submitted to the Go Virginia State Board for final consideration of funds. The Go Virginia State Board approved this project along with four others during their December 12, 2017 meeting. The HRCyber Co-Lab was approved for two years of funding totaling $1,285,426 – $642,713 per year. This funding will allow HRCyber to continue to develop and expand the cybersecurity ecosystem within Hampton Roads and other regions across Virginia and to formalize the organization. The project will focus on four pillars – outreach through a Virginia Cyber Trail which will allow collaboration between educators, researchers, employers across Virginia; innovation through industry collaborations by connecting industry to academic and federal labs and technologies to accelerate innovation and technology; commercialization through the Cyber Arena that will be a highly-advanced collaboration hub providing a virtual environment for stakeholders to test and analyze cybersecurity techniques and new technologies; and jobs creation and workforce development through Digital Entrant programs that take current internships and apprenticeships and expand them to accelerate placement of transitioning military and graduates to open cybersecurity jobs. Please use this site to see the Go Virginia press release regarding this and the other approved projects – http://govirginia.org/2017/12/go-virginia-board-approves-first-grants/.

Old Dominion University faculty also submitted proposals and were awarded grants related to national cybersecurity initiatives, including the following:

- The Engineering Management and Systems Engineering researchers were awarded $115,000 through The National Security Agency Cybersecurity Core Curricula Development Grant to develop a course in cybersecurity risk management to support the President's Cybersecurity National Action Plan. https://www.odu.edu/news/2017/6/nsa_grant#.WjKNh2eWypo

- The Department of Electrical and Computer Engineering was awarded a three-year, $360,000 NSF Research Experience for Undergraduates (NSF REU) program. This grant will provide 10 undergraduate students from across the country with research opportunities

in cybersecurity during the 10-week summer program. https://www.odu.edu/news/2017/4/nsf_undergrad_resear#.WjKM7GeWypo

- Old Dominion University was awarded a multi-year National Science Foundation grant of $500,000 to address cybersecurity workforce shortages through increased educational and training opportunities. This grant will continue some of the work started with HRCyber's emphasis on developing articulation agreements and educational pathways to assist in filling the multitude of open cybersecurity positions within the region and state. https://www.odu.edu/about/odu-publications/insideodu/2017/11/30/topstory2

- Old Dominion University was awarded a five-year National Science Foundation grant of $1,000,000 to provide 18 scholarships to low-income students in the cybersecurity program as part of the S-STEM Track program. http://www.odu.edu/news/2018/4/cybersecurity_grant?utm_source=homepage&utm_medium=interactive&utm_campaign=HP-Slider#.WstxEWeWypo

Old Dominion also has two NSF grants pending.

- The Scholarship for future workforce in information security, analytics and entrepreneurship is a 5 year proposals totaling $1,000,000. This project will create a scholarship fund for up to 60 students per year ($10,000 each) pursuing Information Systems and Technology or Enterprise Cybersecurity degree programs.

- SaTC (Education): An interdisciplinary examination of cybersecurity pathways between regional higher education institutions is a 2 year project totaling $300,000. This project will study and evaluate the success of the NICE RAMPS grant (HRCyber) and further its efforts to strengthen the pathways established as part of the NICE RAMPS grant.

New Academic Programs. Starting in fall 2017 Old Dominion University began to offer two new Bachelor of Science Interdisciplinary Studies majors in cybersecurity – cybercrime and cyber operations. In addition to these two new majors, ODU also started a Bachelor of Science in Business Administration–Information Technology, with a focus on enterprise cybersecurity. ODU is also working on approval for a Master of Science Cybersecurity degree with the intent of offering this degree program in fall 2018.

Other Cybersecurity initiatives/Achievements in the region.

Regent University opens a state-of-art cyber range training center in a partnership with Cyberbit Ltd., in October 2017. https://www.regent.edu/news-events/regent-university-launches-state-art-cyber-range-training-center-cyberbit/

Thomas Nelson Community Colleges receives designation as a National Center of Excellence in Cyber Defense Education in August 2017. http://tncc.edu/news/thomas-nelson-community-college-receives-designation-national-center-excellence-cyber-defense

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For additional information on HRCyber accomplishments please visit the webpage at http://securitybehavior.com/hrcyber/ or contact Dr. Brian Payne (bpayne@odu.edu) or John Costanzo (jcostanz@odu.edu).