

The Commonwealth Cyber Initiative CoVA CCI Node Quarterly Update for 1st Quarter, Fiscal Year 21 (FY21)

General

COVA CCI focus during the 1st Quarter of FY 21 was on continuing the five funded cybersecurity research projects, finalizing the hiring of the research scientists, and preparing for the next round of student experiential learning opportunities and upcoming request for proposals.

- COVA CCI researchers continue to apply for and receive grants from both federal, state, and private industry for their cybersecurity research. As of the end of the 1st quarter an additional \$2.5 million in research grants have been awarded to ODU, NSU, and W&M.
- The five research teams, consisting of researchers from Old Dominion University, William & Mary and two business partners have continued their research projects. Each project team made a presentation summarizing research progress during our September 2020 Leadership Council meeting.
- As of the end of the 1st quarter, COVA CCI has hired five research scientists; three at Old Dominion University, one at William & Mary, and one at Norfolk State. One of the three ODU scientists was hired as a match.
- The first two courses developed under the Cybersecurity Curriculum Development program were submitted. New course development proposals from five additional faculty members, representing Old Dominion University, William & Mary, Paul D. Camp Community College, and Tidewater Community College, were approved for development during 2nd quarter (Fall semester).
- A second round of the graduate student experiential learning program was started in September 2020 with eight students from ODU and W&M. These students will be assisting Christopher Newport University, Paul D. Camp Community College, Innovate Cyber Challenge, and the Academic and Experiential Learning Committees.
- Twenty students were selected to participate in the second iteration of the INNOVATE Cyber Challenge. These students are from CNU, NSU, ODU, and TCC. Their work will focus on five problem statements related to cybersecurity issues. A final showcase will be held in December 2020.
- Six students, two from CNU and four from ODU, are participating in the second session of the undergraduate cybersecurity research program during the fall 2020 semester. They will present their research in December 2020.
- The Virginia Space Grant Consortium continues to support the COVA CCI student initiatives through processing student payments for the INNOVATE Cyber Challenge and undergraduate cybersecurity research program. They also are working on placing interns with employers across the region. To date we have placed 2 interns with 5 more pending. COVID-19 has slowed the placement of interns during the spring and summer months.
- COVA CCI and Old Dominion University are continuing the construction on the Cyber Innovation Part on the main campus of ODU in Norfolk. The Cyber Innovation Park offers 10,000 square feet of space and will be the future home of ODU's School of Cybersecurity and COVA CCI. This center will be hub for cybersecurity faculty, research, students, and industrial practitioners to work together and collaborate.

- COVA CCI is also investing in the COVA Share collaborative computing research/instructional lab to support cyber faculty and students from across the node.

Update on the Seven Requirements

1. External Research Grants Attracted to Support the Work of CCI

Narrative: COVA CCI researchers continue to apply for and receive grants from both federal, state, and private industry for their cybersecurity research. As of the end of the 1st quarter an additional \$2.5 million in research grants have been awarded to ODU, NSU, and W&M. Each of these grants has a PI or Co-PI who is affiliated with or received funding directly from COVA CCI and/or CCI for their research.

Figure 1: External Research Grants

External Research Grants Attracted to Support the Work of CCI			
Project Title	Sponsor	Award Organization	Amount
AI-Human Collaboration in Autonomous Vehicles for Safety and Security	NSF	ODU	\$500,000
Developing Cyber Talents to Secure DoD Cyberspace	NSA	ODU	\$75,000
Deep Learning Driven Cybersecurity Research in a Multidisciplinary Environment	NSF	ODU	\$405,000
Tangram: Scaling into the Exascale Era with Reconfigurable Aggregated "Virtual Chips"	NSF	ODU	\$213,426
Building Cybersecurity Inclusive Pathways towards Higher Education and Research (CIPHER)	NSF	ODU	\$100,000
Side-channel Eavesdropping with Motion Sensors	NATO	ODU	\$30,000
JROTC Students to Defend the Cyberspace	NSA	ODU	\$100,000
Hampton Roads NROTC Consortium Midshipman Cyber Research and Training	ONR	ODU	\$250,000

BlockFL: A Blockchain-based Fully Distributed Federated Learning Framework	Industry	ODU	\$ 84,129
Cyber Risk and Resilience Analytics	FTI	ODU/VMASC	\$330,000
Assured Cyber Supply Chain Provenance using Permissioned Blockchain	Department of Energy	ODU/VMASC	\$87,500
Cyber Resilience Metrics for Bulk Power Systems	Department of Energy	ODU/VMASC	\$75,000
Modeling Security Risk to and Resiliency of Energy Delivery Systems using Software Defined Networks, Department of Energy	Department of Energy	ODU/VMASC	\$125,000
AI Model Certification in Operational Environments	MITRE	ODU/VMASC	\$66,000
Bulk Electric Systems Supply Chain Cyber Risk Management	Department of Energy	ODU/VMASC	\$317,000
Cyber Security Center of Excellence	DoD OSD	ODU/VMASC	\$225,000
Blockchain Empowered Cyber Resilient Networked Device Identity Management Platform	CIT	ODU/VMASC	\$150,000
Advanced Instrumentation Technology Spectrum Risk Assessment	Circadence	ODU/VMASC	\$276,000
Center of Excellence in cyber security	Air Force Research Lab	NSU	\$1,000,000
Total:			\$2,533,555

2. Research Grants Awarded from the Funds Contained in HB30

Narrative: COVA CCI is providing funding under the research category for three initiatives.

1) COVA CCI is providing funding five projects through the COVA CCI Cybersecurity Research and Innovation Funding program. This program supports diverse and inclusive CPSS research efforts, with a focus on the intersection of artificial intelligence (AI), cybersecurity, and CPS technologies applied to maritime, transportation, and defense sectors. Projects were approved in April 2020 for a total of \$679,429 and will be completed in May 2021. See Figure 2: COVA CCI funded research grants.

2) COVA CCI is funding Cybersecurity Curriculum Development projects focused on identifying gaps in existing curricula and the development of strategies to fill these gaps. Two projects were funded in Q3 2020 for a total of \$20,000. An additional five projects were approved in Q1 2021 for a total of \$60,000. See Figure 3: COVA CCI curriculum development projects.

3) COVA CCI is funding a Cybersecurity Undergraduate Research Program. This program leverages the strength of research-extensive institutions to support active research participation by undergraduate students in the area of cybersecurity. Students will have opportunities to explore a variety of cutting-edge research topics, including but not limited to: Blockchain Security, Cyber Law & Policies, Human Behavior Security, Online Scams, Mobile Protection, Secure Digital Printing, Secure Internet of Things, Secure Machine Learning, Social Engineering, and Wireless Security. The selected students participate in one of the two sessions: Session 1 (04/13/2020 - 07/31/2020) and Session 2 (08/29/2020 - 12/19/2020). Each session offers a 16-week research program where a participant will work on a research project under the guidance of a faculty member and each selected student will receive a stipend of \$2500 to support her/his research and training. The call-for-participation (CFP) was announced on February 13, 2020, and 39 students applied with 18 selected to participate. Ten students completed Session 1 and six students are currently working on their research in session two. Two students withdrew from the program. See Figure 4: COVA CCI cybersecurity undergraduate research program.

Figure 2: COVA CCI funded research grants

Research Grants Awarded from the Funds Contained in HB30		
Project Title	Institutions	Amount
Leveraging AI and Machine Learning to Develop New CPSS and Workforce Development Solutions	Old Dominion University Civilian Cyber	\$150,000
Trust, Interoperability and Inclusion: A Framework for Creating Cyber-Trust in Connected Homes	William & Mary Old Dominion University	\$150,000
Encouraging Positive Changes in Cyber Hygiene Behaviors	Old Dominion University MI Technical Solutions	\$87,709

and Knowledge in the Department of Defense		
Securing IoT Devices through Power Side Channel Auditing and Privacy Preserved Convolutional Neural Networks	William & Mary Old Dominion University	\$150,000
Explore Privacy-Preserving in Deep Image Retrieval Systems	Old Dominion University William & Mary Hampton University	\$142,720
		Total: \$679,429

Figure 3: COVA CCI curriculum development projects

COVA CCI curriculum development projects		
Project Title	Institutions	Amount
Q4 2020		
Fundamentals of Cybersecurity for local governments and SME leaders	William & Mary	\$10,000
Implementing Blockchain Applications	Old Dominion University	\$10,000
Q1 2021		
Small College Cybersecurity Curriculum Enhancement Project	Paul D. Camp Community College	\$10,000
Core Legal Topics in Cybersecurity for non-lawyers	Tidewater Community, College William & Mary	\$20,000
Information Literary for Cybersecurity	Old Dominion University	\$20,000
International Cyber Policy Training and Competition	Old Dominion University	\$10,000
		Total: \$80,000

Figure 4: COVA CCI cybersecurity undergraduate research program

COVA CCI cybersecurity undergraduate research program		
Project Title	Institutions	Amount
UG Cybersecurity Research Session 1 (4/13/20 – 7/31/20)	Christopher Newport Univ, Old Dominion University, Tidewater Community College	\$30,000
UG Cybersecurity Research Session 2 (8/29/20 – 12/19/20)	Christopher Newport Univ, Old Dominion University	\$15,000
		Total: \$45,000

3. Research Faculty Recruited

Narrative: The following research faculty were recruited and hired by the COVA CCI Node in the 1st Q 2021:

- Le Thanh Tan, Old Dominion University, Ph.D., Engineering, Institut National de la Recherche Scientifique (2015).
- Rui Ning, Old Dominion University, Ph.D., Engineering, Old Dominion University (2020).
- Moeti Masiane, Norfolk State University, Ph.D., Computer Science & Applications, Virginia Tech (2020).
- Daniel Shin, William & Mary, JD, Law, William & Mary (2019) – Hired Q3 2020
- Yan Lu, Old Dominion University, Ph.D., Modeling & Simulation, Old Dominion University (2020). Hired as a match.

4. Results of Entrepreneurship and Workforce Programming

Innovation, Workforce Development and Experiential Learning Programs

Narrative: COVA CCI is supporting several programs in innovation, workforce development, and student experiential learning. These include the INNOVATE Cyber Challenge, graduate student experiential learning program, and cybersecurity internship program.

The innovation program consists of the INNOVATE Cyber Challenge. This program takes a cohort of 20 students from across the region and groups them into four teams. Each team is assigned a cybersecurity problem/challenge. They use design thinking to come up with unique solutions for this problem. A total of 40 students have participated in the program – 20 in the spring 2020 semester and 20 in the fall 2020 semester.

A second round of the graduate student experiential learning program was started in September 2020 with eight students. These students are from ODU and W&M. These students will be assisting Christopher Newport University, Paul D. Camp Community College, Innovate Cyber Challenge, and the Academic and Experiential Learning Committees. These students are able to work with institutions and faculty from across COVA CCI. For example, ODU provides a graduate student to work with Paul D. Camp Community College cybersecurity faculty and students. This experience allows these graduate students to develop new workforce habits.

The COVA CCI Cybersecurity Internship program has been impacted the most by COVID-19. To date two students have been placed – CNU student placed with Steven Baxley and TCC student placed with Peregrine Technical solutions. An additional five (5) students are pending placement over these next three months. The Virginia Space Grant Consortium is aggressively recruiting new companies and students for this program. We anticipate that placements during the fall semester will increase.

Figure 5: Innovation/Entrepreneurship Grants awarded

Innovation / Entrepreneurship Grants Awarded		
Project Title	Institutions	Amount
INNOVATE Cyber Challenge (Spring 2020)	Christopher Newport Univ ECPI University Norfolk State University	\$25,000

	Old Dominion University Tidewater Community College William & Mary	
INNOVATE Cyber Challenge (Fall 2020)	Christopher Newport Univ Norfolk State University Old Dominion University Paul D. Camp Community College Tidewater Community College	\$27,000
Total: \$52,000		

Workforce Development

Figure 6: Graduate Student Experiential Learning Program

Graduate Student Experiential Learning Program		
Project Title	Institutions	Amount
Graduate Student Experiential Learning Program (Spring 2020)	Christopher Newport Univ Old Dominion University William & Mary	\$15,000
Graduate Student Experiential Learning Program (Fall 2020)	Old Dominion University William & Mary	\$42,000
Total: \$67,000		

Figure 7: Internship program

Internship Program		
Project Title	Institutions	Amount
Internship Program	Christopher Newport Univ Tidewater Community College	\$4,950
Total: \$4,950		

5. Collaborative Partnerships and Projects

CCI Cybersecurity Research Collaboration Funding

Narrative: COVA CCI released an RFP in response to the CCI Cybersecurity Research Collaboration Funding. This program aims to create cross-pollination opportunities for cybersecurity research to collaborate across the Commonwealth. Early indications are that COVA CCI is will submit multiple project proposals with partners from across multiple CCI institutions.

6. Correlated Economic Outcomes (Jobs and New Business Formation)

COVA CCI maintains strong partnerships with industry and is working with these partners on several initiatives. Below are several testimonials from these partners on the value added by supporting COVA CCI.

Chris Shenefiel, CISCO

The collaboration with COVA CCI has been very helpful for industry partners in serving to share innovation, best practices. It has also given industry the opportunity to educate Virginia cybersecurity students, guide curricula and to contribute to research focus areas beyond our normal spheres of collaboration. I believe COVA CCI will have positive impact on the future of cybersecurity in the Commonwealth through partnerships, innovation, and collaboration that would not have happened otherwise.

Tracey Gregorio, CEO, G2OPS

Working with the Coastal Virginia Center for Cyber Innovation has opened the door for numerous opportunities, new employees and interns. I very much appreciate the open dialogue we are fostering between researchers, industry leaders, and the workforce. Based on the success to date, I anticipate that COVA CCI will have a significant impact in our region and CCI will shape the future of cyber in the Commonwealth.

Leigh Armistead, President, Peregrine Technical Solutions

I would like to write about the value of the Coastal Virginia Center for Cyber Innovation and the Commonwealth Cyber Initiative (CCI). As a robust small business, Peregrine Technical Solutions, LLC, is a thought leader within the cybersecurity industrial control systems (ICS) and the Internet of Things (IoT), supporting many federal and commercial customers... We are based in Hampton Roads and have been very closely associated with Old Dominion University for the last five years through a number of cyber research/industry initiatives to include Hampton Roads Cyber (HRCyber) as well as a board member with the Virginia Cyber Alliance. I also served on the committee that produced the CCI Blueprint, and I have been very impressed with the remarkable growth of this latest iteration, with its diverse and large parallel working groups. ODU, as the regional leader, has brought in a number of local industry leaders to provide ongoing feedback to the overall effort, and it shows in the products developed to date. In addition, the close communications between researchers and businesses, along with the vision and future plans for CCI, will undoubtedly result in a number of significant economic benefits for the Commonwealth in general. I look forward to continuing to participate in the effort as a small business thought leader.

Bobby Kenner, CEO, CivilianCyber

We have been highly impressed by the Coastal Virginia Center for Cyber Innovation (COVA CCI) and truly appreciate their support as we work to automate and scale the cybersecurity workforce pipeline. COVA CCI has provided invaluable thought leadership as well as interactive facilitation between researchers and leaders in the public and private sectors. One outcome for us has been a collaboration with the VA Beach EDA to collect feedback from over thirty regional public and private organizational leaders. The result will be an industry-driven cybersecurity workforce needs assessment that will help us deliver an effective solution. Based on our interactions and positive results to date, I have no doubt that COVA CCI is providing great benefit to the region and will continue to serve as a cyber leader throughout the Commonwealth.

Mike Ihrig, CEO, MI Technical Solutions

As MI Technical Solution has grown over the past decade and a half, we have found that we only do so with the help and constant assistance of organizations like Commonwealth Cyber Initiative (CCI). I believe that without their guidance and support, MI Technical Solutions would not have been selected as one of the [Top Workplaces in Hampton Roads](#). I am writing today to express my full support for the CCI in the Commonwealth of Virginia, as I am sure they will continue to have a significant impact in our region, Virginia and the Country. The opened dialogue and the associated contacts developed through our relationship with CCI has provided MI Technical Solutions and in particular me, huge opportunities that I could not have found elsewhere. We here at MITS are looking forward to our continuing relationship and where it might take us as we shape the future.

7. Geographic Distribution of Awards from the Funds Contained in HB30

Figure 8: Distribution of Funds across the node region

Distribution of Funds Across the Node Region	
Institution	Amount
Christopher Newport University	\$5,000
Norfolk State University	\$139,300
COVA CCI Shared Research Environment	\$600,000
Old Dominion University	\$943,258
William & Mary	\$369,971
Virginia Space Grant Consortium [1]	\$145,000
Total Committed Funds	\$2,202,529

Virginia Space Grant Consortium [1]	\$145,000
Christopher Newport students	\$29,475
Norfolk State University students	\$3,000
Old Dominion University students	\$37,500
Paul D. Camp CC	\$1,000
Tidewater Community College Students	\$12,975
William & Mary students	\$1,000
MI Technical Solutions (Sub-contract) [2]	\$39,563
Civilian Cyber (Sub-contract) [2]	\$92,000

Note 1. VSGC is supporting the internship program, undergraduate cybersecurity research program, and the INNOVATE Cyber Challenge with payments to students from different institutions across the region. Funding listed for each partner institution shows the amount of support provided to students in these programs. The total amount of \$145,000 includes student payments and administrative support.

Note 2. Old Dominion is working with MI Technical Solutions and Civilian Cyber as subcontractors for two different cybersecurity research projects. These are the amounts provided to the two companies

and are included in the overall ODU support.

Cyber Innovation Park and Shared Research Environment

Cyber Innovation Park is being developed on the ODU campus with an investment of \$2 million dollars. This includes \$500,000 in capital funds from CCI and \$1,500,000 in capital funds from Old Dominion University. This center will include about 10,000 square foot space in Monarch Hall, for housing a data center, multiple research labs, teaching labs and classrooms, meeting space, faculty offices, and a student cyber incubator. Part of the space will be reconfigurable to support cybersecurity events such as cybersecurity competitions and workshops. The Cyber Innovation Park is anticipated to be made available late spring 2021. It will become home to ODU's school for cybersecurity and COVA CCI, supporting various cybersecurity research, innovation, commercialization, and talent development efforts.

COVA CCI is investing \$600,000 in a shared collaborative research computing environment, known as COVA Share, to support the growing cybersecurity programs, academic and research collaboration opportunities, and industry partnerships. Guided by the researchers in the Coastal Virginia Center for Cyber Innovation, the computing center and network investment will support the COVA Node and enable communication to the Hub and other Nodes. The environment will lay a foundation to support 5G testbed data collection, secure storage and transfer between connected Node members and to the CCI Hub for analysis and other collaboration. It will provide access to a flexibly designed computing environment via connectivity improvements between ODU and William & Mary, and between ODU and Norfolk State University for potential collaborative efforts involving secure transfer of data between schools or secure remote access to physical or virtual hosts.

COVA CCI Node in the News

1. Richmond Times Dispatch (September 30, 2020)
[ODU's new school of cybersecurity addresses a basic human need in today's connected world](#)
2. ODU Launches School of Cybersecurity,
[Virginia Business \(October 1, 2020\)](#)
[WAVY10 News \(September 30, 2020\)](#)
[ODU News \(September 25, 2020\)](#)
3. ODU News (July 29, 2020)
[ODU Psychology Professor Tackles Poor Cyber Hygiene](#)
4. 13NewsNow (May 26, 2020)
[Virginia Students Find the keys to cybersecurity](#)
5. Inside Business (May 25, 2020)
[ODU Cybersecurity Program gives out \\$680,000 in grants](#)

6. ODU News (May 22, 2020)
[INNOVATE Cyber Challenge](#)
7. ODU News (May 14, 2020)
[ODU Receives Funding for Collaborative Projects from the Coastal Virginia Center for Cyber Innovation](#)
8. Virginia Business (April 30, 2020)
[New ODU center focuses on maritime cybersecurity](#)