



ASCENT

Academic Symposium on Cybersecurity,
Emerging Networks, and Technologies

April 14-16, 2024
Blacksburg, VA



Virginia Tech's Senior Military College Cyber Institute welcomes you to Academic Symposium on Cybersecurity, Emerging Networks, and Technologies (ASCENT)!

This is the third annual undergraduate cyber research conference put on as part of the Senior Military College Cyber Institute program. This year's event will be full of exciting student presentations related to ongoing research conducted by the six Senior Military Colleges. Virginia Tech students are joined by students from The Citadel, Norwich University, Texas A&M University, University of North Georgia, and Virginia Military Institute. We are united by our commitment to service to form the "Power of Six."

ASCENT unites our students in their pursuit of cyber research across multiple unique disciplines within the domain and showcases their endeavors to become the next generation of cyber leaders in the Department of Defense (DoD). In addition to student research, several keynotes and panels will highlight the exciting cyber opportunities in the DoD.

We hope that you enjoy your time in Blacksburg. Take this opportunity to connect with your peers from the other Senior Military Colleges - learn more about their research and your career opportunities. We are proud of you and excited to see where you go. To our partners, thank you for investing your time in these students!

Stephanie Travis, Director

Virginia Tech Senior Military College Cyber Institute (SMCCI)

PROGRAM OVERVIEW

SUNDAY, APRIL 14

6:00p - 8:00p Opening Reception & Conference Check-In

MONDAY, APRIL 15

7:00a Breakfast

8:00a Welcome & Opening Remarks

8:45a Junior Civilian Career Panel

9:30a Break

9:45a Junior Officer Career Panel

11:00a Keynote Address - Lieutenant Colonel Erik Brown

11:45a Lunch

1:15p Student Presentations

5:30p Banquet & Keynote Address - Brigadier General Reid Novotny

TUESDAY, APRIL 16

7:30a Breakfast and Poster Reception

9:30a Student Poster Presentations

11:00a Keynote Address - Dr. Wanda Jones-Heath, SES, DAF PCA

12:00p Closing Remarks & Accolades

1:00p Optional Workshops
 Information Warfare - Norwich University
 Cyber Planning - Virginia Tech

Monday, April 15

7:00a - 8:00a

Breakfast

Inn at Virginia Tech, Ballroom CDEF (main level)

8:00a - 8:45a

Welcome and Opening Remarks

Inn at Virginia Tech, Assembly Hall (lower level)

Stephanie Travis, *Director, Virginia Tech Senior Military College Cyber Institute (SMCCI)*

Dr. Eric G. Paterson, *Executive Director, Virginia Tech National Security Institute (VTNSI)*

Major General Randal D. Fullhart, *Virginia Tech Commandant of Cadets, US Air Force, Retired*

8:45a - 9:30a

Junior Civilian Career Panel

Dr. Laura J. Freeman, *Moderator - VTNSI*

Dr. Mackenzie Cosgrove - *Air Force Research Lab*

Mr. Jason Ellis - *DEVCOM Army Research Lab*

Mr. Michael Kinealy - *Navy, Dahlgren*

Mr. Alex Kyer - *Navy, Dahlgren*

9:30a - 9:45a

Break

9:45a - 11:00a

Junior Officer Career Panel

Stephanie Travis, *Moderator*

Ensign May Oberlin - *Navy Cyber Warfare Development Group*

Second Lieutenant Matthew Kusman - *Air Force Research Lab/Information Directorate*

Captain Andrew Schoka - *Army Cyber Officer, US Special Operations Command*

Captain Jeremiah Skilton - *Space Force, Space Training and Readiness Command*

Ensign Charles Valliancourt - *Coast Guard, Cyber Command*

11:00a - 11:45a

Keynote Address

Lieutenant Colonel Erik Brown

United States Air Force, Joint Task Force 3, Cyber National Mission Force

11:45a - 1:00p

Lunch

Inn at Virginia Tech, Ballroom CDEF (main level)

1:15p - 1:35p

Throwing Artificial Intelligence at Critical Infrastructure Security and Seeing What Sticks

Norwich University

Lena Anchordoquy, Ben Stark, and Ali Al Bataineh

1:35p - 1:55p

Peace, War, and Artificial Intelligence

Norwich University

Austin Ayers

Monday, April 15

1:55p-2:15p

Hosting an OSINT-focused Capture the Flag (CTF) Competition: Leveraging Creativity, Collaboration, and Artificial Intelligence

Virginia Tech

Thomas Craycroft, Ethan Dettman, Amirah Jones, Peyton Ludwig, Vivien Pang, Nicholas Viscuso, Anirban Mukhopadhyay, and Kurt Luther

2:15p - 2:35p

Critical Infrastructure of Water and Wastewater Sector

The Citadel

Christian Hines, George Honiotes, and Elisabeth Southern

2:35p - 2:55p

Sector Threat Profile for Power Critical Infrastructure

The Citadel

Jack Cooper, Kirin Chaplin, Noah Klepper, and Julius Gibson

2:55p - 3:15p

Analyzing Malware with Large Language Models

Virginia Tech

Phillip Jordan, Mark Thompson, and Jared Gregersen

3:15p - 3:35p

Classifying Malware with Machine Learning and Agent-Based Solutions

Virginia Military Institute

Nolan Savard, David Feinauer, Jaafar Alghazo, and Sherif Abdelhamid

3:35p - 3:55p

Development of an Underwater Acoustic Modem using Low-Cost SDRs

Virginia Tech

Thomas Coulon, Jace Derdarian, Evan Donohoe, Neha Mehta, Nadeem Huang, and Daniel Jakubisin

3:55p - 4:15p

Steganography Applications – Encoding Medical Records Within Medical Images

Virginia Military Institute

Benjamin Wallace, David Feinauer, Jaafar Alghazo, and Sherif Abdelhamid

Beginning at 5:00pm, a shuttle bus will be available at the main entrance of the Inn at Virginia Tech and will transport to the University Club at Lane Stadium. The bus will run continually until the banquet ends.

5:30p - 6:00p

Cocktail Reception (cash bar)

Virginia Tech University Club at Lane Stadium

6:00p - 8:00p

Banquet Dinner and Keynote Address

Brigadier General Reid J. Novotny

United States Air Force, Deputy Director, Plans and Policy, J5, U.S. Cyber Command

Tuesday, April 16

7:30a - 9:30a

Breakfast and Poster Session

Inn at Virginia Tech, Ballroom CDEF (main level)

9:30a - 11:00a

Poster Presentations

Inn at Virginia Tech, Assembly Hall (lower level)

9:30a

How Anonymous Sudan Leverages Perspective in its Cyber Operations Against Israel

Norwich University
Lucia Frezza

9:35a

Cybersecurity: Body of Knowledge

Virginia Tech
Vicky Sobot, Ansh Suchdeve, Sriram Pasupunuti and Sangmuk Kang

9:40a

Open-Source Analysis of Russian Media Headlines | Research In-Progress

Virginia Tech
Kelsea Austin

9:45a

LLMs for Situational Awareness in the Arab World

The Citadel
Jacob Wood and Deepti Joshi

9:50a

Chinese Foreign Malign Influence: Indonesia Case Study

The Citadel
Finian Butcher

9:55a

Quantum Algorithms for Cybersecurity

Virginia Tech
Medha Durisheti, Kunal Kapoor, Justin Krometis, and James McClure

10:00a

OSINT for Cyber Vulnerability Assessments of Virginia Small Businesses

Virginia Tech
Thomas Craycroft, Ethan Dettman, Amirah Jones, Peyton Ludwig, Vivien Pang, Nicholas Viscuso, Anirban Mukhopadhyay, and Kurt Luther

10:05a

AI Narrative Competition | Research In-Progress

Virginia Tech
Samuel Radocha

10:10a

Additive Machining and the Invisible Threat

Virginia Military Institute
Stacey Vargas, Durig Lewis, Shane Wise, Robert Hudson and Finnigan James

10:15a

Detecting DDoS Attacks on Electric Vehicle Charging Infrastructure

Texas A&M University
Svetlira Van Jakovich, John Hamilton, Marcus Botacin, and Christopher Lanclos

Tuesday, April 16

- 10:20a **Cyber-attacks in Water & Wastewater Sectors of Critical Infrastructure**
The Citadel
Christian Hines, George Honiotes, and Elisabeth Southern
- 10:25a **Discovering Security Breaches using Deep Packet Inspection and Image Classification**
The Citadel
Chad Dailey, Tyler Furches, Parker Langenburg, Dilon Wilson, Dylan Acosta, and Deepti Joshi
- 10:30a **Email DNA: Analyzing Writing Style to Detect Spear Phishing**
The Citadel
Joshua McKinley, Brian Mutua and Alexander Tiberghien
- 10:35a **Adversarial Machine Learning for IoT Networks**
Virginia Tech
DeNaria Fields, Shakiya Friend, Andrew Hermansen, Jiyeon Paik, Tugba Erpek, and Yalin Sagduyu
- 10:40a **SMC Hack-a-Sat**
Virginia Tech
Abdullah Khurram, Nitya Marreddy, Sammy May, Gaston Medrano-Frias, Sully Mrkva, Carson Horne, and Kevin Schroeder
- 10:45a **Covert Communication using Large Language Models**
Virginia Tech
Noah Provenzano, William Bae, Jared Gregersen, and Maice Costa
- 10:50a **Deepfake Detective: On The Effects of Watermarking and Paraphrasing in AI-generated Text Detection**
Virginia Tech
Victoria Kim, Jake McCann, Jared Gregersen, and Maice Costa
- 10:55a **Large Language Models and Honeyword Detection**
Virginia Tech
Bryn Totah and Adien Hrnjez
- 11:00a - 11:45a **Keynote Address**
Dr. Wanda Jones-Heath, SES, DAF, PCA
Harnessing the Power of People and Technology to Continue the US Competitive Advantage

11:45a - 12:00p **Closing Remarks and Accolades**

Boxed Lunches will be available outside Assembly Hall.
Feel free to grab and go if you are traveling.

1:00p - 3:00p

Information Warfare

Hosted by Norwich University

Inn at Virginia Tech, Smithfield Room (upper level)

In this breakout session, we will discuss the fundamentals of conducting research in information warfare and introduce a framework for analyzing and attributing influence operations, as developed by the NATO Centre of Excellence for Strategic Communications. Participants will learn key concepts and guidelines, before walking through a case study together. During a simulated exercise, participants will be challenged to practice this framework on a real-world example. Finally, we will review findings and discuss limitations, risks, and practical applications.

NOTE: Participants should bring their laptops or a device in order to follow along with the exercise

1:00p - 3:00p

Cyber Planning

Hosted by Virginia Tech

Inn at Virginia Tech, Duck Pond Room (upper level)

This breakout session offers an introductory exploration of tactical planning concepts tailored to military cyber operations scenarios. Participants will learn the basics of military planning processes from two experienced military officers in cyber and information operations. Participants will be introduced to three different tactical planning models from different Services (Army, Air Force, Navy, and Marine Corps) and the provided an opportunity to try out one or more of those models in a provided cyber operations scenario.

