ITEA 2016 Cyber Security Workshop
Partnering with Industry and Academia

Cyber Security Capabilities and Collaboration Opportunities @ NSU

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Topics

- Norfolk State University Overview
- Cyber Security @ NSU Overview
- Cyber Security Education Programs
- Cyber Security Research Programs
- Cyber Security Outreach and Workforce Development Programs
- Cyber Security Facilities and Equipment
- Cyber Security Partnerships
- Cyber Security Collaboration Opportunities
Established in 1935

Largest HBCU in Virginia

Academic programs
- Three Colleges, five Schools, 27 academic departments
- 1 associate degree, 30 bachelor’s degrees, 16 masters degrees, 3 doctoral degrees

Enrollment (Fall 2015)
- Total student headcount: 5,107
- Undergraduate headcount: 4,522, Graduate headcount: 585
- Female: 64.3%, Male: 35.7%
- Blacks: 83.0%, Whites: 5.1%, Others: 11.9%

Accredited by the Southern Association of Colleges and Schools
- NSU has also earned accreditation for every eligible program

Located in Hampton Roads region with many large DoD bases/facilities and personnel
NSU has significant strengths in STEM-H:

- 8 academic departments and **Army** and **Naval ROTC** programs
- Graduate programs
  - M.S. - Computer Science, Cyber Security, Electronics Engineering, and Materials Science
  - Ph.D. - Materials Science and Engineering
- Accredited programs
  - Chemistry
  - Computer Science
  - Engineering
  - Nursing
  - Technology
- Fall 2015 enrollment: 1,581
Launching Cyber Security @ NSU

- **Institute for Information Assurance Research** established in 2003
- **M.S. in Computer Science** program started in **August 2003** with emphasis in Information Assurance
- **Information Assurance Techniques for a Simulated Large-Scale Battlefield Environment** award helped to launch cybersecurity research @ NSU
  - A cooperative agreement funded by **DoD** and managed by **Army Research Lab**
  - $5.5 million for 5 years (2005-2010)
  - Multiple faculty and students involved in research
Growing Cyber Security @ NSU

- **NSA/DHS CAE in IA Education** designation granted in May 2009
  - Information Assurance Research, Education and Development Institute (IA-REDI)

- Expanding cybersecurity education programs
  - CNSS 4011 Certificate in Information Systems Security
  - CNSS 4012 Certificate Senior Systems Manager
  - A new emphasis in Computer Science: **BS. CSC. IA**

- Broadening cybersecurity sponsored programs
  - Cybersecurity Workforce Development. NNSA. $773K. 2012-2013.
  - DoD IASP. DoD. $269K. 2010-2014.
  - CyberCorps® SFS. NSF. $1.2 million. 2011-2014.
NSA/DHS CAE in IA/Cyber Defense designation granted for 2015-2020

Expanding cybersecurity education programs
- M.S. in Cybersecurity (online) started in August 2015
- Developing a Cybersecurity Minor for non-STEM majors

Elevating level of capabilities for cybersecurity sponsored programs
- DoD IASP. DoD. $48K. 2015.
Objective: To develop a K-20 pipeline for producing well-qualified cyber security professionals in significant numbers to address cyber security workforce shortage

Partners include

- 13 HBCU
- 1 school district (Charleston, SC)
- 2 DoE national labs (SNL & LLNL)
- SPAWAR (Charleston, SC)
Center Of Excellence in Cyber Security (DoD Supported)

- **Cooperative Agreement** managed by AFRL/Rome
- **Academic partners**
  - Norfolk State University (Norfolk, VA)
  - Old Dominion University (Norfolk, VA)
    Virginia Modeling, Simulation and Analysis Center
- **Mission**
  - Increase knowledge and application of cyber security based on multidisciplinary and collaborative research
  - Increase capacity in research, education, and professional development for faculty and students
- **Objectives**
  - Conduct basic research to develop a cloud-enabled, big-data-analytics-capable *Cyber Analysis, Simulation and Experimentation Environment (CASE-V)* for enhancing situational awareness and decision support for cyber defense and cyber training
  - Perform research-related education and outreach activities
COE Research Programs

- Four research thrusts
  1. Cyber intelligence and cyber defense
  2. Cyber modeling, simulation, analysis and decision support
  3. Cyber training, and intrusion detection and response
  4. CASE-V framework and test bed
COE Research Plans

- **Short-term research objectives** (12-18 months)
  - Scalable detection of APT
  - Human behavior modeling and simulation
  - Foundational APT kill-chain attack, defense and training scenarios
  - CASE-V platform technologies, integration and prototyping (v1)

- **Mid-term research objectives** (18-42 months)
  - Big data security analytics
  - Integrate L-V-C capabilities, and analysis/cognitive capabilities
  - Support advanced APT attack, defense, analysis and training scenarios
  - CASE-V Platform enhancement with big data & simulation capabilities (v2)
  - Host (controlled) events to gain experience & feedback

- **Long-term research objectives** (42-60 months)
  - Security metrics and situational response
  - Collaborative intelligence & interoperability with kinetic simulation systems
  - Comprehensive cyber defense and cyber training capabilities
  - CASE-V platform interoperability and app portability (v3)
  - Participate in joint or federated events
Cyber Security Outreach & Workforce Development Programs

- **COE in Cyber Security**
  - Summer internship at AFRL/Rome
  - Summer internship at COE/NSU
  - Faculty training workshop at COE/NSU
  - Graduate and undergraduate research assistantship

- **Consortium for K-20 Cybersecurity Workforce Pipeline**
  - Summer internship at DoE labs, NSU and other locations
  - Bootcamps for summer interns
  - Curriculum and course development and deployment
  - Faculty workshops and sabbaticals

- **CSET/Computer Science**
  - Cybersecurity Summer Academy
  - Health Sciences Summer Academy
  - CSET Undergraduate Summer Research Programs
  - Cybersecurity Clubs and Events in local schools
Cyber Security Facilities and Equipment

- **Cisco Networking Academy**
- **NETLAB+ Virtual Lab System**
  - 40+ cybersecurity and IT courses available (including custom designed)
  - Used by NSU and Consortium partners
- **Digital Forensics Lab**
- **Cybersecurity Training Lab**
- **Information Security Lab**
  - Cloud computing and big data systems with approximately
    - 700 Xeon 64-bit server cores
    - 4.3 TB RAM
    - 380 TB hard disk storage
    - 10 Gbps Ethernet connectivity and 40 Gbps Uplinks
  - Machine learning and data analytic workstations
- **McDemmond Applied Research Center (MCAR)**
  - Primarily for use by sponsored research programs
Cyber Security Partnerships

- **Test Resource Management Center**
  - STEM Initiatives
  - National Cyber Range (NCR)
  - Cyber Test Technology (CTT)

- **Naval Network Warfare Command (U.S. Fleet Cyber Command)**
  - Working towards a CRADA to enhance situational awareness & decision support for Naval NOC

- **DoE K-20 Cybersecurity Workforce Consortium**

- **Sandia National Labs**
  - Research, co-advising student research, curriculum and course development, internships, workforce development, and recruitment
  - Technology transfer and training from SNL to Consortium partners

- **DeterLab (NSF/DHS)**

- **Cyber Virginia Initiatives**
  - New Virginia Cyber Range
  - New cybersecurity curriculum for Career & Technical Education (DoEd)

- **School Districts in Hampton Roads Region**
Cyber Security Collaboration Opportunities

- **Outreach & Workforce Development**
  - Summer internship @ DoD facilities
  - Summer internship @ NSU (as boot camps for future interns @ DoD facilities)
  - Developing and deploying new modules for Cyber T&E
  - Recruitment

- **Education**
  - Developing and deploying new curricula/courses for Cyber T&E
  - A track for new Ph.D. in Computer Science program (under development)?

- **Research and Development**
  - Co-advising student research
  - Technology and knowledge sharing and leveraging
  - Support UG/G research experiences through scholarships or assistantships
  - **CRADA** or Cooperative Agreements for jointly selected research topics?
  - S&T CTT Development

- **Goal: full engagement year round and long term**
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  - NCR
  - S&T CTT
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- Consortium for K-20 Cybersecurity Workforce Pipeline
- Sandia National Labs
- Norfolk State University
- Department of Computer Science @ NSU
- IA-REDI @ NSU
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