



DoD Support of Cybersecurity Research and STEM Initiatives at Norfolk State University

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Institutional Overview



- **Norfolk State University**
 - Established in 1935
 - Largest HBCU in Virginia
 - 49 degree programs: 3 Doctoral, 15 Master's, 30 Bachelor's, 1 Associate's
 - 2017 student enrollment: 5,305 (84% Non-Hispanic Black)
 - Aspiration: be a powerhouse in STEM
- **College of Science, Engineering and Technology**
 - Eight departments and one Center for Material Research
 - 2017 student enrollment: 1,715
- **Department of Computer Science**
 - Established as a separate department in 1990
 - Four degree programs: BS.CSC, BS.ITE (2012), MS.CSC (2003), MS in Cybersecurity (2015)
 - 2017 student enrollment: 287
 - Major strength: cybersecurity (DHS/NSA CAE designation since 2009)



Cybersecurity @ NSU



- **Received ~\$42M in external funding**
 - Research, education, scholarships, outreach
 - DoD, DoE/NNSA, NSF (e.g., CyberCorps SFS: ~\$2M)
- **Major projects**

Project Title [My Role]	Funding Agency/Program	Amount	Period
Center of Excellence in Cyber Security [PI]	DoD HBCU/MI Program (Research)	\$4,984,352	2015-2020
Enhancing Cybersecurity Research and Experimentation Infrastructure [PI]	DoD HBCU/MI Program (Equipment)	\$499,570	2016-2017
Self-Protecting Security for Assured Information Sharing [PI]	DoD HBCU/MI Program (Research)	\$479,008	2012-2015
Building a Cloud Computing and Big Data Infrastructure for Cybersecurity Research and Education [PI]	DoD HBCU/MI Program (Equipment)	\$497,725	2014-2015
Information Assurance Techniques for a Simulated Large-Scale Battlefield Environment [Research Team Lead]	DoD/ARL	\$5,500,000	2005-2010
Consortium for K-20 Cybersecurity Workforce Pipeline [Co-PI]	DoE/NNSA	\$25,000,000	2014-2019
Massie Chair of Excellence in Information Assurance and Cybersecurity [Research Team Lead]	DoE/NNSA	\$1,250,000	2009-2015
TOTAL		\$38,210,655	
DoD HBCU/MI Program		\$6,460,655	
Subtotal (DoD)		\$11,960,655	



COE in Cyber Security: Overview



- **Funded by DoD HBCU/MI Program**

- Five years: April 2015 - April 2020
- \$4.983 million investment



- **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**

- To develop a **Cyber Analysis, Simulation and Experimentation Environment (CASE-V)**, equipped with cloud computing and big data analytic capabilities, for enhancing situational awareness and decision support in cyber defense and cyber training
- Perform research-related education and outreach activities
- Be a valued resource for the Nation and HBCU/MI Community



COE in Cyber Security: Impact



- **Enabled NSU to reach a significantly higher level of excellence**
 - Growing recognition as a leader in cybersecurity research and related activities
- **Established strong partnerships**
 - AFRL/Rome, Sandia National Labs, SPAWAR
 - DoE Consortium for K-20 Cybersecurity Workforce Pipeline
- **Two new degree programs being planned**
 - PhD in Computer Science (with 2 specializations: cybersecurity & data science)
 - MS in Cyberpsychology
- **Excellent internship opportunities**
 - DoD COEs internship program: 8 ('18), 7 ('17), 3 ('16)
 - COEcyber summer internship program at NSU
 - 4 interns supported by COEcyber each year (2015 - 2018)
 - Additional 16 interns for 2018 supported by DOE Consortium project & NSU
 - SPAWAR Cybersecurity internship program: 3 ('18), 2 ('17)
- **Workforce readiness**
 - Two former research assistants pursuing PhD now (VT and Purdue)
 - One current URA (also former 2017 intern @ AFRL/Rome) receiving DoD IA scholarship starting in August 2018
 - Ten former RAs and interns graduated in 2017 & 2018: currently @ AFRL/Rome (1), SPAWAR (3), Sandia National Labs [and going full-time for M.S. degree at GT and NCAT] (2), Purdue University (1), private industry (3) including Nvidia



COE in Cyber Security: Research Infrastructure



- **State-of-the-art facilities and equipment**
 - New NSU Cybersecurity Complex (Phase 2) specially designed for COEcyber (opened in April 2018)
 - Total investment in construction and equipment: ~\$2.4M (with \$1M from DoD HBCU/MI Equipment Program: FY14 & FY16)





Lessons Learned/Strategies



- **Do good and relevant technical work.**
- **Be responsive and dependable. Deliver quality results.**
- **Delight the stakeholders → repeat/expanded business.**
- **Be persistent and keep trying/refining.**
- **Don't be bashful. Effective communications help get the job done.**
- **Be prepared to submit a proposal under short notice.**
 - Study BAA's to align with research interests of funding agencies.
 - Subscribe to newsletters and alerts of funding opportunities, and plan ahead.
- **Seek feedback and support from program managers.**
 - For example, submit detailed whitepapers (>10 pages) to specific program managers before submitting final proposals, even when not required. Include them as suggested reviewers to evaluate the application.
- **Build strong support within your institution.**
 - Administration, business, financial, pre-award and post-award management.
 - They can be valuable references for you.
- **Networking is crucial, relationships important, partnerships wonderful.**



Special Appreciation To Our DoD Partners



- **Mr. Ed Lee (AFOSR, HBCU/MI Program Manager)**
 - Pathfinder
 - National HBCU Conference (February 2009, Atlanta GA)
 - Suggested an AFOSR program manager, Dr. Bob Herklotz, to contact
- **Dr. Bob Herklotz (AFOSR, Information Operations & Security Program Manager, retired)**
 - Early supporter
 - FY11 DoD HBCU/MI Research Program (deadline: 05/25/2011)
 - Emailed a whitepaper to Dr. Herklotz on 04/04/2011 (cc: Mr. Ed Lee)
 - Dr. Herklotz responded on 04/07/2011: “The white paper is interesting enough to make it worthwhile to submit a proposal against the HBCU MSI Baa attached. It would be nice to ... It would be nice if ...”
 - Incorporated the 2 suggested research topics into the final proposal, and suggested Dr. Herklotz as reviewer
 - The proposal was funded for \$479K, 2012-2015
 - Invited to and attended Dr. Herklotz’s annual PI meeting (October 2012)
 - FY13 DoD HBCU/MI Equipment Grant Program (deadline: 07/26/2013)
 - Emailed a whitepaper to Dr. Herklotz on 06/10/2013 6:01 PM
 - Dr. Herklotz responded on 06/11/2013 6:46 AM: “Looks good to me, I will recommend it for funding.”
 - The proposal was funded for \$497K, 2014-2015
- **Ms. Evelyn Kent (DoD HBCU/MI Program Manager)**
 - Strongest supporter in cybersecurity research @ NSU who really believed in us
 - Four awards from her program (~\$6.5M), and opening doors for us (e.g., SPAWAR)
- **Dr. Tim Kroecker (AFRL/Rome, Program Manager for COEs)**
 - Champion for our cause
 - The person you want to know!