Building the Next Generation of Cyber AI Professionals: Lessons from Bowie State University's CyberAI Scholarship For Service Program

1. Introduction

The United States faces a growing shortage of cybersecurity professionals who can defend critical infrastructure, government systems, and sensitive data. As AI (Artificial Intelligence) becomes more common in both offensive and defensive cyber operations, the demand has expanded beyond traditional cybersecurity competencies. Employers increasingly need professionals who can work at the intersection of AI and cybersecurity, including machine learning based threat detection, AI supported vulnerability analysis, and the governance implications of deploying intelligent systems in sensitive environments.

Despite this demand, the pipeline of qualified cybersecurity professionals entering government service remains insufficient. HBCUs, which serve a significant portion of the nation's computing students and have historically produced graduates who pursue public service careers, represent an underutilized and strategically important pathway into this workforce. These institutions bring technical training capacity and a strong commitment to careers in government and public service, which aligns with the mission of the CyberAI Scholarship for Service program.

BSU's Department of Computer Science has had a Scholarship for Service program since Spring 2023. The NSF program is now called the CyberAI SFS program to reflect the growing convergence of cybersecurity and artificial intelligence. Supported by a $2.1 million NSF grant, the program has developed a structured model for recruiting, supporting, and placing computing students into government cybersecurity careers while strengthening AI related competencies that reflect the direction of the field.

This paper describes that model and shares early lessons from implementation. It summarizes the student experience, program operations, and outcomes to date, and concludes with practical takeaways for HBCUs considering CyberAI SFS participation. The paper also extends an invitation to an April 2026 virtual workshop for institutions interested in joining as mentoring partners and building toward their own program readiness.

2. Program Background and Context

2.1 CyberCorps Scholarship for Service

The CyberCorps Scholarship for Service program, sponsored by the National Science Foundation in partnership with the Department of Homeland Security, was established to address the shortage of cybersecurity professionals in federal, state, local, and tribal governments. The program provides scholars with financial support, including stipends, tuition, and professional development allowances, in exchange for a commitment to government service after graduation for a period equivalent to the length of the scholarship received.

Scholars are expected to pursue internships with government agencies during their enrollment, attend the annual SFS Job Fair, and upon graduation secure cybersecurity roles in qualifying government positions. The program is one of the most direct and financially supported pathways from a computing degree into a government cybersecurity career currently available to students.

2.2 BSU's Program and the Evolution to CyberAI SFS

BSU's Department of Computer Science received a $2,099,963 grant over five years to start the Bulldog Cyber Scholarship program beginning Spring 2023. The program was designed to recruit, educate, mentor, and train computer science majors, including students transferring from community colleges, with a particular focus on building a talent pipeline from an HBCU into the national cybersecurity workforce.

As the field has evolved, so has the program. The integration of artificial intelligence into cybersecurity operations has made AI literacy an essential competency for the next generation of government cyber professionals. BSU has responded by developing a dedicated Cyber AI curriculum, incorporating AI certifications into the scholar development pathway. This positions BSU scholars as cybersecurity practitioners who are also prepared to navigate AI enabled cyber environments.

2.3 BSU's Strategic Position

BSU is a Historically Black University located in Prince George's County, Maryland, situated in the Baltimore Washington technology corridor, one of the most concentrated regions of federal cybersecurity activity in the country. The Department of Computer Science holds an NSA DHS Center of Academic Excellence in Cyber Defense designation and participates in the University Affiliated Research Center program. With enrollment growing from 229 students in Fall 2019 to 598 in Fall 2024, the department has the student pipeline, research infrastructure, and institutional relationships to sustain a high impact SFS program. BSU's location and mission position it to supply diverse, well-prepared talent into government agencies and national laboratories.

3. Program Structure and Operations

3.1 Recruitment and Selection

Recruitment targets academically strong computer science majors and community college transfer students, with a minimum GPA requirement of 3.2 and a demonstrated commitment to government service. Recruitment channels include ETAP, classroom visits, departmental announcements, faculty referrals, and outreach to student organizations, including the Women in Computer Science Club. Applications include a resume, a 500-word essay on career goals and commitment to government service, two faculty references, and an unofficial transcript.

The selection committee, led by leadership of the grant, reviews applications and conducts in person interviews to assess academic preparation, commitment to program requirements, and

readiness for government placement. A waitlist is maintained to fill gaps that arise after initial selection. The program received 20 applications in its most recent recruiting cycle, nine from women and eleven from men, demonstrating strong interest and the impact of targeted outreach.

3.2 Cohort Support and Study Spaces

A dedicated physical space within the Computer Science Department provides scholars with a collaborative environment for academic work, research, and peer support. Scholars use this space for study, mentor check ins, group projects, and informal knowledge sharing. This dedicated environment signals institutional commitment and gives scholars a professional home base within the department.

An SFS Program Coordinator, hired in July 2025, works directly alongside scholars in this space, providing real time support for program navigation, administrative questions, and daily operational needs. This embedded coordination model has helped maintain scholar engagement and reduce administrative burden on faculty and students.

3.3 Advising and Monitoring

Biweekly meetings between scholars, the Principal Investigator, and Co PI provide consistent touchpoints for reviewing academic progress, discussing research development, and addressing emerging challenges. Shared digital folders allow advisors, faculty mentors, and scholars to track and update progress between meetings. Academic advising is provided by a dedicated staff advisor who meets with each scholar before each semester to ensure correct course registration, appropriate sequencing of cybersecurity focus courses, and timely progress toward graduation.

3.4 Faculty Mentored Research

Research mentorship is a core component of the scholar experience. Five faculty members have been recruited to serve as research mentors; each paired with one or more scholars based on research interests and technical alignment. Mentoring pairs meet biweekly to discuss progress, troubleshoot technical challenges, and develop publishable work. Faculty mentors establish expectations at the start of each pairing, and scholars are expected to produce outputs such as conference papers and poster presentations.

3.5 Program Coordination

The Program Coordinator manages scholar communications, tracks program milestones, coordinates with OPM and NSF program offices, supports internship placement logistics, and organizes professional development activities. Dedicated coordination capacity has been essential as scholar numbers grow and program activities expand.

4. Student Experience

4.1 Certification Preparation

Technical certification is a structured component of the scholar pathway. All scholars are expected to complete the CompTIA Security+ certification, with preparation beginning during winter break under the guidance of an assigned trainer. The program has also introduced IBM AI certifications and AWS Cloud Practitioner training as part of the evolving CyberAI curriculum, positioning scholars with credentials that reflect both foundational cybersecurity competency and emerging AI integrated skill sets. At least four scholars completed CompTIA Security+ during the current program period.

4.2 Faculty Mentored Research

Scholars engage in faculty mentored research on cyber-AI topics. Current and recent projects include local government supply chain cybersecurity, an AI supported auto scheduling application, a mobile app for object recognition and navigation for visually impaired, cybercrime trends and youth vulnerability, and phishing threats in academic environments. These projects provide scholars with publication and presentation experience that strengthens government employment candidacy.

4.3 Professional Development

Scholars participate in a structured set of professional development activities designed to build industry awareness, networks, and career readiness. Activities have included the annual SFS Job Fair in Washington, DC, the Women in CyberSecurity Conference, the Grace Hopper Celebration (attended by multiple scholars), the BSU Career Fair, and Cyber Day, where scholars presented research posters.

4.4 Conference Participation and Research Presentations

Scholars attended and presented at the Consortium for Computing Sciences in Colleges Conference in 2025, presenting four research posters based on faculty mentored projects. One poster received an Honorable Mention recognition. Conference participation gives scholars experience presenting technical work, receiving feedback, and engaging with the broader computing community.

4.5 Capture the Flag Competitions and Cybersecurity Club Leadership

The program includes competitive cybersecurity challenges into the scholar experience. At the CCSC Conference, scholars participated in the Capture the Flag competition and earned third place overall. In addition, several scholars have taken on leadership roles in the BSU Cybersecurity Club, including officer level positions and recruitment leadership roles that support broader student engagement in cybersecurity.

5. Outcomes and Placements

5.1 Scholar Cohort

Since launching in Spring 2023, the program has supported 14 scholars across cohorts, with seven currently active and additional scholars onboarding for Spring 2026. The program has maintained strong retention through cohort support, biweekly advising, and dedicated coordination.

5.2 Internship Placements

The program achieved 100% summer internship placement for its scholars. Placements included the US Coast Guard, MIT Lincoln Laboratory, CyberTection Antivirus,and Bowie State University. Scholars contributed to work such as vulnerability management, cloud and DevSecOps support, cybersecurity research, privacy awareness, chatbot development, and departmental tool development. The range of placements, from federal agencies to industry partners, reflects flexibility in meeting service requirements while building skills relevant to CyberAI roles.

5.3 Government Employment Outcomes

Two scholars have completed the program and transitioned into qualifying government positions. One completed a master's degree and is employed by the Government Accountability Office supporting the Chief Data Office. Another graduated in 2025 and is serving as a Patent Examiner in Computer Science at the United States Patent and Trademark Office. Those who are graduating, two have offers with DoD and another with Coast Guard.

5.4 Operational Choices That Supported Participation

Several operational decisions have supported scholar participation while meeting program requirements. Hiring a Program Coordinator embedded in the scholar workspace provided real time support and reduced friction. Biweekly structured meetings created accountability without excessive burden. Dedicated study space provided a professional environment for a commuter heavy population. Navigating the government hiring freeze required flexibility and placement options, including approved industry organizations, reinforcing the value of maintaining diverse placement pathways.

6. Lessons Learned and Takeaways for HBCUs

6.1 Recruitment Works Best When It Is Structured and Sustained

Recruitment success reflects consistent visibility rather than a single campaign. Faculty referrals, student organization outreach, town halls, and department newsletters-built awareness across the student body. HBCUs considering SFS participation, should plan for sustained recruitment and early program visibility.

6.2 Coordination Capacity Is Not Optional

Hiring a dedicated Program Coordinator has been one of the most consequential operational choices. Faculty cannot absorb the coordination demands of a functioning SFS program within existing workloads. A coordinator who is accessible and empowered is a structural requirement for program quality and scholar success.

6.3 Integrating AI into Cybersecurity Preparation Is Increasingly Important

The evolution from CyberCorps SFS to CyberAI SFS reflects changes in the field. Cybersecurity roles increasingly include AI related tools and workflows. BSU's investment in a Cyber AI course, AI certifications, and AWS Cloud Practitioner training positions scholars for roles aligned with current hiring needs. HBCUs building toward participation should plan for AI related competencies early.

6.4 Research and Conference Participation Strengthen Government Placement

Scholars who present research, publish technical work, and compete in CTF competitions often develop stronger placement profiles. These experiences build communication skills, technical credibility, and professional identity. Embedding research and conference participation as expected components has helped differentiate BSU scholars.

6.5 Flexibility in Placement Is a Program Asset

The government hiring freeze highlighted the importance of diverse, approved placement options. Programs that rely only on direct federal agency placements are vulnerable to external disruptions. Maintaining relationships with approved industry partners, national laboratories, and federally funded research centers supports placement stability.

7. Conclusion and Invitation

Bowie State University's CyberAI SFS program has demonstrated what is possible when HBCU invests in a coordinated scholarship and placement pipeline. Fourteen scholars supported, 100% internship placement, early government placements, conference recognition, and curriculum updates aligned with the convergence of AI and cybersecurity reflect deliberate choices around coordination, mentorship, research integration, and scholar support.

CyberAI SFS now places increased emphasis on engagement with non SFS institutions, including mentoring other HBCUs toward program readiness and eventual participation. BSU welcomes this role as an extension of its mission and an opportunity to expand impact across the HBCU community.

To support institutions exploring participation, BSU will host a virtual workshop in April 2026 for HBCUs interested in CyberAI SFS. The workshop will cover program structure, operational requirements, the mentoring partner pathway, lessons learned from implementation, and practical

steps institutions can take to build readiness. HBCUs interested in attending or learning more about the mentoring partner pathway are encouraged to reach out directly.