September 2022

Cybersecurity Occupations in Mississippi

Profiling Cybersecurity-Related Job Openings, Job Seekers, and Recent Graduates

SLDS
Statewide Longitudinal Data System

Prepared by Mississippi State University's NSPARC

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ABOUT MISSISSIPPI'S SLDS

Mississippi's Statewide Longitudinal Data System (SLDS) is one of the most comprehensive systems in the country and includes administrative records from more than 25 education, workforce, and human service agencies in the state. The SLDS allows for the alignment of multiple sources of de-identified administrative data over time to evaluate educational or workforce strategies in terms of real outcomes, such as entrance into employment, wages, and skill gains.

PREPARED BY MISSISSIPPI STATE UNIVERSITY'S NSPARC

NSPARC, the National Strategic Planning & Analysis Research Center at Mississippi State University, is a trusted source for research addressing critical challenges faced by government, economic and workforce development professionals, educational institutions, nonprofits, and the private sector. Drawing on a team of social scientists, economists, data engineers, data analysts, and machine learning experts, NSPARC facilitates informed decision-making.

With over 20 years of experience, NSPARC excels at combining data from disparate sources to tackle complex issues. NSPARC scientists uncover trends and enable evidence-based research across areas ranging from workforce development, education, and economics to disaster resilience, and community development. NSPARC scientists' versatility allows them to easily translate knowledge from one domain to another and collaborate effectively with diverse partners, ensuring research findings have real-world impact. This allows NSPARC to draw meaningful insights from data to address challenges faced by policymakers, employers, economic developers, and state agencies.

For more information, contact NSPARC at nsparc@nsparc.msstate.edu or 662-325-9242.

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OVERVIEW

This brief provides data pertaining to Mississippi's Cybersecurity workforce and the employer demand for employees with their skills. Data are included on individuals who have used Mississippi Works, the state's job board, to look for work ("job seekers") and have experience in cybersecurity-related occupations. Data are also included on graduates from Mississippi's public universities and community colleges who majored in cybersecurity-related degree programs. Finally, data are included on job postings by employers seeking skilled employees for in-state, out-of-state, and remote work in cybersecurity-related occupations.

The results of this analysis show that 553 credentialed job seekers with past experience in cybersecurity-related occupations have actively sought work in Mississippi in the past year. The results also show that, in Academic Year (AY) 2021, Mississippi's community college system produced 306 graduates from cybersecurity-related programs, and Mississippi's public universities produced an additional 507 graduates. Finally, the analysis shows that 12,160 in-state or remote-based cybersecurity jobs are available to Mississippians each year, and an additional 18,122 cybersecurity jobs are advertised to Mississippians who are willing to move out-of-state for work.

DATA

The following data were obtained from Mississippi's State Longitudinal Data System (SLDS) for use in the study:

MISSISSIPPI WORKS JOB SEEKER AND JOB OPENINGS DATA

Data on job openings and on individuals looking for work come from the Mississippi Department of Employment Security's (MDES) state job board, Mississippi Works. Mississippi Works allows employers to create job announcements, and it allows job seekers to search and apply for jobs. Real-time data from Mississippi Works can be used to determine the demand for labor in a region, as well as the number of people that are looking for work. Detailed information about the job seekers is also available, such as their place of residence, educational background, previous occupations, skills, and years of experience. For this study, we consider only job openings that have been open during the past 12 months (September 2021 – September 2022) and job seekers who have actively searched for employment during the same period. Approximately 160,000 job seekers have used Mississippi

Works in the last year, and approximately 43,000 companies are registered in the system.

MISSISSIPPI COMMUNITY COLLEGE AND PUBLIC UNIVERSITY DATA

Data on college graduates come from administrative records from Mississippi's 15 community colleges and eight public universities. These data include information on the enrollment, county of residence, academic major, and graduation for the approximately 81,000 students enrolled annually in public universities and 70,000 students enrolled in community colleges. Academic majors are cross-walked with relevant occupations using information from the National Center for Education Statistics (NCES). These data are updated annually with student records from the previous academic year.

INDICATORS

The following indicators were utilized to conduct this analysis:

Credentialed Job Seekers –individuals who have actively utilized Mississippi Works, within the past 12 months (September 2021 – September 2022), who have experience in a cybersecurity-related occupation, and who have completed a community college or university instructional program (including college certificate programs, 2-year degree programs, 4-year degree programs, and/or post-graduate degree programs).

Graduates –individuals who have graduated from a Mississippi public community college or university in AY 2021, and who majored in a cybersecurity-related degree program. Community college graduates who subsequently enrolled in a Mississippi public university are excluded from this measurement, as they are less likely to seek full-time employment until after completing their university education.

Job Openings –actively advertised job openings posted on Mississippi Works within the past 12 months (September 2021 – September 2022) seeking applicants for cybersecurity-related occupations.

METHODOLOGY

This analysis required the identification of cybersecurity-related occupations, graduates from related instructional programs, and related job openings. The methods for identifying these critical components are as follows.

IDENTIFYING JOB SEEKERS AND CYBERSECURITY-RELATED OCCUPATIONS

Occupations were identified using Standard Occupational Classification (SOC) System Codes, the federal occupation classification standard used by the U.S. Bureau of Labor Statistics. Occupations in the "Computer Occupation"

classification category were selected, and job responsibilities were reviewed using resources available through the Department of Labor's O*NET OnLine web portal (for example, a job responsibility of a Computer Network Support Specialist is to "analyze and report computer network security breaches or attempted breaches").

Using this information, occupations were sorted into three groups. The first group are the Directly-Related Occupations; occupations in this group have clear associations to the cybersecurity field. The second group are the Partially-Related Occupations; occupations in this group have some overlap with cybersecurity tasks, but have other primary responsibilities. The third group are Occupations with Transferrable Skills; these are occupations which require technology skills that partially overlap with the skills required to work in an occupation directly related to cybersecurity. Computer occupations deemed to be unrelated to cybersecurity are excluded from this analysis.

A comprehensive list of all job seekers who actively searched for work on Mississippi's official Job Board, Mississippi Works, was created for the study period (September 2021 – September 2022). The past work history of each active job seeker was examined to determine if the job seeker indicates experience in one or more of the identified cybersecurity-related occupations. This list of nearly 2,000 job seekers with cybersecurity-related experience was then narrowed to include only the 553 job seekers who hold a college or university credential, such as a college certificate, a 2-year degree, a 4-year degree, or a post-graduate degree.

IDENTIFYING GRADUATES OF CYBERSECURITY-RELATED INSTRUCTIONAL PROGRAMS

To identify relevant instructional programs, each occupation's SOC code was cross-walked to a Classification of Instructional Programs (CIP) code, the national standard of academic program titles developed by the U.S. Department of Education. If a single degree program was matched to multiple occupations, the description of the degree program was used in conjunction with the occupational descriptions to determine the most appropriate match.

To count the graduates of these programs, administrative data was used to identify students graduating in AY 2021 in the Fall, Spring, or Summer semester. Graduates from community colleges were also examined to determine if they subsequently enrolled in a Mississippi public university, as these students are less likely to pursue full-time employment until completing their university education; these students were removed from the graduate counts reported in this analysis.

IDENTIFYING CYBERSECURITY-RELATED JOB OPENINGS

A comprehensive list of job openings was extracted from Mississippi Works. All job openings posted in Mississippi Works include an SOC code; this code was compared to the previously-defined list of cybersecurity SOC codes to identify cybersecurity-related job openings.

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Due to the fact that Mississippi Works includes the capability for employers to post job openings outside of Mississippi, each posting was examined to classify the identified cybersecurity-related job openings into four distinct categories:

In-State Openings – a job posting which specifies that the job site or employer location is in Mississippi.

Possible In-State Openings – a job posting which lists Mississippi as one potential location for work, and which is posted by an employer with a physical presence in the state.

Out-of-State Openings – a job posting which either (a) lists the job site as a state other than Mississippi, or (b) lists Mississippi as a potential location for work but was posted by an employer without any physical presence in the state.

Remote Eligible Openings – a job posting advertising a telework-eligible posting. Postings which require the employee to be on-site part time (e.g., a posting advertising "50% telework) are excluded from this category and are instead placed into one of the prior three categories, according to the location of the part-time work site.

RESULTS

TABLE 1: MISSISSIPPI CREDENTIALED JOB SEEKERS IN CYBERSECURITY-RELATED OCCUPATIONS, SEPTEMBER 2021 – SEPTEMBER 2022

SOC	Occupation Title	Credentialed Job Seekers
Directly-Related Occupations		
15-1212	Information Security Analysts	25
15-1211	Computer Systems Analysts	95
15-1231	Computer Network Support Specialists	45
15-1299	Computer Occupations, All Other (Including Information Security Engineers, Digital Forensic Analysts, Penetration Testers, and Blockchain Engineers)	57
Subtotal		*222*
Partially-Related Occupations		
11-3021	Computer and Information Systems Managers	140
15-1221	Computer and Information Research Scientists	10
15-1245	Database Administrators and Architects	80
15-1241, 15-1244	Network and Computer Systems Administrators and Architects	41

Table 1 Continued on Next Page

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Table 1 Continued

Subtotal		**271**

Occupations with Transferrable Skills

15-1251	Computer Programmers	24
15-1256	Software Developers, Software Quality Assurance Analysts, Testers	36
Subtotal		**60**
Total		**553**

Notes: This table reports the number of active job seekers with cybersecurity experience and credentials who have used the state job board, Mississippi Works, to search for employment within the past 12 months (June 2020 – June 2021). Job seekers must have completed a community college or university instructional program to be included in this analysis (i.e., a college certificate program, a 2-year degree program, a 4-year degree program, and/or a post-graduate degree program).

Source: Mississippi State Longitudinal Data System (SLDS), 2022

TABLE 2: MISSISSIPPI GRADUATES FROM CYBERSECURITY-RELATED INSTRUCTIONAL PROGRAMS, AY 2021

CIP	Program Title	Graduates		Total
		Community College	University	
Directly-Related Programs				
111003	Computer and Information Systems Security / Information Assurance	43	3	**46**
430116	Cyber/Computer Forensics and Counterterrorism	14	0	**14**
110901	Computer Systems Networking and Telecommunications	104	0	**104**
111002	System, Networking, and LAN / WAN Management	0	6	**6**
Subtotal		***161***	***9***	**170**
Partially-Related Programs				
110301	Data Processing and Data Processing Technology	0	29	**29**
110701	Computer Science	26	3	**29**
140901	Computer Engineering, General	0	62	**62**
Subtotal		***26***	***94***	**120**

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Table 2 Continued

Programs with Transferrable Skills

110101	Computer and Information Sciences, General	29	315	*344*
110201	Computer Programming / Programmer, General	74	0	*74*
110400	Information Science/Studies	16	0	*16*
521201	Management Information Systems, General	0	89	*89*
Subtotal		*119*	*404*	*523*
Total		*306*	*507*	*813*

TABLE 3: CYBERSECURITY JOB OPENINGS, SEPTEMBER 2021 – SEPTEMBER 2022

SOC	Occupation Title	In-State	Possible In-State	Out-Of-State	Remote Eligible
Directly-Related Programs					
15-1212	Information Security Analysts	136	214	1,218	777
15-1211	Computer Systems Analysts	377	283	2,113	1,212
15-1231	Computer Network Support Specialists	26	7	22	0
15-1299	Computer Occupations, All Other (Including Information Security Engineers, Digital Forensic Analysts, Penetration Testers, and Blockchain Engineers)	29	694	4,843	1,956
Subtotal		*568*	*1,198*	*8,196*	*3,945*
Partially-Related Programs					
11-3021	Computer and Information Systems Managers	285	268	1,588	236
15-1221	Computer and Information Research Scientists	52	63	514	113
15-1245	Database Administrators and Architects	51	26	311	163
15-1244	Network and Computer Systems Administrators	245	248	1,493	996
15-1241	Computer Network Architects	30	23	121	50
Subtotal		*663*	*628*	*4,027*	*1,558*
Programs with Transferrable Skills					
15-1251	Computer Programmers	42	40	330	153
15-1256	Software Developers, Software Quality Assurance Analysts, Testers	252	796	5,569	2,317
Subtotal		*294*	*836*	*5,899*	*2,470*
Total		*1,525*	*2,662*	*18,122*	*7,973*

Notes: This table reports the number of job openings actively advertised in Mississippi Works within the past 12 months (June 2020 – June 2021) for a cybersecurity-related occupation.

Source: Mississippi State Longitudinal Data System (SLDS), 2022

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TABLE A1: UNIVERSITY GRADUATES FROM CYBERSECURITY-RELATED INSTRUCTIONAL PROGRAMS, AY 2021

CIP	Program Title	Alcorn State University	Delta State University	Jackson State University	Mississippi State University	Mississippi Valley State University	University of Mississippi	University of Southern Mississippi	Total
Directly-Related Programs									
111003	Computer and Information Systems Security / Information Assurance	-	-	-	3	-	-	-	**3**
430116	Cyber/Computer Forensics and Counterterrorism	-	-	-	-	-	-	-	**0**
110901	Computer Systems Networking and Telecommunications	-	-	-	-	-	-	-	**0**
111002	System, Networking, and LAN/WAN Management	6	-	-	-	-	-	-	**6**
Subtotal		*6*	*0*	*0*	*3*	*0*	*0*	*0*	*9*
Partially-Related Programs									
110301	Data Processing and Data Processing Technology	-	-	-	-	-	-	29	**29**
110701	Computer Science	-	-	3	-	-	-	-	**3**
140901	Computer Engineering, General	-	-	18	38	-	1	5	**62**
Subtotal		*0*	*0*	*21*	*38*	*0*	*1*	*34*	*94*
Programs with Transferrable Skills									
110101	Computer and Information Sciences, General	25	-	45	105	3	85	52	**315**
110201	Computer Programming / Programmer, General	-	-	-	-	-	-	-	**0**
110400	Information Science/Studies	-	-	-	-	-	-	-	**0**
521201	Management Information Systems, General	-	13	-	47	-	29	-	**89**
Subtotal		*25*	*13*	*45*	*152*	*3*	*114*	*52*	*404*
Total		*31*	*13*	*66*	*193*	*3*	*115*	*86*	*507*

Notes: This table reports the number of Mississippi public university graduates who graduated from a cybersecurity-related instructional program in AY 2021.

Source: Mississippi State Longitudinal Data System (SLDS), 2022

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CIP	Program Title	Coahoma	Copiah-Lincoln	ECCC	EMCC	Hinds	Holmes	ICC	Jones	MDCC	MGCCC	Meridian	NEMCC	NWCC	PRCC	SMCC	Total
Directly-Related Programs																	
111003	Computer and Information Systems Security / Information Assurance	-	1	3	8	31	-	-	-	-	0	-	-	-	-	-	**43**
430116	Cyber/Computer Forensics and Counterterrorism	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	**14**
110901	Computer Systems Networking and Telecommunications	-	2	6	6	15	18	11	10	-	12	4	-	5	8	7	**104**
111002	System, Networking, and LAN/WAN Management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Subtotal		*0*	*3*	*9*	*14*	*46*	*18*	*11*	*10*	*0*	*26*	*4*	*0*	*5*	*8*	*7*	*161*
Partially-Related Programs																	
110301	Data Processing and Data Processing Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
110701	Computer Science	-	3	-	-	-	-	10	7	2	-	-	-	4	-	-	**26**
140901	Computer Engineering, General	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Subtotal		*0*	*3*	*0*	*0*	*0*	*0*	*10*	*7*	*2*	*0*	*0*	*0*	*4*	*0*	*0*	*26*
Programs with Transferrable Skills																	
110101	Computer and Information Sciences, General	-	-	-	2	-	-	2	-	-	25	-	-	-	-	-	**29**
110201	Computer Programming / Programmer, General	-	-	-	5	6	6	24	13	-	6	5	8	1	-	-	**74**
110400	Information Science/Studies	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	**16**
521201	Management Information Systems, General	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Subtotal		*0*	*0*	*0*	*7*	*6*	*6*	*26*	*13*	*0*	*31*	*5*	*8*	*17*	*0*	*0*	*119*
Total		*0*	*6*	*9*	*21*	*52*	*24*	*47*	*30*	*2*	*57*	*9*	*8*	*26*	*8*	*7*	*306*

Notes: This table reports the number of Mississippi public community college graduates who graduated from a cybersecurity-related instructional program in AY 2021 and did not subsequently enroll in a Mississippi public university. Community college graduates who subsequently enrolled in a Mississippi public university are excluded from this count, as these students are less likely to pursue full-time employment until after completing their university education.

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