2017 Augusta Metro Cybersecurity Workforce Study

Augusta Metro area is becoming an innovation hub for cyber-related operations

Cyber Workforce (including Fort Gordon) is estimated at 12,716 occupations, which is 5.3% of the workforce

Cyber-related and IT jobs range from $46,150-$110,390 annually, with an estimated mean wage of $72,324. Cybersecurity jobs have an estimated mean salary of $97,778.

Most occupations have a general requirement for a bachelor's degree.

Top 3 Paying Jobs:
- Computer & Information Systems Manager (8% of total positions)
- Software Developers (4% of total positions)
- Systems Software (6% of total positions)
- Computer Network Architects (3%)

Estimated increase in cybersecurity workforce by 138% within 5 years.

cyber.augusta.edu
2017 Augusta Metropolitan Area
Cybersecurity Workforce Study

Augusta University
Cyber Institute | Master of Public Administration Program
Table 5 | How many unfilled and/or vacant full-time cybersecurity positions do you currently have in your organization in the Augusta Metropolitan Region? | 19

Figure 4 | Why have you not filled your vacant cybersecurity positions? [Select all that apply] | 20

Table 6 | In the next year, how many new cybersecurity employees do you estimate hiring in the Augusta Metropolitan Region? | 21

Table 7 | In the next 2-5 years, how many new cybersecurity employees do you estimate hiring in the Augusta Metropolitan Region? | 22

Figure 5 | What occupational skills are applicants generally lacking? | 23

Figure 6 | Which soft skills are applicants generally lacking? | 24

Table 8 | Which of the following are important to your organization when hiring cybersecurity professionals? [Check all that apply] | 25

Table 9 | Which cybersecurity certifications do you consider important for your organization? [Select all that apply] | 25

Table 10 | Does your organization support employee tuition reimbursement? | 26

Table 11 | Does your organization support employee reimbursement for conferences, tech training, or professional organization membership? | 26

VI. Implications, Projections, and Conclusion | 27

VII. References | 29

Appendix A: Survey | 30

Appendix B: Author Biographies | 36

Appendix C: About the Programs | 36
We are pleased to release the 2017 Augusta Metropolitan Area Cybersecurity Workforce Study. This study is intended to assess local cybersecurity workforce needs for Augusta University, local policy makers, and the Augusta Metro community. It includes a snapshot of the current cyber/IT workforce and a projection of the future needs for cybersecurity workers by Augusta Metro businesses, government agencies, and nonprofits. The major findings show that:

1. The Augusta Metro area is an innovative hub for cyber- and information technology-related jobs [Cyber/IT]. Over 5% of the area's workforce is engaged in these types of jobs, which pay well above average wages.

2. The Augusta Metro area is becoming an even more robust center for cyber-related/IT occupations and moving toward what Fortune magazine labeled as one of the possible cybersecurity capitals for not just the United States but the world. The study indicates that sampled businesses, nonprofits, and public agencies expect to grow their cybersecurity workforce by 138%, or more than 800 jobs, over the next five years. Extrapolating this finding to all enterprises suggests the Augusta Metro cybersecurity workforce may increase by over 4,000 positions injecting an estimated $337 million into the local economy.

3. Augusta University is positioned to be the center of education for the community's cyber and technology industry as most employers want their cyber workers to hold a bachelor's degree in information technology and/or computer science.

This study is composed of seven major sections. Section I offers an overview in an Executive Summary. Section II provides an introduction to the entire workforce study. Section III details the study methodology. Sections IV and V report the findings regarding the current Augusta Metro cyber/IT workforce situation and future cybersecurity workforce needs. Section VI discusses the implications of the findings including growth projections for the Augusta Metro cybersecurity workforce based on the study's findings. Finally, Section VII provides a list of the cited references. Three appendices disclose the survey instrument and author information.

This workforce analysis is the product of a collaborative effort between the Augusta University Cyber Institute [CI] and the Augusta University Master of Public Administration [MPA] Program. It was conducted by Dr. Wes Meares and Dr. Will Hatcher of the MPA.
June 26, 2017

Program and Dr. Mark Harris of the Cyber Institute and Hull College of Business with the research assistance of Allison Vick, MPA.

We would like to recognize the contributions of the others who made the study possible. First and foremost, we would like to thank the 278 organizations who took their valuable time to complete the survey as well as the group of local cybersecurity and information technology professionals who provided feedback and other assistance. Rob Dennis in Augusta University Corporate Relations was instrumental in helping encourage local partners to complete our survey. We are extremely grateful for his dedication to the project. Tom Clark from the CSRA Alliance provided data on cyber/IT workforce positions at Fort Gordon. Susan Parr, President/CEO of the Augusta Metro Chamber of Commerce, helped the project by supplying contact information for local businesses. Andy Mueller, Vice President of the Columbia County Chamber of Commerce, helped recruit businesses to participate in the project's survey. Karyn Nixon in Augusta University's Government Relations and Community Affairs helped reach out to local organizations. Arthur Takahashi and Brian Marshall in the Division of Communication and Marketing helped communicate the report and its findings to the Augusta community. Chelsea Medeiros donated her photography for the report. Dr. Gregg Murray and Erycha Medeiros of the Department of Political Science provided administrative support for the report, and the Pamplin College of Arts, Humanities, and Social Sciences provided additional financial support.

Given the substantial role of cyber in the Augusta community, we hope this will be the first of a series of cyber-related/IT studies. Please contact us if you would like further information. We are excited about the emergence of cyber in the Augusta Metro area as reported in this study and are always glad to share more information about it.

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Executive Summary

The Augusta Metro area is moving toward becoming a major technology hub with the arrival of the US Army Cyber Command Headquarters at Fort Gordon and the new Hull McKnight Georgia Cyber Institute and Training Center in downtown Augusta. To learn more about the community's potential as a cyber hub, the Augusta University Cyber Institute [CI] and Master of Public Administration [MPA] program conducted a workforce analysis of cybersecurity-related employment in the Augusta Metro area as defined by the Augusta-Richmond County Metropolitan Statistical Area.¹

The study includes analyses of current employment data from sources such as the US Bureau of Labor Statistics [BLS] for cyber-related | IT positions in the community and of an online survey about future cybersecurity needs that was submitted to 1,554 private companies, nonprofits, and public agencies in the Augusta Metro area.² The study was conducted by Dr. Mark Harris, a faculty member in the Hull College of Business and Cyber Institute and director of Graduate Studies in Information Security Management, Dr. William Hatcher, director of the MPA program, and Dr. Wesley Meares, a faculty member in the MPA program. The findings of the workforce study are intended to inform Augusta University, local policy makers, and the Augusta Metro community about the cybersecurity employment needs of the Augusta Metro area and the state of Georgia.

MAJOR FINDINGS

Overall, the CI | MPA Cybersecurity Workforce Study’s findings indicate that cybersecurity is poised to be one of the fastest growing areas of employment in the Augusta Metro area. In particular, the study's major findings suggest that:

1 | the Augusta Metro area is an innovative hub for cyber- and technology information-related occupations. Currently, over 5% [approximately 12,716 occupations] of the Augusta Metro's workforce serves in these types of jobs, which pay above average wages.

2 | the Augusta Metro area is moving toward being an even more robust center for cyber-related | IT occupations and what Fortune magazine labeled as one of the possible cybersecurity capitals for not just the United States but the world [Roberts, 2017]. The study’s survey found that sampled businesses, nonprofits, and public agencies expect to grow their cyber-related | IT workforce by 138% over the next five years. Extrapolating this finding to all businesses, nonprofits, and public agencies means that the Augusta Metro cyber workforce may increase by over 4,000 positions, which will produce over an estimated $337 million in salary for the local economy.

3 | Augusta University is positioned to be the center of education for the community’s cyber and technology industry. The study's survey found that most employers want their current and new employees to hold a bachelor's degree in information technology and/or computer science.

¹ The Augusta-Richmond County Metropolitan Statistical Area includes as of 2014 an estimated 580,000 people that live in counties and cities in Georgia and South Carolina. The counties are Richmond, Burke, Columbia, Lincoln, and McDuffie in Georgia and Aiken and Edgefield in South Carolina.

² Of the organizations, 278 completed the cyber workforce survey. This is a response rate of approximately 18%. This participation rate is strong for a workforce survey, and the sample is approximately representative of the overall population of the area's companies, nonprofits, and public agencies.
CURRENT CYBER WORKFORCE

The CI|MPA Cybersecurity Workforce Study examines current data from sources such as the US Bureau of Labor Statistics to get a useful picture of the present cyber|IT workforce in the community. Below are the key features of the current cyber|IT workforce:

- The size of the cyber|IT workforce, excluding Fort Gordon, is estimated to be 2,880 occupations, which is 1.8% of the total workforce.
- The size of the cyber|IT workforce, including Fort Gordon, is estimated to be 12,716 occupations, which is 5.3% of the total workforce. The size of the cyber workforce at Fort Gordon is estimated to be 9,836 occupations.
- The cyber-related|IT jobs are high-wage positions with a mean annual wage ranging from $46,150 to $110,390 compared to a mean non-cyber wage of $43,450.
- The jobs require specialized training and education with most cyber-related|IT occupations having a general requirement of a bachelor's degree.

It is important to note that these data include all cyber-related|IT jobs and not just cybersecurity-related jobs.

FUTURE CYBERSECURITY WORKFORCE
AND INFORMATION-TECHNOLOGY EMPLOYMENT NEEDS

Recently, Georgia Power conducted a workforce analysis of the cybersecurity jobs in the Central Savannah River Area [CSRA]. The study called for a comprehensive survey of the cyber- and information technology-related employment needs of local companies. The CI|MPA Cybersecurity Workforce Study conducts this survey of companies, nonprofits, and public agencies in the Augusta Metro area. Based on the survey results:

- The organizations that participated in the survey expect to increase their cybersecurity work force by 138%, or 839 positions, in the next five years. It is important to note that this large percentage of growth does not include new businesses that will be created as the community becomes more of a cyber hub.
- Extrapolating from the 1,554 organizations in the metro area identified to participate in the study, the total cybersecurity workforce will increase by as many as 4,662 if those organizations create as projected an average of three jobs each over the next two to five years.
- Most organizations surveyed [51%] do not outsource any portion of their cybersecurity needs. This means that Augusta University’s academic programs will have opportunities to help train and educate the local cyber workforce.
- The most desired degrees by companies are bachelor’s and master’s degrees in information technology|computer science.

3The Bureau of Labor Statistics (BLS) data includes occupations in cybersecurity and also cyber-related positions in information technology. Therefore, throughout the paper, we refer to the BLS occupations as cyber-related | IT jobs. The survey analysis examines occupations that are primarily cybersecurity.
The Augusta-Richmond County Metropolitan Statistical [Augusta Metro] area is experiencing rapid growth in its cybersecurity and information technology sectors. The United States Army's decision to relocate its Cyber Command facilities and staff to Fort Gordon is driving this community's economic growth. This economic opportunity is bringing the community together around a vision of the area as an innovative hub for cybersecurity and cyber-related IT industries.

To help describe the community's growth in cyber-related IT occupations, the Cyber Institute [CI] and Master of Public Administration [MPA] Program conducted a cybersecurity workforce study. The study is comprised of two analyses: 1| an analysis of the current cyber-related IT occupations in the Augusta Metro and 2| a survey of future cybersecurity-related needs of businesses, nonprofits, and public agencies in the metro area. The goal of the study is to describe the community's cybersecurity-related occupations, examine future growth, and provide information for Augusta University, local policy makers, and the Augusta-area community about cybersecurity workforce needs.

Georgia's cybersecurity workforce is estimated to be 28,368 with approximately 12,783 cybersecurity job openings [Cyberseek, 2017]. The Augusta Metro area is poised to be a national and international center for jobs in the technology sectors. For example, a 2011 Brookings Institute Report found that the metro area's employment is comprised of 20% science, technology, engineering, and mathematics jobs [Brookings Institute, 2011]. Industry experts estimate that the cybersecurity industry will contribute up to $1 billion to the Augusta economy [Cline, 2017]. Recently, Fortune [Roberts, 2017] identified Augusta as one of seven cities that may be on track to be the world's cybersecurity capital.

Analyses of the cyber-related IT workforce in the Augusta Metro indicate that the area is moving...

“...The workforce study is comprised of two analyses: 1| an analysis of the current cyber-related IT occupations in the Augusta Metro...”

4 According to the Cyberseek website, the database “is supported by the National Initiative for Cybersecurity Education [NICE] a program of the National Institute of Standards and Technology in the US Department of Commerce.” The database is intended to help students, educators, and professionals by supplying information on the cybersecurity labor supply. The Cyberseek data are produced by partnerships between Burning Glass, the Computing Technology Industry Association [CompTIA], and the National Initiative for Cybersecurity Education [NICE].
toward being a cyber hub. According to the United States [US] Bureau of Labor [BLS] statistics, the rate of growth for jobs in cyber-related | IT positions is projected to be faster than the average rate of growth for all other occupations. The Augusta Metro cyber | IT workforce, including Fort Gordon, is estimated to be 12,716 occupations, which is 5.3% of the total workforce. The cyber-related | IT positions in the Augusta Metro are high paying jobs with salaries greater than the metro area’s mean salary for all other occupations. The mean annual salary for cyber-related | IT jobs ranges from $46,150 to $110,390 with the mean non-cyber occupations paying on average $43,450.

The 2017 CI | MPA Cybersecurity Workforce Study finds that the current cybersecurity-related workforce in the Augusta Metro is strong and is projected to significantly grow in the future. Overall, the 2017 CI | MPA Cybersecurity Workforce Study finds that the current cybersecurity-related workforce in the Augusta Metro is strong and is projected to significantly grow in the future. The study’s survey found that businesses, nonprofits, and public agencies in the Augusta Metro expect to increase their cybersecurity workforce in the next five years by 138%, adding 839 positions. It is important to note that this large percentage of growth does not include new businesses that will be created as the community becomes more of a cyber hub.

“...2 | a survey of future cybersecurity-related needs of businesses, nonprofits, and public agencies in the metro area.”

Site of the future James M. Hull William D. McKnight Georgia Cyber Innovation and Training Center on the Augusta University Riverfront Campus, located in downtown Augusta.
The study examines the cyber-related IT workforce in the Augusta Metropolitan Statistical Area. As of 2014, the Augusta Metro is home to an estimated 580,000 people that live in counties and cities in Georgia and South Carolina. The counties are Burke, Columbia, Lincoln, McDuffie, and Richmond in Georgia and Aiken and Edgefield in South Carolina. For the study, cyber-related IT positions are broadly defined as occupations that require workers to be knowledgeable about cybersecurity as part of their overall job responsibilities. The workforce study is comprised of two analyses: 1 | an analysis of the current cyber-related IT occupations in the Augusta Metro; and 2 | a survey of Augusta-area businesses, nonprofits, and public agencies about their future cyber-related IT needs.

To describe the current workforce, we examined 2016 occupational data from the US Bureau of Labor Statistics [BLS] and other studies examining cyber-related IT positions. The analysis is intended to provide a snapshot of the community’s current cyber IT workforce. The snapshot will be used to help track the growth of the workforce in future studies. Since we examined one year, this is a cross-sectional analysis of the Augusta Metro’s current cyber-related IT workforce. The data sources are detailed in the cross-sectional employment section in this report. The analysis defines cyber-related IT occupations broadly by examining occupations that require workers to be knowledgeable about cybersecurity as part of their overall job responsibilities. The individuals in these positions can range from IT generalists to highly specialized software engineers and/or cybersecurity personnel.
To estimate future growth in the cyber workforce, we conducted an online survey of 1,554 private companies, nonprofits, and public agencies in the Augusta Metro area. The Augusta Metro includes the following counties: Richmond, Burke, Columbia, Lincoln, and McDuffie in Georgia and Aiken and Edgefield in South Carolina. Of the 1,554 organizations surveyed, 278 completed the CI|MPA Cybersecurity Workforce Survey. This is a response rate of approximately 18%. The survey took most respondents approximately 15-20 minutes to complete.

The full survey is included in Appendix A. The survey requested the following information:

- type of organizations [i.e., private, nonprofit, or public agency]
- number of total employees that work in the organizations
- current size of the organizations’ cyber-related | IT workforce
- projected growth of the cyber-related | IT positions in the surveyed organizations
- cyber-related | IT training and education needs of the organizations
- challenges facing organizations when trying to fill cyber-related | IT occupations

Generally speaking, the survey respondents broadly reflect the Augusta Metro economic environment. The 278 responding organizations includes companies, nonprofits, and public agencies. The sizes of the organizations range from zero to more than 1,000 employees. The organizations with zero employees were nonprofits staffed by volunteers. The average number of employees in the 278 organizations is 124. Private companies represent a majority of the responding organizations with 54% being private businesses and 8% being publicly traded companies. Accordingly, 62% of the sample is comprised of organizations from the private sector. Forty-eight percent of the Augusta Metro’s top 25 IT companies completed the survey.

Nonprofits and public agencies represented a smaller, but significant, percentage of the sample. The Augusta Metro is home to one of the largest concentrations of nonprofits in the nation [Cline, 2016]. Therefore, we were not surprised that 27% of the sample was comprised of nonprofits. Lastly, 10% of the sample identify as public agencies—federal, state, regional, or local governments. We discuss the composition of the sample in greater detail in the survey section of this report.
The cross-sectional employment analysis presents occupational data on the community’s current information technology (IT) workers in positions where they need to understand cybersecurity. The analysis defines cyber-related IT occupations broadly by examining occupations that require workers to be knowledgeable about cybersecurity as part of their overall job responsibilities. The individuals in these positions can range from IT generalists to highly specialized software engineers and/or cybersecurity personnel.

The data on the current cyber IT workforce primarily comes from the US Bureau of Labor Statistics (BLS) data on employment in the Augusta Metropolitan Statistical Area. This area includes the following counties: Aiken (SC), Burke (GA), Columbia (GA), Edgefield (SC), Lincoln (GA), McDuffie (GA), and Richmond (GA) (Bureau of Labor Statistics, 2017).


In order to understand employment and salary for cybersecurity-related IT employment, data was collected from the US Bureau of Labor Statistics Occupational Employment Statistics (OES) program. OES is often used in studies examining the size of an industry’s workforce and wage information [Barth, Davis, Freeman, & Wang, 2016; Cyber Center for Excellence, 2014; Piiparinen, & Russell, 2016]. The OES program conducts a biannual mail survey of nonfarm work establishments in order to produce employment and wage estimates for specific occupations. Each six-month panel examines roughly 200,000 establishments. Data collected from the survey is used to build occupational estimates and wage estimates for the nation, state, and metropolitan levels. Each estimate is based upon findings and trends from the previous six survey periods. Occupations reported by the establishments are coded into one of the Office of Management and Budget’s 2010 Standard Occupational Classification (SOC) system categories.

We identified SOC categories that are cyber-related IT occupations. We used the definitions in the 2010 Standard Occupational Classification system to identify job categories that contained the skill set, education, and/or general tasks which require training in cybersecurity. The positions are detailed in Table 1. As stated, the study adopts a broad definition of cyber-related IT positions as technology occupations where the worker needs to possess an understanding of cybersecurity. Using the 2010 Standard Occupational Classification categories, estimates for the number of cyber-related IT occupations and the respective wage for the category were calculated. Again, this information is presented in Table 1. Lastly, we relied on data from the BLS career handbook and the Occupational Network Database to understand the typical level of education and the required number of years of experience for individuals in the various categories of cyber-related IT positions.

While the OES report does survey private, nonprofit, and public sectors, the analysis excludes military-specific occupations. Therefore, estimates derived from the OES survey exclude military personnel. Being that Fort Gordon and its cyber IT workforce are of particular importance in the Augusta Metro area, the number of cyber-related IT positions on the base were provided by Fort Gordon data sources [IMCOM, 16]. It should be noted that the information on Fort Gordon’s workforce is not available in SOC-related positions. Wage information, education level, and typical years of experience were also not available for military positions.

| Table 1 shows how the cyber-related IT workforce includes 2,880 positions, which is 1.4% of the total employment in the Augusta Metro area of 213,890 in 2016. The top six categories for cyber-related IT jobs in the Augusta Metro are: Computer Support Specialist [19%]; Other Computer Occupations [13%]; Computer System Analyst [13%]; Software Developers, Applications |
**TABLE 1**

**AUGUSTA METRO [AUGUSTA-RICHMOND METROPOLITAN STATISTICAL AREA CYBER|IT EMPLOYMENT AND WAGE ESTIMATES 2016**

<table>
<thead>
<tr>
<th>SOC Job Code</th>
<th>Occupation</th>
<th>Employment</th>
<th>Percentage of Total Positions</th>
<th>Annual Mean Wage [$]</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-3021</td>
<td>Computer &amp; Information Systems Manager</td>
<td>230</td>
<td>8%</td>
<td>$110,390</td>
</tr>
<tr>
<td>15-1121</td>
<td>Computer Systems Analyst</td>
<td>380</td>
<td>13%</td>
<td>$63,920</td>
</tr>
<tr>
<td>15-1122</td>
<td>Information Security Analysts</td>
<td>90</td>
<td>3%</td>
<td>$84,010</td>
</tr>
<tr>
<td>15-1131</td>
<td>Computer Programmers</td>
<td>100</td>
<td>3%</td>
<td>$74,030</td>
</tr>
<tr>
<td>15-1132</td>
<td>Software Developers, Applications</td>
<td>310</td>
<td>11%</td>
<td>$74,660</td>
</tr>
<tr>
<td>15-1133</td>
<td>Software Developers, Systems Software</td>
<td>170</td>
<td>6%</td>
<td>$93,080</td>
</tr>
<tr>
<td>15-1134</td>
<td>Web Developers</td>
<td>50</td>
<td>2%</td>
<td>$68,810</td>
</tr>
<tr>
<td>15-1141</td>
<td>Database Administrators</td>
<td>80</td>
<td>3%</td>
<td>$80,610</td>
</tr>
<tr>
<td>15-1142</td>
<td>Network &amp; Computer Systems Administrators</td>
<td>330</td>
<td>11%</td>
<td>$74,320</td>
</tr>
<tr>
<td>15-1143</td>
<td>Computer Network Architects</td>
<td>100</td>
<td>3%</td>
<td>$93,690</td>
</tr>
<tr>
<td>15-1151</td>
<td>Computer User Support Specialists</td>
<td>560</td>
<td>19%</td>
<td>$46,150</td>
</tr>
<tr>
<td>15-1152</td>
<td>Computer Network Support Specialists</td>
<td>120</td>
<td>4%</td>
<td>$49,990</td>
</tr>
<tr>
<td>15-1199</td>
<td>Computer Occupations, All Others</td>
<td>360</td>
<td>13%</td>
<td>$80,700</td>
</tr>
</tbody>
</table>

**Total Number of Positions:** 2,880 100%  
**Est. Mean Wage:** $72,324


[11%]; Network & Computer Systems Administrators [11%]; and Computer & Information Systems Manager [8%]. The estimated annual mean wage for this group was $72,324 and salaries ranged from $46,150 to $110,390, which is significantly higher than the 2016 annual mean wage of the Augusta Metro area, which was $43,450. The BLS data presented in this section is mostly IT occupations and not pure cybersecurity occupations. It needs to be noted that the average salary for pure cybersecurity employees is significantly higher than the figures collected from the BLS data. For instance, the average salary of cybersecurity professionals surveyed by [ISC]² was $97,778 in 2015 [Suby and Dickson, 2015].
### Table 2
#### Augusta Metro [Augusta-Richmond Metropolitan Statistical] Area Cyber IT Employment and Education

<table>
<thead>
<tr>
<th>SOC Job Code</th>
<th>Occupation</th>
<th>Typical Education Requirement</th>
<th>Typical Job Exp. Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-3021</td>
<td>Computer &amp; Information Systems Manager</td>
<td>Bachelor's †</td>
<td>5 years</td>
</tr>
<tr>
<td>15-1121</td>
<td>Computer Systems Analyst</td>
<td>Bachelor's †</td>
<td>None</td>
</tr>
<tr>
<td>15-1122</td>
<td>Information Security Analysts</td>
<td>Bachelor's †</td>
<td>&gt; 5 years</td>
</tr>
<tr>
<td>15-1131</td>
<td>Computer Programmers</td>
<td>Bachelor's</td>
<td>None</td>
</tr>
<tr>
<td>15-1132</td>
<td>Software Developers, Applications</td>
<td>Bachelor's †</td>
<td>None</td>
</tr>
<tr>
<td>15-1133</td>
<td>Software Developers, Systems Software</td>
<td>Bachelor's †</td>
<td>None</td>
</tr>
<tr>
<td>15-1134</td>
<td>Web Developers</td>
<td>Associate's</td>
<td>None</td>
</tr>
<tr>
<td>15-1141</td>
<td>Database Administrators</td>
<td>Bachelor's</td>
<td>&gt; 5 years</td>
</tr>
<tr>
<td>15-1142</td>
<td>Network &amp; Computer Systems Administrators</td>
<td>Bachelor's</td>
<td>None</td>
</tr>
<tr>
<td>15-1143</td>
<td>Computer Network Architects</td>
<td>Bachelor's †</td>
<td>None</td>
</tr>
<tr>
<td>15-1151</td>
<td>Computer User Support Specialists</td>
<td>Bachelor's/Associate/Post-Secondary Certificate</td>
<td>None</td>
</tr>
<tr>
<td>15-1152</td>
<td>Computer Network Support Specialists</td>
<td>Associate's/Post-Secondary Certificate</td>
<td>None</td>
</tr>
<tr>
<td>15-1199</td>
<td>Computer Occupations, All Others</td>
<td>Bachelor's, Associate, or Post-Secondary Certificate</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: 2017 Bureau of Labor Statistics Occupational Handbook. Note: † Indicates that in an employee survey by Occupational Network Database in conjunction with BLS, at least 10% indicated of those surveyed in the SOC Job Category had obtained a Post Bachelors Certificate or a Degree beyond BA/BS.

### Educational Requirements and Work Experience

Table 2 contains the educational requirements and work experience needed for the identified cyber-related IT occupations. Nine of the 13 occupations normally require a bachelor's degree. The other occupations normally require less than a bachelor's degree. Accordingly, most of the cyber-related IT occupations require a high level of education. Other studies support this finding. According to a study conducted by Burning Glass Technologies [2015], the need for advanced education is greater for cyber-related IT occupations. The study found five out of every six cybersecurity job postings require at least a bachelor's degree.

An Occupational Network Database and BLS survey found six categories to have over 10% of individuals with education beyond the bachelor's degree. The education beyond a bachelor's degree includes post-bachelor’s certificates, master’s degrees, and doctoral degrees.
Fort Gordon Cyber-Related IT Workforce

Fort Gordon personnel are not included in the SOC and BLS data presented in Tables 1 and 2. Given the importance of Fort Gordon’s employment to the Augusta Metro’s cyber | IT workforce, we obtained data on occupations housed at the base. According to the US Army Installation Management Command [IMCOM, 2016], there were 25,885 military and civilian personnel who worked at Fort Gordon. Of those, we estimate 38%, or 9,826 jobs, are positions directly related to cyber | IT. Augusta Metro’s Total Cyber-Related IT Workforce

When the information from Fort Gordon is combined with the BLS data, we estimate the Augusta Metro’s cyber | IT workforce is comprised of 12,716 positions, which is 5.3% of the overall community’s total workforce [239,775 estimated jobs].

Employment in these categories are only expected to grow. According to the US Bureau of Labor Statistics [BLS], the rate of growth for jobs in cybersecurity is projected to be faster than the average for all other occupations. BLS expects demand for cybersecurity professionals will grow by 53% nationwide. Furthermore, Burning Glass [2015] reported that cybersecurity jobs grew 3.5 times faster than any other IT job and 12 times faster than other jobs from 2010-2014.

Georgia, in particular, appears to be a magnet for cyber-related IT jobs. The Georgia Department of Labor [2016] has identified a number of cyber-related IT positions as “Hot Careers.” These are occupations, for which job growth is expected to be faster than state annual average job growth, that will pay above the state annual average wage and will have at least 100 annual openings. Burning Glass [2015] reported that the number of job postings for cybersecurity positions in Georgia has increased by 121% from 2010-2014.

The Georgia Department of Labor [2017a, b] has projected that the Augusta Metropolitan region will experience positive job growth in cyber-related IT positions in both the short [to 2018] and long term [to 2022]. These projections do not include the new investments in cybersecurity by Augusta University and the State of Georgia or the relocation of Department of Defense personnel, both civilian and non-civilian, to Fort Gordon. Accordingly, the cyber-related IT growth is expected to be even greater than projected by the Georgia Department of Labor.

Though growth is expected, there still exists a gap. There are simply not enough individuals going into the field of cybersecurity to meet the demand. However, a recent survey conducted by Raytheon [2016] found, while there still is a large gap, the percentage of US millennials that are interested in a career in cyber has increased from 33% in 2015 to 43% in 2016. Augusta University and other educational institutions in the Augusta Metro will need to address this gap.

To do so, we must better understand what companies, nonprofits, and public agencies need to educate future cyber | IT workers and prepare for the growth of cybersecurity jobs. While this look at secondary data is important, it does not address future cyber | IT employment needs or take into account recent investments into the community. For these reasons, we conducted a survey of the Augusta Metropolitan employers to understand the current size of the cybersecurity workforce and the needs of employers in the area.

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6 The authors thank the CSRA Alliance, in particular Tom Clark, for providing the information concerning the percentage of Fort Gordon employees who are directly related to cybersecurity.
7 This estimate does not include individuals who are not in cyber-related positions but have work responsibilities that may be related to information technology. For example, individuals in the Intelligence Command and Medical Command have responsibilities related to cybersecurity but are not included in the 38% because specific information was not available.
8 The community’s total workforce includes the non-military occupations from the BLS and the occupations at Fort Gordon.
In order to better understand the cyber workforce, we conducted an online survey of private, public, and nonprofit organizations in the Augusta Metro. The CI|MPA Cybersecurity Workforce Survey’s objective is to describe the cyber-related needs of all organizations in the community, not just the large cyber firms. Thus, the respondents to the survey include a wide range of industries. For the purpose of the survey, we defined cybersecurity personnel as employees whose primary role is protecting confidentiality, integrity, and availability of information and computing assets through risk management. The survey and the methods used in data collection were approved by the Augusta University Institution Review Board.  

We constructed a database of 1,554 organizations in the Augusta Metro area using information from the Augusta Metro Chamber of Commerce, the Columbia County Chamber of Commerce, the Aiken County Chamber of Commerce, and the CSRA Alliance. We administered the survey by email using Qualtrics, an online survey provider to collect survey responses. We received 278 usable survey responses, which is a response rate of 18%.

The survey, located in Appendix A, requested information from organizations concerning the characteristics of the organization; the current size of their cybersecurity workforce; the training deemed important by the firm for current and future needs.

Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Study

[FIGURE 1]

OF THE FOLLOWING CATEGORIES, WHAT ONE BEST DESCRIBES YOUR ORGANIZATION?

Federal Gov. 2%

Local Gov. 4%

State or Regional Gov. 4%

Private Business 54%

Publicly Traded Business 8%

Nonprofit 27%

Missing 1%

10 Documentation is available upon request to the corresponding author, William Hatcher [wihatcher@augusta.edu].
cybersecurity personnel; the future cybersecurity personnel needs of the firm; and the experience the organization has had trying to fill cybersecurity roles in the Augusta Metro area.

The first questions in the survey asked respondents about the characteristics of their organizations. The organizations that responded ranged from 0 to more than 1,000 employees with an average number of employees of 124. Figure 1 displays information pertaining to the type of organization surveyed. We detailed the composition of the sample in the study’s methodology section.

Respondents were asked to identify the sub-sector in which their organization belongs. Table 3 shows the largest responding sub-sectors were healthcare [9.7%], government [7.6%], education [7.6%], and finance and insurance [6.1%]. It should be noted that “other” was the largest category, and includes a variety of businesses.

Next, the survey asked respondents to estimate characteristics and size of their current cyber workforce. Table 4 shows that 50.7% of the organizations completely maintain their cybersecurity operations in-house. Significantly, this means that many of the companies are more likely to house cyber-related jobs in the Augusta Metro area than to outsource them to other communities.

**Table 3**

**What is your organization’s primary business sector?**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts, Entertainment &amp; Recreation</td>
<td>13</td>
<td>4.7</td>
</tr>
<tr>
<td>Construction</td>
<td>12</td>
<td>4.3</td>
</tr>
<tr>
<td>Education</td>
<td>21</td>
<td>7.6</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>17</td>
<td>6.1</td>
</tr>
<tr>
<td>Government</td>
<td>21</td>
<td>7.6</td>
</tr>
<tr>
<td>Healthcare</td>
<td>27</td>
<td>9.7</td>
</tr>
<tr>
<td>Hospitality</td>
<td>12</td>
<td>4.3</td>
</tr>
<tr>
<td>Information</td>
<td>10</td>
<td>3.6</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>10</td>
<td>3.6</td>
</tr>
<tr>
<td>Mining, Quarrying &amp; Oil</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Public Administration</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Real Estate, Rental &amp; Leasing</td>
<td>16</td>
<td>5.8</td>
</tr>
<tr>
<td>Retail</td>
<td>13</td>
<td>4.7</td>
</tr>
<tr>
<td>Transportation &amp; Warehousing</td>
<td>4</td>
<td>1.4</td>
</tr>
<tr>
<td>Wholesale</td>
<td>4</td>
<td>1.4</td>
</tr>
<tr>
<td>Other</td>
<td>94</td>
<td>33.6</td>
</tr>
<tr>
<td>Did not answer</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>278</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Study

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11 The organizations that responded with zero employees were nonprofit organizations run by volunteers.
A smaller percentage of organizations [36.1%] outsource at least some of their cybersecurity for at least some of their operations. We asked these organizations what types of cyber-related tasks they outsource. We found the following:

- 56 organizations indicate that their most outsourced task is network monitoring
- 49 organizations indicate that they outsourced all cybersecurity needs
- 28 organizations indicate that their most outsourced task is incident response

Next, we asked organizations to discuss why they outsourced those cybersecurity tasks. We found the following:

- 51 organizations indicate that it was to reduce risk
- 48 organizations indicate that outsourcing creates more free time for employees to focus on the overall mission of the organization

- 41 organizations indicate that they lack needed personnel12

The final question in this section asked about the current size of the organization’s full-time cybersecurity workforce. Answers ranged from 0 -100, with a total cybersecurity workforce of 605 employees.

### Table 4
**Does your organization outsource any of its cybersecurity needs?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100</td>
<td>36.0</td>
</tr>
<tr>
<td>No</td>
<td>141</td>
<td>50.7</td>
</tr>
<tr>
<td>I do not know</td>
<td>35</td>
<td>12.6</td>
</tr>
<tr>
<td>Did not answer</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>278</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey*

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12 Some companies explained they had other reasons for outsourcing such as: “required by contract,” “as part of [a] state partnership,” and “too small to have our own person.”
Additionally, respondents were asked questions concerning the current demand for cyber employees and the skills they desire in future hires. Table 5 displays information pertaining to how many unfilled and/or vacant cybersecurity positions are in the responding organizations. Answers ranged from 0 - 20 for a total of 92 unfilled or vacant cybersecurity positions. Of those organizations that did have unfilled or vacant positions, 26 organizations had between 1 and 3 positions unfilled or vacant.

Respondents were also asked the titles of the positions they were trying to fill, with responses including: cyber analyst, IT engineer, security analyst, MSSP operations, systems administrator, systems engineering, data scientist, and trainers. Furthermore, when asked why vacant positions have not been filled, the 53 organizations that responded indicated lack of qualified employees [13.2%], lack of funding to pay qualified employees [13.2%], currently filling the positions soon [15.1%], and issues retaining employees [3.7%]. Additionally, 54.7% had other

### Table 5

**How many unfilled and/or vacant full-time cybersecurity positions do you currently have in your organization in the Augusta Metropolitan Region?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>Total Number of Vacancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>190</td>
<td>68.3</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>5.7</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>.7</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>1.1</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>.4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>.4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>.4</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>.4</td>
<td>8</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>.7</td>
<td>40</td>
</tr>
<tr>
<td>Did not answer</td>
<td>61</td>
<td>21.9</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>278</strong></td>
<td><strong>100</strong></td>
<td><strong>92</strong></td>
</tr>
</tbody>
</table>

*Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey*
We also asked respondents about their future need for cyber employees. We did this by posing two questions:

- How many new cyber employees do you estimate hiring in the Augusta Metro Region in the next year? [See Table 6]
- How many new cyber employees do you plan to hire in the next 2-5 years? [See Table 7]

When questioned about how many new cybersecurity employees they are hiring in the next year, answers ranged from 0 to 30, and of organizations that were looking to add to their cybersecurity workforce most were planning on adding 1 to 2 positions. The organizations in the survey are planning on adding a total of 207 new cybersecurity positions in the next year.

“The organizations in the survey are planning on adding a total of 207 new cybersecurity positions in the next year.”
We asked organizations to identify the skills that these cyber hires will need. Their answers included the following:

- “ability to protect the network and engage in proper damage control upon incident”
- “Scan, patch, network monitoring, firewall administration and monitoring”
- “At least an associate’s degree in cybersecurity with skills in ethical hacking, firewall protection, intrusion prevention, etc.”
- “CCNA/SEC+/CISSP”
- “Penetration testing, regulatory compliance, network monitoring”
- “Fire wall protection, data recovery”

Over the next two to five years, organizations are planning to hire 632 positions, which would more than double the current size of the responding organizations’ cyber workforces. When asked about which skills these hires will need, responses included:

- “Network and database security skills”; “Knowledge of Firewalls, virus detection and prevention, [and] hacking prevention”
- “Computer Network Defense, Intrusion Detection/Prevention System design/development/management, certifications [DoD 8570.01M], firm understanding of active directory, [and] GPO and network configurations”
- “Defensive tactics, policy management, forensic analysis”

**Table 6**

**IN THE NEXT YEAR, HOW MANY NEW CYBERSECURITY EMPLOYEES DO YOU ESTIMATE HIRING IN THE AUGUSTA METROPOLITAN REGION?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>Number of New Hires</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>166</td>
<td>59.7</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td>7.9</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>2.9</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0.4</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>1.8</td>
<td>25</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>0.4</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>1.1</td>
<td>30</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>0.4</td>
<td>13</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>0.4</td>
<td>16</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>0.7</td>
<td>40</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>0.4</td>
<td>30</td>
</tr>
<tr>
<td>Did not answer</td>
<td>66</td>
<td>23.7</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>278</strong></td>
<td><strong>100</strong></td>
<td><strong>207</strong></td>
</tr>
</tbody>
</table>

*Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey*
Another important aspect of understanding the future needs of employers is to understand what skills they perceive are lacking in the current workforce.

First, we asked which basic occupational skills applicants are generally lacking, as seen in Figure 5. The number one response was general knowledge about how a business works [86]. Other top responses included project management [57], computer software [46], and none [46]. Additionally, a number of respondents selected other [51], and provided detailed responses which included: “big data analytics; computer engineering, embedded software development”; “limited IT foundation on either systems or network administration”; and “IP|Sec, micro-segmentation, high level consulting skills.”

### Table 7

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>Number of New Hires</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>121</td>
<td>43.7</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>46</td>
<td>16.6</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>5.4</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0.7</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1.1</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>1.1</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>2.2</td>
<td>60</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>0.4</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>3</td>
<td>1.1</td>
<td>60</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>0.4</td>
<td>25</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>0.4</td>
<td>30</td>
</tr>
<tr>
<td>52</td>
<td>1</td>
<td>0.4</td>
<td>52</td>
</tr>
<tr>
<td>81</td>
<td>1</td>
<td>0.4</td>
<td>81</td>
</tr>
<tr>
<td>100</td>
<td>2</td>
<td>0.4</td>
<td>200</td>
</tr>
<tr>
<td>Did not answer</td>
<td>72</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>278</strong></td>
<td><strong>100</strong></td>
<td><strong>632</strong></td>
</tr>
</tbody>
</table>

Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey
Second, we inquired about what soft skills applicants were lacking, see Figure 6. Respondents’ top responses included: written communication [83]; time-management [76]; critical thinking [68]; conflict resolution [62]; motivation [61]; and oral communication [60]. Furthermore, we asked if there were other soft skills that applicants are generally lacking, responses included: “customer service skills” and “entrepreneurship, ambition”.

Figure 5
What occupational skills are applicants generally lacking? [Select all that apply]

Source: 2017 Augusta Metro CI|MPA Cyber Workforce Study
The last set of questions were general questions about cybersecurity employment. We asked respondents to identify what is important for their organization when hiring cybersecurity professionals [See Table 8]. The five top answers were: cybersecurity work experience, network security monitoring, risk management skills, cybersecurity certifications, and business continuity skills.

Next, respondents were asked which cybersecurity certifications are considered important for your organization [See Table 9]. The number one certification was entry level [e.g. Security +]. This was followed by advanced managerial [e.g. CISSP, CISM], intermediate [e.g. CASP, GSEC] and advanced specialized [e.g. GSE, GPEN].

To provide information regarding education requirements, we asked organizations to rank which degrees and military occupations are needed for cyber-related employees. A college education was identified as being a requirement for most organizations. The respondents...
### Table 8

**Which of the following are important to your organization when hiring cybersecurity professionals? [Select all that apply]**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cybersecurity work experience</td>
<td>91</td>
<td>32.7%</td>
</tr>
<tr>
<td>Cybersecurity certifications</td>
<td>70</td>
<td>25.2%</td>
</tr>
<tr>
<td>College degrees</td>
<td>38</td>
<td>13.7%</td>
</tr>
<tr>
<td>Healthcare security skills</td>
<td>21</td>
<td>7.6%</td>
</tr>
<tr>
<td>Digital Forensics skills</td>
<td>16</td>
<td>5.8%</td>
</tr>
<tr>
<td>Penetration/Security testing skills</td>
<td>29</td>
<td>10.4%</td>
</tr>
<tr>
<td>Network security monitoring</td>
<td>88</td>
<td>31.7%</td>
</tr>
<tr>
<td>Incident response skills</td>
<td>54</td>
<td>19.4%</td>
</tr>
<tr>
<td>Risk management skills</td>
<td>81</td>
<td>29.1%</td>
</tr>
<tr>
<td>Security policy skills</td>
<td>59</td>
<td>21.2%</td>
</tr>
<tr>
<td>Business continuity skills</td>
<td>63</td>
<td>22.7%</td>
</tr>
<tr>
<td>Legal compliance skills</td>
<td>55</td>
<td>19.8%</td>
</tr>
<tr>
<td>Security clearance</td>
<td>23</td>
<td>8.3%</td>
</tr>
<tr>
<td>Other</td>
<td>39</td>
<td>14.0%</td>
</tr>
</tbody>
</table>

*Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey*

### Table 9

**Which cybersecurity certifications do you consider important for your organization? [Select all that apply]**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>29</td>
<td>10.4%</td>
</tr>
<tr>
<td>I do not know</td>
<td>122</td>
<td>43.9%</td>
</tr>
<tr>
<td>Advanced Managerial (e.g. CISSP, CISM)</td>
<td>20</td>
<td>7.2%</td>
</tr>
<tr>
<td>Advanced Specialized (e.g. GSE, GPEN)</td>
<td>15</td>
<td>5.4%</td>
</tr>
<tr>
<td>Intermediate (e.g. CASP, GSEC)</td>
<td>16</td>
<td>5.8%</td>
</tr>
<tr>
<td>Entry Level (e.g. Security +)</td>
<td>25</td>
<td>9.0%</td>
</tr>
<tr>
<td>NSA specified CAE-Cyber Defender Basic</td>
<td>5</td>
<td>1.8%</td>
</tr>
<tr>
<td>NSA specified CAE-Cyber Defender Advanced</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>NSA specified CAE-Cyber Ops</td>
<td>5</td>
<td>1.8%</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

*Source: 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey*
ranked a bachelor’s degree in IT or cybersecurity as number one and a master’s degree in IT or cybersecurity as number two. A bachelor’s degree in non-IT or cybersecurity was ranked third and a master’s degree in information security management was ranked fourth.

We asked employers about the education and continuing education benefits that they provide to their employees. One benefit that is becoming more popular is tuition reimbursement. Of the organizations surveyed, 18.3% offered tuition reimbursement for employees [See Table 10]. Additionally, we asked if the organization provides reimbursement for conferences, tech training, or professional development. Over half [51.6 %] of the organizations said that they do offer one or more of these benefits to employees.

To close our survey, we asked organizations what the community can do to help with their cybersecurity challenges. Most of the assistance revolves around training through workshops and conferences. The answers included:

- “Ensuring there is a trained pool of workers available”
- “Workshops and lunch and learns are always great”
- “Provide conferences and workshops”
- “Act as catalyst for cybersecurity issues keep the Cyber Center for Innovation and Excellence on track [with] cyber-focused education.”

### Table 10
**Does Your Organization Support Employee Tuition Reimbursement?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>71</td>
<td>18.3</td>
</tr>
<tr>
<td>No</td>
<td>121</td>
<td>31.7</td>
</tr>
<tr>
<td>Did not answer</td>
<td>191</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>383</td>
<td>100</td>
</tr>
</tbody>
</table>

**Source:** 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey

### Table 11
**Does Your Organization Support Employee Reimbursement for Conferences, Tech Training, or Professional Organization Membership?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>144</td>
<td>51.6</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>12.6</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>4.7</td>
</tr>
<tr>
<td>Did not answer</td>
<td>86</td>
<td>31.1</td>
</tr>
<tr>
<td>Total</td>
<td>278</td>
<td>100</td>
</tr>
</tbody>
</table>

**Source:** 2017 Augusta Metro CI|MPA Cybersecurity Workforce Survey
Cybersecurity is poised to be one of the fastest growing areas of employment both locally and nationwide [BLS, 2017]. With the potential of Augusta becoming a cyber hub, this report is a timely investigation of the cybersecurity workforce. It not only provides updated statistics concerning the workforce in previous studies, such as Georgia Power Community and Economic Development's [2017] study, but it also reports the results of a survey of all types of organizations in the Augusta Metropolitan Statistical area concerning their current and future cybersecurity needs. Each analysis, the cross-sectional employment data and the survey, has key findings.

The cross-sectional employment analysis found that the current size of the cyber-related IT workforce outside of Fort Gordon is an estimated 2,880 occupations [1.4% of the metro’s workforce]. Including Fort Gordon increases the cyber IT workforce to an estimated 12,716 occupations [5.3% of the metro’s workforce]. The analysis shows that these cyber-related IT positions are high-wage jobs with average salaries ranging from $46,150 to $110,390. These occupations require a high level of education with most in the Augusta Metro cybersecurity workforce requiring at least a bachelor’s degree.

Based on the results of this research, limited projections regarding the growth of the Augusta Metro cybersecurity workforce and its economic impact on the local economy can be made. The 278 organizations that participated in the survey expect to increase their cybersecurity workforce in the next five years by 839 positions, a growth rate of 138%. This is an average of three jobs per organization. If the 1,554 organizations sampled in the Augusta Metro area create the average projection of three cybersecurity jobs, the total workforce will increase by an estimated 4,662 in the next five years. This significant growth does not include positions created at Fort Gordon or new organizations moving to the area.

The cyber IT workforce will also make a significant financial contribution to the Augusta Metro economy. Based on the US Bureau of Labor statistics [BLS], the average salary of cyber-related IT jobs is $72,324 [See Table 1]. Using this estimate, the projected increase of 4,662 positions will produce more than $337 million of salary income for the Augusta community. However, the salary impact on the local
The $72,324 average salary is based on the BLS data that includes the salaries of general IT positions with salaries lower than most personnel that work primarily in cybersecurity. To estimate a more accurate salary impact, the average salary of pure cybersecurity professionals should be examined. The study’s survey defined cybersecurity positions as ones where the employee is primarily engaged in cybersecurity activities. Based on data collected by the respected [ISC]², the average US salary for cybersecurity professionals in 2015 was $97,778 [Suby and Dickson, 2015]. This salary may more accurately reflect the cybersecurity jobs expected from the CI|MPA Cybersecurity Workforce Study’s survey results. Using this salary estimate for pure cybersecurity positions, the projected increase of 4,662 occupations will produce an anticipated $455 million of salary income for the Augusta Metro area. These projections should be taken with caution, but based on the data gathered in this research, the local community should expect significant job growth in the cybersecurity workforce that will strengthen Augusta’s overall economy.

Not only are the federal and state governments investing millions into cybersecurity infrastructure in the area, but local government and private industry are also making large investments. The metro’s overall economy will most likely grow due to the multiplying effects of the cybersecurity workforce. The employees in the cyber-related IT positions will earn above average salaries that will be funneled back into the local economy to strengthen the housing market, the retail sector, the tax bases for local governments, and the overall community development efforts of the Augusta community. The growth in the Augusta Metro’s cybersecurity workforce will help strengthen the overall community.
References


On behalf of Augusta University's Master of Public Administration [MPA] program and the Cyber Institute [CI], we invite you to participate in a survey for the 2017 CI|MPA Cybersecurity Workforce Study. The survey was created by Dr. Mark Harris, a faculty member in the Hull College of Business, Dr. William Hatcher, director of the MPA program, and Dr. Wesley Meares, a faculty member in the MPA program. The survey seeks to collect information from local businesses, nonprofits, and public agencies about their cybersecurity employment. We are interested in knowing more about the future cybersecurity employment needs of your organizations. We hope to use this information to help design our cybersecurity programs to serve the employment needs of the Augusta Metro area and the overall state of Georgia.

The Augusta Metro area is facing a unique opportunity to be a high technology hub with the arrival of the US Army Cyber Command Headquarters at Fort Gordon and the new Hull McKnight Georgia Cyber Institute Training Center. We invite you to participate in our study by taking this online survey. By participating in the survey, you will help the Cyber Institute plan for future academic initiatives and projects.

The online survey should take approximately 15 - 20 minutes to complete. The survey is completely voluntary and you may exit by closing the survey at any time, without penalty. While survey software will be communicating with your computer, your IP address will not be reported to the researcher. Data will not be presented in a way that the individuals could be identified. We plan to share anonymized aggregated survey results with the community.

If you have further questions about the study, please contact Dr. William Hatcher at wihatcher@augusta.edu. If you have questions about your rights as a research participant, please contact the Institutional Review Board Office at Augusta University at [706] 721-1483 or email: irb@augusta.edu. By accessing this survey link, you agree to participate in this study. You understand that your participation is voluntary, that your name will not be associated with your responses and you are 18 years or older. Thank you for your time and participation in this survey.

Dr. Mark Harris
Dr. William Hatcher
Dr. Wesley Meares
1. What is the zip code for your organization’s main location in the Augusta Metropolitan Region?

2. Of the following, which one best describes your organization?
   - Private business
   - Publicly traded business
   - Nonprofit
   - Federal government
   - State or regional government
   - Local government

3. What is the size of your organization in the Augusta Metropolitan Region [estimate if needed]?
   - Number of Employees

4. What is your organization’s primary business sector?
   - Agriculture, Forestry, Fishing & Hunting
   - Arts, Entertainment & Recreation
   - Construction
   - Education
   - Finance & Insurance
   - Government
   - Healthcare
   - Hospitality
   - Information
   - Manufacturing
   - Mining, Quarrying & Oil
   - Public Administration
   - Real Estate, Rental & Leasing
   - Retail
   - Transportation & Warehousing
   - Utilities
   - Wholesale
   - Other ________________

5. How would you best describe your job title?
   - Chief Executive Officer [CEO] or Owner
   - Chief Information Officer [CIO]
   - Chief Information Security Officer [CISO]
   - Chief Technology Officer [CTO]
   - IT Manager/Director
   - Security Manager/Director
   - Chief Trust Officer
   - Human Resources Manager
   - Other ________________

6. Definition: Cybersecurity is the role of protecting confidentiality, integrity, and availability of information and computing assets through risk management. Cybersecurity employees are those that perform these duties as their primary job function.

7. Does your organization outsource any of its cybersecurity needs?
   - Yes
   - No
   - I don’t know

8. You indicated your organization outsources cybersecurity needs. Please describe what is outsourced by choosing all that apply.
   - All cybersecurity needs
   - Incident response
   - Network monitoring
   - Employee security awareness training
   - Medical record system
   - Other ________________
9 | You indicated your organization outsources cybersecurity needs. Please describe why you outsource [select all that apply].
   ▶ Save money
   ▶ Lack of local skilled professionals
   ▶ Reduce risk
   ▶ Free time to improve company focus
   ▶ Other ____________________

10 | How many full-time cybersecurity employees do you have in the Augusta Metropolitan Region [estimate if needed]? Cybersecurity employees perform cybersecurity duties as their primary job function.
   ▶ ___Full-time cybersecurity employees

11 | How many unfilled and/or vacant full-time cybersecurity positions do you currently have in your organization in the Augusta Metropolitan Region?
   ▶ ___Open cybersecurity positions

12 | What cyber positions is your organization trying to fill in the Augusta Metropolitan Region?

13 | Why have you not filled your vacant cybersecurity positions? [Select all that apply].
   ▶ We are in the process of hiring and expect open positions to be filled soon
   ▶ Lack of qualified employees in the area
   ▶ Issues retaining the employees
   ▶ Lack of funding to pay the qualified employees
   ▶ Other ____________________

14 | In the next year, how many new cybersecurity employees do you estimate hiring in the Augusta Metropolitan Region?
   ▶ ___Cybersecurity employees

15 | What skills will the cybersecurity hires you make in the next year need?

16 | In the next 2-5 years, how many new cybersecurity employees do you estimate hiring in the Augusta Metropolitan Region?
   ▶ ___Cybersecurity employees

17 | What skills will the cybersecurity hires you make in the next 2-5 years need?

18 | Which basic occupational skills are applicants generally lacking? [Select all that apply].
   ▶ Applied mathematics
   ▶ Computer literacy
   ▶ Computer software
   ▶ Project management
   ▶ General knowledge about how a business works
   ▶ None
   ▶ Other ____________________

19 | Which soft skills are applicants generally lacking? [Select all that apply].
   ▶ Written communication
   ▶ Oral communication
   ▶ Teamwork/Collaboration
   ▶ Adaptability
   ▶ Problem solving
   ▶ Critical thinking
   ▶ Conflict resolution
   ▶ Dependability
   ▶ Honesty
   ▶ Leadership
   ▶ Motivation
   ▶ Time-management
   ▶ None
   ▶ Other ____________________
20| Which of the following are important to your organization when hiring cybersecurity professionals? [Select all that apply].
- Cybersecurity work experience
- Cybersecurity certifications
- College degrees
- Healthcare security skills
- Digital Forensics skills
- Penetration/Security Testing skills
- Network security monitoring skills
- Incident response skills
- Risk management skills
- Security policy skills
- Business continuity skills
- Legal compliance skills
- Security clearance
- Other ________________

21| Which cybersecurity certifications do you consider important for your organization? [Select all that apply].
- None
- I do not know
- Advanced Managerial [e.g. CISSP, CISM]
- Advanced Specialized [e.g. GSE, GPEN]
- Intermediate [e.g. CASP, GSEC]
- Entry level [e.g. Security+]
- NSA specified CAE-Cyber Defender Basic
- NSA specified CAE-Cyber Defender Advanced
- NSA specified CAE-Cyber Ops
- Other ________________

22| Which degrees/military occupations do you consider important for your cybersecurity needs? [Please drag to reorder based upon priority, 1 being the highest priority and 9 being the lowest priority]
- Bachelor’s degree in non-IT|CS area
- Master’s degree in non-IT|CS area
- Bachelor’s in IT|CS
- Master’s in IT|CS
- Master’s in Health IT|Security
- Master’s in Information Security Management
- Military occupation specialty [e.g. 255S, 35D, 17C]
- Other

23| Would your current employees in cybersecurity positions benefit from additional training/education in specific areas? [Select all that apply].
- Healthcare security
- Forensics
- Penetration/Security testing
- Network security monitoring
- Incident response
- Risk management
- Security policy
- Business continuity
- Legal compliance
- Other ________________
24. **How long has your organization been in Augusta Metropolitan Region?**
   - Less than 3 years
   - Between 3 and 5 years
   - Between 6 and 10 years
   - More than 10 years

25. **Augusta University is seeking organizations interested in hosting undergraduate technology-related internships and/or semester-long cybersecurity student projects? Please indicate below if your organization is interested.**
   - Undergraduate technology-related internships
   - Semester-long cybersecurity student projects
   - Maybe
   - No

26. **You indicated an interest in potentially hosting internships or student projects. Please leave your organization name and relevant contact information if you wish for us to follow-up.**
   - Contact Information ________________

27. **What community resources/activities would help your organization be successful in Augusta? [Select all that apply].**
   - Tech conferences
   - Tech training workshops [1-3 hours]
   - Continuing education [1-3 days]
   - Local IT/Security professional organizations
   - Other ________________

28. **Does your organization support employee tuition reimbursement?**
   - Yes
   - No

29. **Does your organization support employee reimbursement for conferences, tech training, or professional organization membership?**
   - Yes
   - No
   - Other ________________

30. **What is the primary challenge you face regarding your cybersecurity employees?**

31. **What are the one or two most effective actions the Augusta community could do to assist your organization with its cybersecurity needs?**

32. **What else would you like for us to know about how Augusta University can help your organization?**

33. **If any, what additional questions should we ask in next year’s survey?**
To participate in next year’s survey, contact the Master of Public Administration [MPA] program at: mpa_program@augusta.edu
Wesley Meares, PhD

Dr. Meares is an Assistant Professor in Political Science and Public Administration at Augusta University. In the Department of Political Science, he teaches classes on public policy and public administration. His research agenda focuses on the effects of public policy on neighborhood- and individual-level outcomes and the administrative features of community and economic development policies. This research extends to the impacts of housing, urban revitalization, community development, and economic development policies. His research has appeared in journals such as Cities, Journal of Urbanism, Journal of Public Affairs Education, and Community Development.

In addition to his peer-reviewed work, Dr. Meares also served as an evaluator for a variety of programs. This includes his work as a co-principle investigator for a series of annual evaluations for the City of Covington’s [KY] HOPE VI program [2012-2014].

Mark Harris, PhD

Dr. Mark A. Harris is the Director of the Information Security Management program at the Augusta University Cyber Institute and Hull College of Business. He has a Ph.D. in Information Systems from Virginia Commonwealth University, a MS in E-commerce and a B.S. in Information Technology from Old Dominion University. His research interests include mobile device security, behavioral factors of security, security policy management, awareness training, and health IT security. He has authored many papers in well-respected refereed information systems security journals and conferences. Before academia, Mark was a senior network engineer for a large university, where he oversaw an expansive network.
**William Hatcher, PhD**

Dr. Hatcher is Director of Augusta University's Master of Public Administration program and an Associate Professor of Political Science. His research focuses on the administrative features of community development and public finance. His research agenda tries to understand why public administration scholars and practitioners often have different opinions regarding the efficacy of certain administrative practices. His research has appeared in journals such as *American Journal of Public Health, Journal of Public Affairs Education, Public Administration Quarterly*, and *The Review of Regional Studies*.

Dr. Hatcher is active in NASPAA, the accrediting body for MPA programs, where he serves as chair of the organization's small MPA programs section. In the Department of Political Science, he teaches courses on public administration and public policy. He has served as chair of the Board of Adjustment in Richmond, Kentucky. The Board of Adjustment is responsible for granting planning variances, conditional uses, and other adjudication of planning and zoning decisions.

**Allison Vick, MPA**

Allison Vick is a doctoral student studying Political Science at the University of Georgia, concentrating in American Politics. She received her Master of Public Administration degree and Bachelor of Arts in History with Secondary Teacher Certification from Augusta University. She has worked with Augusta University's Center for Public Service and Research and has been involved with research projects including topics in immigration policy, local policing, Administrative Agencies and the Supreme Court, and workforce trends.

Augusta University’s Cyber Institute plays a significant role in cybersecurity at a national level. Geographically situated at the center of key federal and infrastructure assets, such as Fort Gordon and the Army Cyber Center of Excellence, National Security Agency (NSA-GA), Savannah River National Lab, Department of Energy, and Plant Vogtle, the Cyber Institute provides remarkable opportunities as we invest in cybersecurity education, research, and outreach.

**Our Vision**

To become a national leader in cybersecurity education by creating unique academic programs with three core strengths: Cyber Operations, Health Security, and Data Science.

**Our Mission**

The mission of the Cyber Institute is to enable, support, and champion meaningful innovative inter-disciplinary models of research and education for cyber security with focus on building collaborative partnerships that impact K-12 education, academic, healthcare, government, and business communities.

**Our Impact**

- Pilot cybersecurity professional development for Georgia high school teachers in Cybersecurity Curriculum Pathway approved by Georgia Department of Education (GADOE)
- Conduct GenCyber Camps every summer to introduce high school students to cybersecurity and robotics
- Host SANS Vet Success Immersion Academy, an intensive, accelerated program that provides training and certifications needed to fill critical jobs in cybersecurity
- In partnership with the Georgia Chamber, Augusta University hosts CyberGA each year with speakers who hold top-level positions in cybersecurity across many disciplines, including the Army and CIA.
- Sponsor and host of BsidesAugusta and Security Onion’s Users Conference.
- Club sponsor and facilitator for Girls Who Code for 6th-12th grade girls in Richmond and Columbia County Schools.

For more information, visit: [cyber.augusta.edu](http://cyber.augusta.edu), call: 706-CYBER-A, or email: [cyber@augusta.edu](mailto:cyber@augusta.edu)
The Master of Public Administration [MPA] Program at Augusta University is a 20-year old program that has retained Network of Schools of Public Policy, Affairs, and Administration or NASPAA accreditation since 2007. The MPA program has strong commitments to bettering its local community and its students and encouraging local businesses, governments, and nonprofits to utilize the MPA program as a resource. The MPA program enhances the performance of public and nonprofit organizations in our region and the nation by preparing a new generation of public service leaders to competently and ethically lead public and nonprofit organizations; as well as, taking an active role in the community through *Town and Gown* events such as, collaborative projects, education and information events for the community, and applied research projects with community partners. This CI|MPA Cybersecurity Workforce Study is one of those projects.

**Our Values**

We seek to have a program that:

1. Emphasizes **integrity**—accountability, honesty, fairness, and ethical behavior in personal and professional relationships and activities
2. Inspires faculty and students to **public service** that reflects the highest ideals of citizenship and service to the community, the nation, and the world
3. Emphasizes **democratic values** so students observe and respect the Constitution and the rule of law in service to the public
4. Develops **professionalism** by emphasizing competence, excellence, efficiency, objectivity, and impartiality
5. Focuses on **equity and diversity** through emphasizing that public administration professionals' exercise of authority and responsibility must always be tempered by a respect for human dignity, fairness, and social equity.

For more information, please visit: [augusta.edu/pamplin/MPA](http://augusta.edu/pamplin/MPA), call: **706-737-1710**, or email: **mpa_program@augusta.edu**