TRENDS IN WORKFORCE DEMAND

Seven Key Economic Clusters

October 2016

Metropolitan Washington
Council of Governments

TRENDS IN WORKFORCE DEMAND: SEVEN KEY ECONOMIC CLUSTERS

ABOUT COG

The Metropolitan Washington Council of Governments (COG) is an independent, nonprofit association that brings area leaders together to address major regional issues in the District of Columbia, suburban Maryland, and Northern Virginia. COG's membership is comprised of 300 elected officials from 22 local governments, the Maryland and Virginia state legislatures, and U.S. Congress.

CREDITS

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SPECIAL THANKS

ACCOMMODATIONS

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INTRODUCTION

During 2016, the Metropolitan Washington Council of Governments (COG) is analyzing real-time labor market data to better understand in-demand jobs and skills in the region. This effort expands upon COG's existing indicators of regional competitiveness and is one of the initiatives recommended in the *2016 State of the Region: Economic Competitiveness Report*.

This report is second in a two-part series identifying and analyzing workforce demand in metropolitan Washington. The first report, *Trends in Workforce Demand – Demand Overview, is* a high-level demand overview and was released in May 2016. The report found that after lagging behind the performance of the nation since the third quarter of 2011, metropolitan Washington's employment growth caught up and then surpassed the nation in the fourth quarter of 2015. Job postings data indicated Professional, Scientific, and Technical Services and Health Care and Social Assistance were driving this increase. It also examined the top ten occupations in greatest demand. Half were computer occupations and the other half, except for Sales Representatives, were among the 15 most common occupations in metropolitan Washington in 2015.

This report will examine the workforce demand from seven key economic clusters. These were identified with the potential to drive metropolitan Washington's economic growth over the next decade by the *Roadmap for the Washington Region's Economy*. These key economic clusters are also the focus of the Global Cities Initiative, which is working to determine how to support and grow the region's export economy. A special focus will be placed on advanced industries and STEM-intensive occupations. With leaders in metropolitan Washington currently betting that these economic clusters will help diversify the economy, it is important to determine how to assist businesses in these clusters. One element is ensuring the development and attraction of the right talent to the region.

The content of these reports will serve two purposes:

1. Inform our region's governmental and business leaders about current workforce demand to assist them in crafting workforce development policies and programs that are responsive to market trends and that will advance the region's economic competitiveness in future years.

2. Serve as a leading indicator about how our region's economy is growing and changing.

Analysis of real-time job posting data with a focus on identifying emerging market-driven changes in industry and occupational demands will greatly assist current efforts to better prepare the region's labor force to meet these new demands and strengthen the region's economy.

EXECUTIVE SUMMARY

Although growth in employment has outpaced the nation's average for the last four quarters, metropolitan Washington's economy remains vulnerable to the federal government.

Federal employees represent approximately an eighth of metropolitan Washington's workforce and their average annual pay is approximately 44 percent higher than the regional average[i]. While this component of the workforce has provided a strong foundation for the region for years, many of these employees are getting ready to retire. Nearly a third of the federal workforce will be eligible to retire in 2017[ii]. Some but not all of the retiring federal workers will be replaced. Their successors may not be as advanced in their careers and may be a paid a lower rate of compensation. In addition, federal employment has declined from its height in 2011, while state, local, and private sector employment has increased[iii].

While the rest of the country recovered from the great recession, metropolitan Washington lagged behind; the region was impacted by sequestration. A decline in federal procurement spending impacted the region's private sector; the private sector only grew by half the rate of prior years in both 2013 and 2014[iv]. To help mitigate against potential future declines in federal procurement, metropolitan Washington needs to actively seek out new customers, besides the federal government, for its private sector.

Fortunately, leaders in metropolitan Washington have noticed and are working together to diversify the region's economy away from the federal government. The *Roadmap for the Washington Region's Economic Future* identified seven key economic clusters with the potential to drive metropolitan Washington's economic growth over the next decade: Advocacy, Information and Communications Technology, Science and Security Technology, Biology and Health Technology, Business and Financial Services, Media and Information Services, and Leisure and Business Hospitality Services. The average annual pay for all of these economic clusters, except for Leisure and Business Hospitality Services, is higher than the regional average. Building upon this work, the region's current export economy, support systems, and opportunities for growth are being studied by the Global Cities Initiative. The Global Cities Initiative helps public and private sector leaders grow their metropolitan economies by strengthening international connections and competitiveness.

It is important that a key ingredient to help these seven key economic clusters grow is not overlooked: talent. In the first part of this report, the importance of diversifying metropolitan Washington's economy is further discussed. An overview of the key economic clusters is provided and then they are linked to advanced industries. Advanced industries are defined by the Brookings Institution as those that, "1) Spend at least $450 per worker per year on research and development (R&D) and 2) employ at least 20 percent of their workforce in science-technology-engineering-mathematical (STEM) intensive occupations." They have driven post-recession employment recovery and their continued expansion is considered a cornerstone of future prosperity.[v] Utilizing job postings data for the first half of 2016, the first part of this report considers the STEM-intensive, as well as comprehensive, talent needs of the key economic clusters. The second part of this report considers each of the key economic clusters and identifies the educations, skills, and experience for the top ten occupations with the greatest number of job postings during the first half of 2016. Key findings include:

- Currently there is a mixed story about the state of metropolitan Washington's economy as well as its advanced industries jobs. While employment growth outpaced the rest of the country for the last four quarters, the economy remains vulnerable to the federal government.

- Overall, the seven key economic clusters performed well between 2014 and 2015.
- By supporting the key economic clusters, the region is also supporting its advanced industries.
- STEM-intensive talent, which is associated with innovation, is needed by all of the key economic clusters.
- The key economic clusters also have other, more comprehensive needs for talent.
- Whether considering STEM-intensive talent or comprehensive needs for talent, the key economic clusters are frequently placing job postings for the same kinds of workers.
- Workers trained to perform computer occupations are in high demand by the key economic clusters.
- While educational requirements tended to be high, there were also opportunities with lower educational barriers.

It is of vital importance that metropolitan Washington provide a steady supply of talented workers to fill these occupations to support growing businesses in these economic clusters. While the region can attract talent by offering a high quality of life, it can also cultivate talent within. The information in this report can be used to craft workforce development policies and programs that support the key economic clusters and advance the region's economic competitiveness in future years.

PART I. SPURRING ECONOMIC PROSPERITY WITH AN INNOVATIVE WORKFORCE

IMPORTANCE OF DIVERSIFYING METROPOLITAN WASHINGTON'S ECONOMY

Leaders in metropolitan Washington are recognizing the importance as well as challenge of diversifying the regional economy. This necessity became clear over the last few years. While metropolitan Washington generally performed better during the great recession, it was hit harder than the rest of the country by sequestration. A ten-billion-dollar drop in federal procurement as well as a federal hiring freeze led to the loss of an estimated 36,000 jobs[vi].

The Demand Overview, the first in this two-part series of reports, found that metropolitan Washington's job growth considerably improved between 2014 and 2016. It caught up and then exceeded the nation during the last quarter of the 2015 and continued to outperform the nation in 2016.

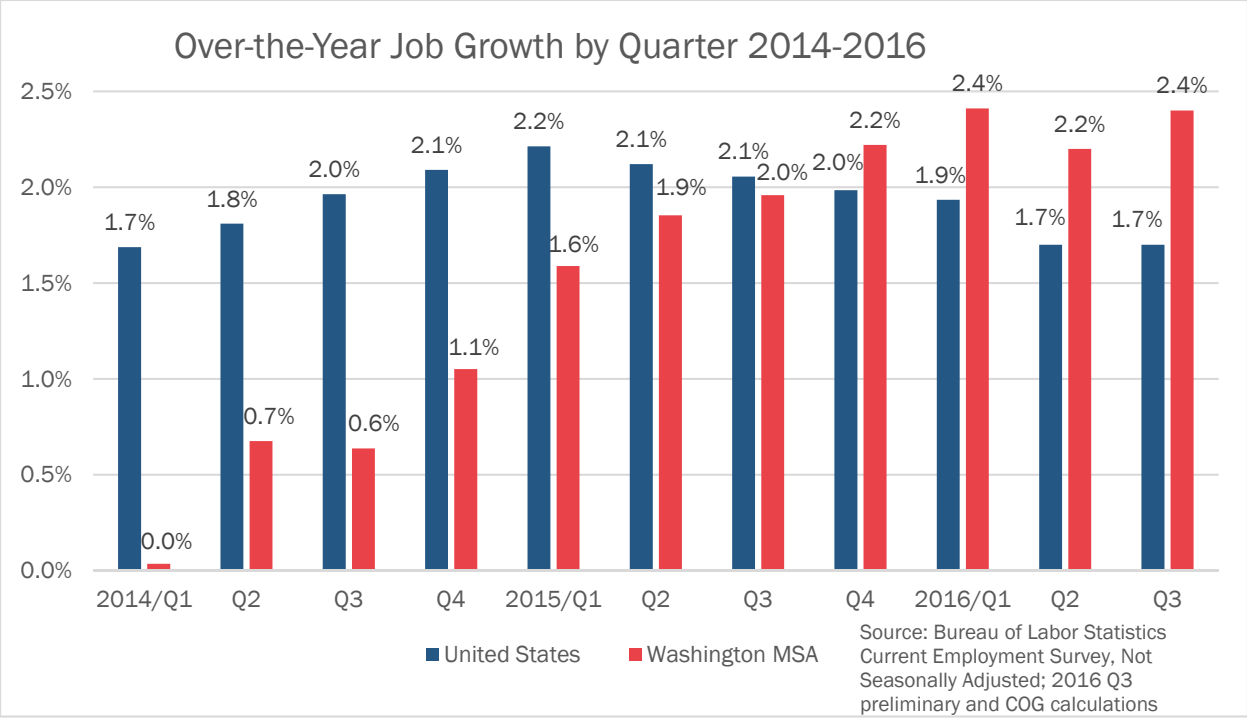


Figure 1. Job growth in the region began to accelerate in 2014

However, between 2014 and 2015, in the Washington-Arlington-Alexandria, DC-VA-MD-WV metropolitan statistical area (Washington MSA), federal jobs grew at about a quarter of the rate of all jobs in metropolitan Washington.

Table 1. Federal employment is not keeping pace, Washington MSA

	Federal Employment Growth	Total Nonfarm Employment Growth
2014-2015	0.5%	1.9%

Source: Bureau of Labor Statistics Current Employment Statistics, Seasonally Adjusted and COG calculations

The federal government is the largest employer in the region and it pays the highest average annual wages per job ($105,700). Many of these highly compensated employees are near retirement, according to a 2014 U.S. Government Accountability Office (GAO) Report, over 30 percent of the federal workforce will be eligible to retire by 2017[vii]. Additionally, the average annual wages paid in 2015 for all other types of ownership, state government ($63,300), local government ($58,200), and private ($70,000), were lower. If wage rates remain the same for non-federal employment and that employment increases at a rate faster than federal employment, the average annual pay for the region may decline.

Table 2. Average annual pay, metropolitan Washington, 2015

	Average Annual Pay (2015)
Federal Government	$105,700
State Government	$63,300
Local Government	$58,200
Private	$70,000
Total	$73,400

Source: BLS Quarterly Census for Employment and Wage, June 2016 and COG calculations

Metropolitan Washington has historically relied upon federal jobs and contracts. Between 11 and 13 percent of total nonfarm employment in the Washington MSA has been federal since 2000[viii]. Many private establishments continue to rely upon federal contacts, which remain subject to political forces. For long-term stability, the region needs to diversify its economy away from the federal government in a smart, strategic way, that supports the growth of high-paying jobs in the private sector.

INNOVATIVE TALENT DRIVES THE ADVANCED INDUSTRIES

There is growing consensus that our economic well-being is dependent upon the growth of advanced industries. According to Brookings, they are "the best shot at supportive, innovative, inclusive, and sustainable growth." Advanced industries spend at least $450 per worker per year on research and development and employ at least 20 percent of their workforce in science-technology-engineering-mathematics (STEM)-intensive occupations[ix]. Research by the Economics and Statistics Administration found that STEM workers "play a key role in the sustained growth and stability of the U.S. economy, and are a critical component to helping the U.S. win the future" and U.S. businesses are concerned over the supply and availability of this talent.[x]

Performance of advanced industries versus comparative areas

The Washington MSA ranked third in terms of number of advanced industries jobs in 2015. However, research by the Metropolitan Policy Program at Brookings indicates that the metropolitan Washington's advanced industries are less diverse and are growing at a slower rate than other high ranking regions. Among the five metropolitan areas with the greatest number of advanced industries jobs, the Washington MSA has the lowest diversity, it only has five industries with 2.5 percent or more of the advanced industries employment: Computer Systems Design and Related Services; Management, Scientific, and Technical Consulting Services; Architectural, Engineering, and Related Services; and Data Processing, Hosting, and Related Services. While this is positive because it indicates considerable specialization, it also means that we are vulnerable to ups and downs in these industries. In contrast with Washington, where 75 percent of these jobs are in the top three industries, only 46 percent of these jobs are in the top three industries in New York, 45 percent in Houston, 43 percent in Chicago, and 36 percent in Los Angeles. In addition, among those metro areas with the ten highest advanced industries' share of all jobs, the Washington MSA had the second lowest growth rate in advanced industries jobs between 2013 and 2015, only growing faster than Wichita, Kansas. There may be untapped opportunities to expand the advanced industries in the metropolitan Washington. Given the research that indicates that advanced industries contribute to high quality growth; effort should be focused on supporting these industries.

Table 3. Metro areas with greatest number of advanced industries jobs, 2015

Metropolitan Area	Advanced Industries Jobs
New York-Newark-Jersey City, NY-NJ-PA	671,000
Los Angeles-Long Beach-Anaheim, CA	523,000
Washington-Arlington-Alexandria, DC-VA-MD-WV	**442,000**
Chicago-Naperville-Elgin, IL-IN-WI	426,000
Houston-The Woodlands-Sugar Land, TX	362,000

Source: Brookings, *America's Advanced Industries: New Trends*, https://www.brookings.edu/research/americas-advanced-industries-new-trends/

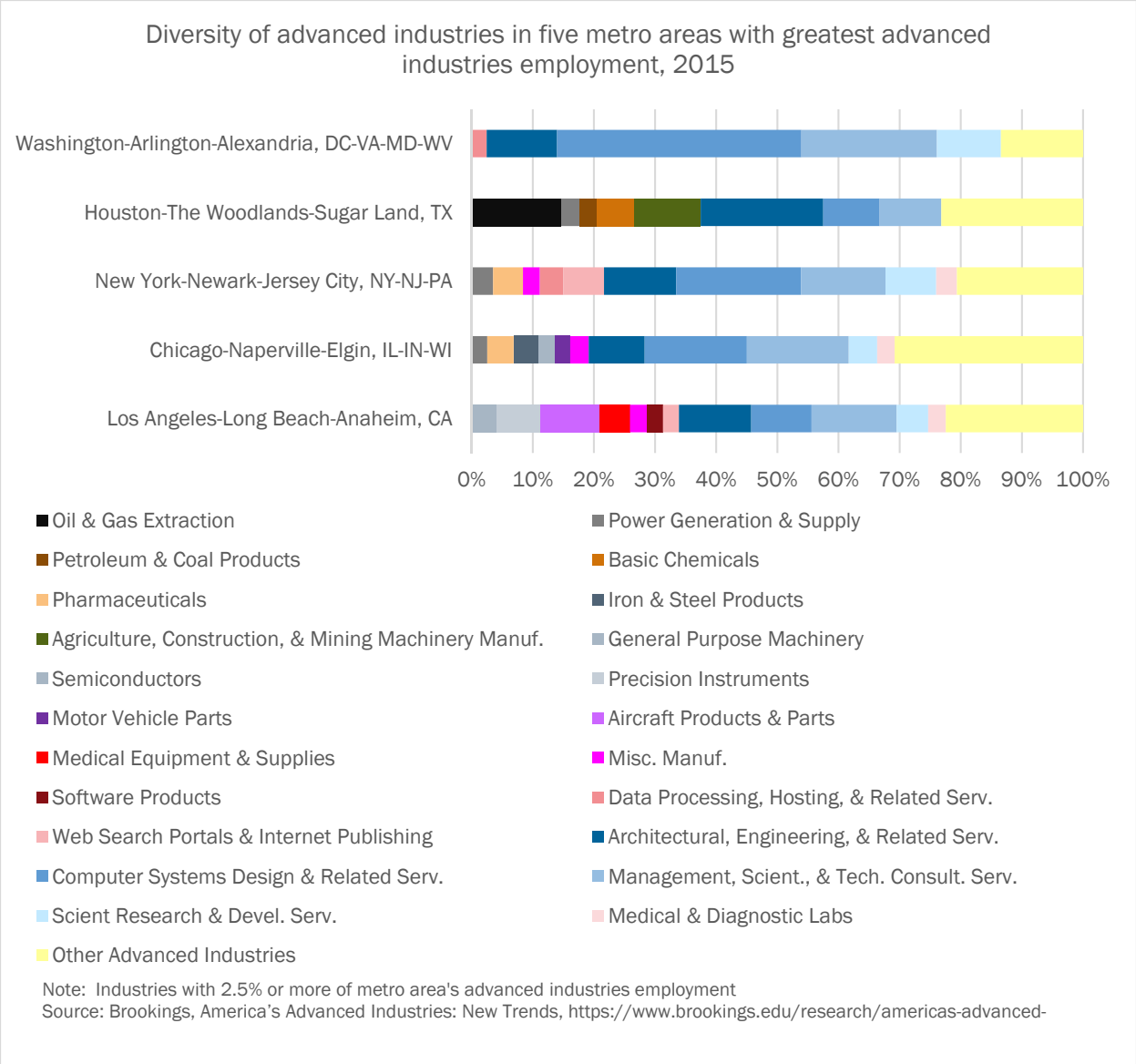


Figure 2. Diversity of advanced industries in five metro areas with greatest advanced industries employment, 2015

Table 4. Metro areas with ten highest advanced industries' share of all jobs, 2015

Metropolitan Area	Advanced Industries' Share of all Jobs (2015)	Advanced Industries' Job Growth (2013-2015)
San Jose-Sunnyvale-Santa Clara, CA	31.2%	5.9%
Seattle-Tacoma-Bellevue, WA	15.8%	2.1%
Detroit-Warren-Dearborn, MI	15.5%	4.3%
San Francisco-Oakland-Hayward, CA	15.3%	7.9%
Wichita, KS	15.2%	-1.0%
Palm Bay-Melbourne-Titusville, FL	13.9%	2.3%
Washington-Arlington-Alexandria, DC-VA-MD-WV	**13.5%**	**0.9%**
Boston-Cambridge-Newton, MA-NH	13.3%	2.6%
Austin-Round Rock, TX	13.1%	6.0%
Raleigh, NC	12.5%	7.0%

Source: Brookings, *America's Advanced Industries: New Trends*, https://www.brookings.edu/research/americas-advanced-industries-new-trends/

OVERVIEW OF THE SEVEN KEY ECONOMIC CLUSTERS

During the last year, a bold, coordinated call to reinvigorate metropolitan Washington's economy was issued. Interindustry Forecasting at the University of Maryland (Inforum) identified seven key economic clusters, with the potential to drive the region's growth and development over the next decade[xi]. These key economic clusters became the focal point of the *Roadmap for the Washington Region's Economic Future.* American University conducted a policy gap analysis focused on identifying (1) gaps in policies to support the key economic clusters as well as (2) policies that address major economic development challenges highlighted in interviews with executives in the private sector[xii]. During the same time period, COG released the *2016 State of the Region: Economic Competitiveness Report* and also recommended supporting these key economic clusters. Currently, a coalition including the Metropolitan Washington Council of Governments, the Greater Washington Board of Trade, and the Consortium of Universities of the Washington Metropolitan Area, are focusing on these key economic clusters while working to evaluate the region's current export economy, support systems, and opportunities for growth through the Global Cities Initiative.

Increasingly, economic development is focusing on acquiring talent. The policy gap analysis conducted by American University found a key issue for economic development was to cultivate, attract and retain the best talent pool to stimulate business growth. This report will focus on talent that the seven key economic clusters are seeking. If the region is willing to bet that these economic clusters will help diversify the economy, it is crucial to support them. Attracting and training the right workforce plays an integral part.

Table 5. Seven key economic clusters – private sector employment, metropolitan Washington, 2010, 2014, 2015

	Average Annual Employment			Annual Growth		Annual Growth Rate	
Key Economic Cluster	2010	2014	2015	2010 - 2014	2014 - 2015	2010 - 2014	2014 -2015
Advocacy	105,800	112,300	113,500	1,625	1,200	1.5%	1.1%
Information and Communications Technology	200,500	197,000	202,500	-875	5,500	-0.4%	2.8%
Science and Security Technology	108,600	108,700	110,200	-100	1,700	-0.1%	1.3%
Biology and Health Technology	13,500	12,100	12,500	-350	400	-2.7%	3.3%
Business and Financial Services	220,000	232,100	236,400	3,025	4,300	1.3%	1.9%
Media and Information Services	25,000	24,600	24,500	-100	-100	-0.4%	-0.4%
Leisure and Business Hospitality Services	59,500	61,200	63,000	425	1,800	0.7%	2.9%
Total of Seven Key Economic Clusters	**732,900**	**748,000**	**762,600**	**3,775**	**14,600**	**0.5%**	**2.0%**
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment (All Ownership Types)	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016 and COG calculations
Notes: 1) May not sum to total due to rounding.
2) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.

The private sector employment for each of the economic clusters in 2010, 2014, and 2015 is shown above, in Table 5. In metropolitan Washington, these economic clusters accounted for approximately 27 percent of total employment in 2015. The Business and Financial Services cluster

has the greatest employment and grew at a rate close to that of total private employment between 2010 and 2015. Biology and Health Technology, which has the smallest employment, grew faster than any other cluster between 2014 and 2015, but has not returned to its 2010 employment level.

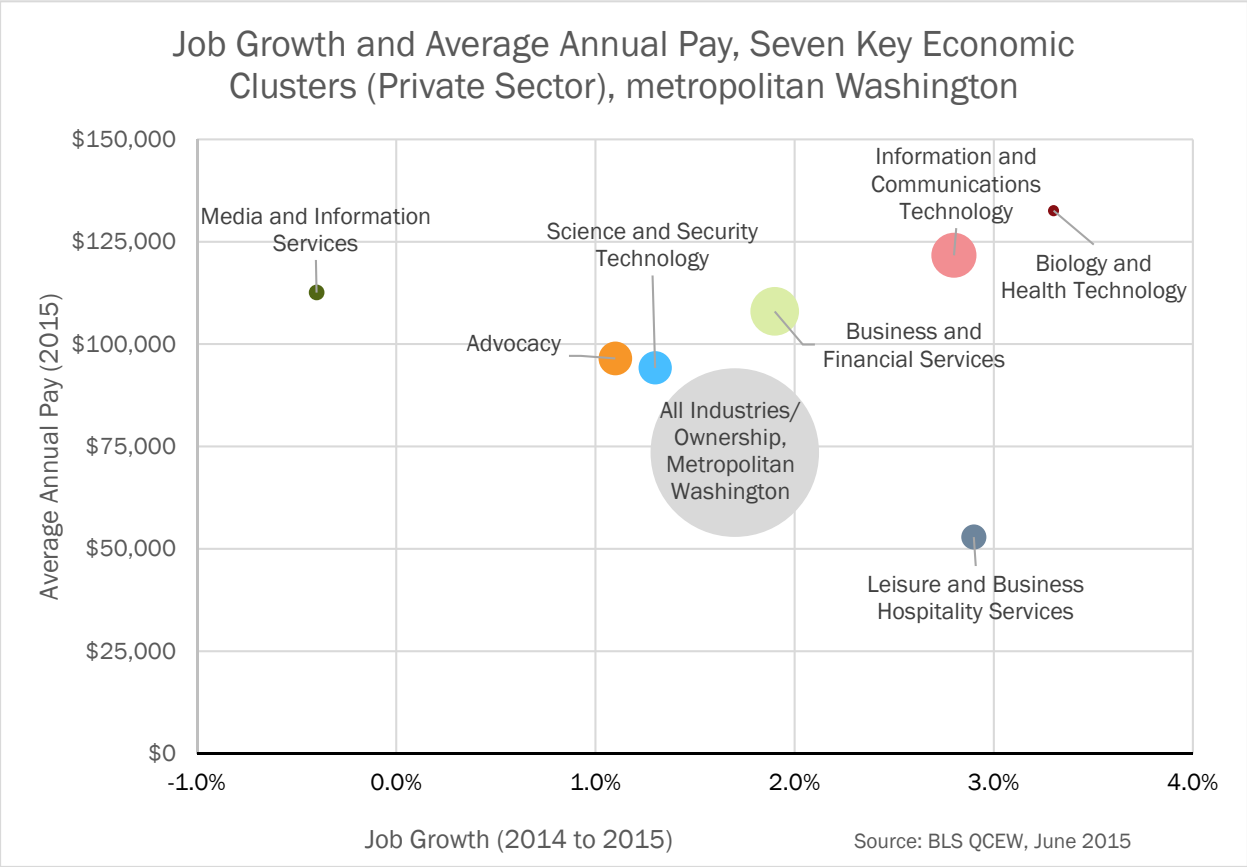


Figure 3. Job growth and average annual pay, seven key economic clusters (private sector), metropolitan Washington, 2014, 2015

The average annual pay (2015) and job growth (2014-2015) for each of the key economic clusters is plotted above. The size of the circles represents the 2015 employment for the cluster. Information and Communication Technology and Biology and Health Technology were the best performing key economic clusters with higher rates of growth and higher average annual pay. Media and Information Services is the only cluster that declined in employment. Leisure and Business Hospitality Services is the only cluster with average annual pay lower than metropolitan Washington's average.

Alignment: the advanced industries and key economic clusters

By supporting the key economic clusters, metropolitan Washington is also supporting many of its advanced industries. All of the key economic clusters, except for Leisure and Business Hospitality Services, include advanced industries.

The key economic clusters are concentrated in the advanced industries services subsector, but a few also include industries in the manufacturing subsector. The advanced industries also have an energy subsector but it is not represented in the key economic clusters[xiii]. During 2015, the five advanced industries with the greatest number of jobs in the Washington MSA included: Computer

Systems Design and Related Services; Management, Scientific, and Technical Consulting Services; Architectural, Engineering, and Related Services; and Data Processing, Hosting, and Related Services. All five of these are included in the key economic clusters.

Table 6. Key economic clusters with advanced industries

		Advanced Industries Subsectors	
		Services	**Manufacturing**
Key Economic Cluster	**Advocacy**	•Research and Development the Social Sciences and Humanities	
	Information and Communications Technology	•Software Publishers •Telecommunications •Data Processing, Hosting, and Related services •Computer Systems Design and Related	
	Science and Security Technology	• Engineering Services • Environmental Consulting Services • Other Scientific and Technical Consulting Services • Scientific Research and Development Services	• Aircraft Products and Parts Manufacturing • Miscellaneous Transportation Equipment Manufacturing
	Biology and Health Technology	•Research and Development in Biotechnology	•Medical Equipment and Supplies Manufacturing
	Business and Financial Services	• Architectural Services • Management, Scientific, and Technical Consulting Services	
	Media and Information Services	•Cable and Other Subscription Programming •News Syndicates •Libraries and Archives •Internet Publishing and Broadcasting and Web Search Portals •All Other Information Services	
	Leisure and Business Hospitality Services		

KEY ECONOMIC CLUSTERS' NEEDS FOR TALENT

STEM-intensive talent needs

While only one key economic cluster, Leisure and Business Hospitality Services, does not include any of the advanced industries, it, along with the rest of the key economic clusters, hires STEM-intensive occupations. These positions require training in science, technology, engineering, and mathematics disciplines and they play a direct role in driving economic growth. The U.S. Department of Labor's Occupational Information Network (O*NET) has identified 167 STEM occupations[xiv]. During the first half of 2015, 24 percent of all job postings in metropolitan Washington were for these STEM-intensive occupations which is considerably higher than the rate for the nation (13%). There was an even higher share for four of the seven key economic clusters: Business and Financial Services (36%), Science and Security Technology (34%), Information and Communications Technology (32%), and Biology and Health Technology (26%).

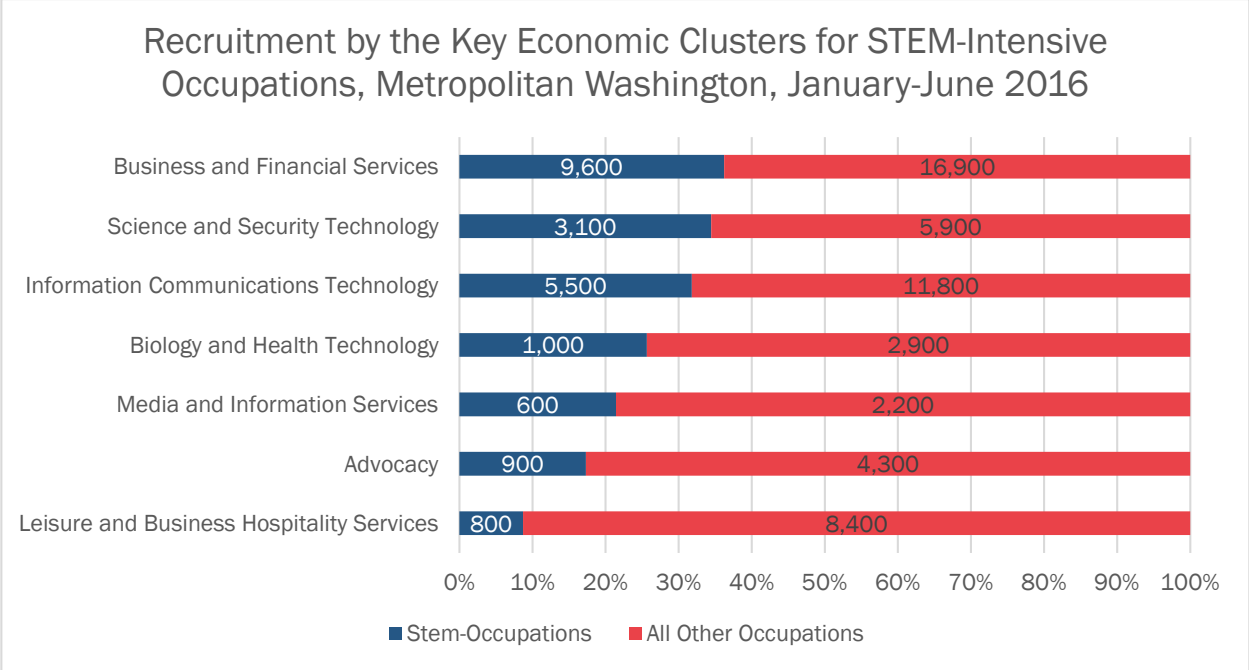


Figure 4. Recruitment by the key economic clusters for STEM-intensive occupations

Across the key economic clusters, many employers are seeking the same talent. For each of the key economic clusters, the ten STEM-intensive occupations (as defined by O*NET) with the greatest number of job postings during the first half of 2016 were identified. After the duplicates were removed, twenty-five occupations remained. These are listed in Appendix A.

Below are the ten STEM-intensive occupations with the greatest number of job postings placed by the key economic clusters in the first half of 2016. With the exception of Auditors, these occupations ranked within the top ten for more than one economic cluster. Metropolitan Washington has a powerful advantage to prepare workers for these occupations that require education in the science, technology, engineering, and mathematics disciplines. The region is home to 23 colleges and universities, numerous technical colleges and specialty schools, and nationally-recognized research laboratories within universities and federal government.

Table 7. STEM-intensive occupations in the greatest demand by the key economic clusters, metropolitan Washington, January-June 2016

Occupation	Ranked within Top Ten							Total Job Postings, Key Economic Clusters	Total Job Postings and Rank (if within top ten), All Industries
	Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services		
Software Developers, Applications	X	X	X	X	X	X	X	5,400	24,000 Rank = 1
Information Security Analysts	X	X	X		X	X	X	2,200	7,400 Rank = 2
Computer Systems Analysts	X	X	X	X	X	X	X	1,600	5,300 Rank = 3
Database Administrators	X	X	X		X	X		900	3,900 Rank = 6
Computer Network Architects	X	X	X		X	X		800	3,300 Rank=7
Business Intelligence Analysts	X	X	X	X	X	X	X	700	2,400 Rank = 9
Computer User Support Specialists	X	X		X	X	X		700	4,200 Rank = 4
Accountants	X				X	X	X	600	4,000 Rank = 5
Auditors					X			500	1,500 Rank = 10
Architectural and Engineering Managers						X	X	400	1,000

Note: Only those occupations included on O*NET's list of STEM occupations are included; additional occupations may require STEM training.

Comprehensive needs

Although STEM-intensive occupations are associated with the most innovation, employers' needs are not confined to these occupations. A range of occupations are needed for businesses to operate. To evaluate the broader needs for talent, the ten occupations with the greatest number of job postings placed by employers in the key economic clusters during the first half of 2016 were identified. Many of these occupations were ranked within the top ten by more than one cluster. Three of these occupations were STEM-intensive: Software Developers, Information Security Analysts, and Computer Systems Analysts. Half of these occupations are computer occupations. The remaining occupations, except for Sales Managers, were among the 20 most common occupations in metropolitan Washington in 2015[xv].

Table 8. Occupations in the greatest demand by the key economic clusters, metropolitan Washington, January-June 2016

Occupation	Ranked within Top Ten							Total Job Postings, Key Economic Clusters	Total Job Postings and Rank (if within top ten), All Industries
	Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services		
Software Developers, Applications[1]	X	X	X	X	X	X		5,400	24,000 Rank = 1
Sales Representatives	X	X	X	X	X	X	X	3,700	13,800 Rank = 2
Computer Systems Engineers/Architects[2]		X	X		X	X		2,800	9,300 Rank = 5
Managers, All Other	X	X	X	X	X	X	X	2,800	10,800 Rank = 4
Management Analysts		X	X		X			2,200	8,000, Rank = 6
Information Security Analysts[1]		X	X		X			2,200	7,400 Rank = 7
Computer Systems Analysts[1]		X	X		X			1,600	5,300
Sales Managers		X		X			X	1,400	4,100
Information Technology Project Managers[2]		X			X			1,400	5,000
Security Guards			X					1,300	2,100

Notes: [1] STEM-intensive occupation; included on O*NET's list of STEM occupations

[2] While not included on O*NET's list of STEM occupations, requires STEM training.

In part two of this report, the ten occupations in greatest demand during the first half of 2016 for each of the key economic clusters are identified. Many occupations were ranked within the top ten for demand by more than one cluster. In total, there were 36 unique occupations, which are listed in Appendix B. Educational requirements, titles, and skills are included for each of these occupations. In general, for the 70 occupations that were identified, a high level of education was required and the average annual wage was above the average for Washington MSA. In fact, only ten of the 70 occupations were paid an annual median wage below the region's average ($50,690) in 2015 (BLS OES). As for education requirements, 73 percent or more of the job postings for 60 of the 70 occupations required a Bachelor's degree or higher.

Opportunities with lower educational thresholds

Ten out of the 70 jobs identified in the second part of this report had lower educational requirements. For these occupations more than half of the job postings only required a high school degree. The workers in these occupations are compensated less. Seven of these occupations were from the Leisure and Business Hospitality Services cluster's top ten. The job postings for these occupations from all industries had similar educational requirements, except for Sales Representatives, which is broadly defined in this report and varies substantially based upon the economic cluster and specific industry placing the job posting.

Businesses are actively looking for these workers. Two of these occupations have very high turnover rates: Waiters and Waitresses and Hotel, Motel, and Resort Desk Clerks[xvi]. These jobs often play an important role linking individuals to entry-level jobs with low entrance barriers.

Table 9. Occupations in high demand by the key economic clusters with lower education thresholds, metropolitan Washington, January-June 2016

Occupation	Average median wage	Cluster with lower education thresholds	Total Job postings for cluster with lower education threshold	% job postings requiring a high school degree[1]	Total job postings, all industries	% job postings requiring a high school degree, all industries[1]
Security Guards	$35,600	Science and Security Technology	1,100	93%	2,100	70%
Hotel, Motel, and Resort Desk Clerks	$25,200	Leisure and Business Hospitality Services	700	90%	1,200	91%
Maids and Housekeeping Cleaners	$24,000	Leisure and Business Hospitality Services	600	100%	1,200	100%
Waiters and Waitresses	$19,900	Leisure and Business Hospitality Services	400	100%	1,400	100%
Cooks, Restaurant	$24,400	Leisure and Business Hospitality Services	300	70%	1,500	83%
Sales Representatives	$66,900	Leisure and Business Hospitality Services	300	63%	13,800	28%
Concierges	$32,500	Leisure and Business Hospitality Services	200	87%	400	87%
First-Line Supervisors of Food Preparation and Serving Workers		Leisure and Business Hospitality Services	200	63%	3,100	57%
Secretaries and Administrative Assistants, except Legal, Medical, and Executive	$42,000	Advocacy	100	60%	5,800	48%
Customer Service Representatives	$36,500	Media and Information Services	100	78%	4,600	61%

Notes: [1] Where educational requirement included in job postings.

Beyond the needs of employers in the seven key economic clusters

This section will briefly mention occupational needs of employers across all industries. For more information, please see the first report in this series. During the first half of 2016, there were three occupations that ranked within the top ten for all industries that did not rank within the top ten for any of the key economic clusters: Registered Nurses, Retail Salespersons, and Heavy and Tractor-Trailer Truck Drivers. While leaders in metropolitan Washington are working to strategically support the seven key economic clusters, developing talent to fill these positions should not be overlooked.

PART II. THE WORKFORCE NEEDS OF THE SEVEN KEY ECONOMIC CLUSTERS

The next seven sections of this report focus on each of the key economic clusters. Each section begins with private sector employment estimates for the cluster. Next, the occupational structure of the cluster's employment is examined and compared with the occupational structure of its job postings. The rest of each of these sections utilizes job postings, to report: the top ten employers, the types of stem-intensive occupations (as defined by O*NET), and the top ten occupations in greatest demand. For each of the top ten occupations, a figure with the level of education, titles, years of experience, and skills requested in job postings is offered. Appendix B provides a table with the average median wage in metropolitan Washington in 2015 and the number of job postings for each cluster during the first half of calendar year 2016.

The distribution of the employment and job postings for the key economic clusters is shown below. For many of the key economic clusters, there are similar portions of employment as well as job postings. For those with greater share of job postings than employment, it may indicate (1) that the cluster is growing or (2) that there is a high rate of turnover. Lower shares of job postings compared to employment may indicate (1) a slowdown in hiring or (2) less turnover. For example, Leisure and Business Hospitality Services grew at the second fastest rate between 2014 and 2015, but also has several occupations with higher replacement rates. It is recommended that the distribution of job postings or relative demand from each of the key economic clusters be considered while reviewing the next seven sections.

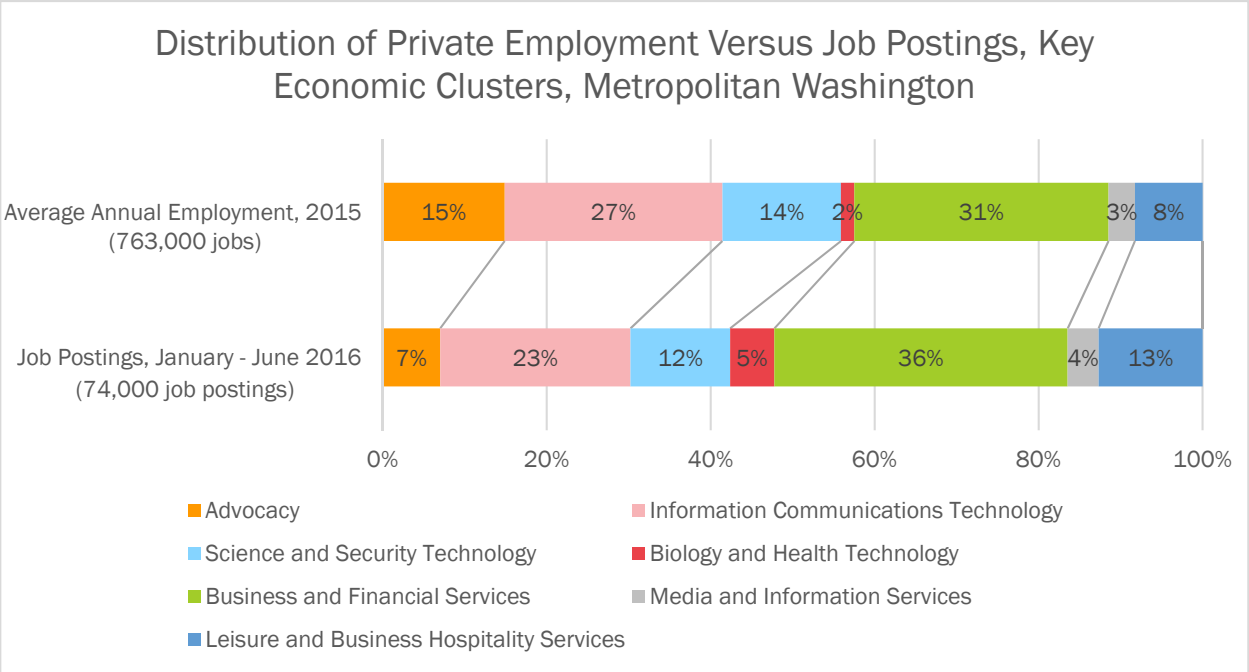


Figure 5. Distribution of employment versus job postings, seven key economic clusters, metropolitan Washington

ADVOCACY

Description

Organizations in this cluster work to influence societal outcomes through lobbying government, conducting research, and assembling coalitions. The below table reports the 2010, 2014, and 2015 private sector employment estimates for each industry in this cluster. While this cluster is composed of 14 different industries, the majority of the employment is in four industries: Social Advocacy Organizations, Professional Organizations, Business Associations, and Social Science and Humanities Research. Although the employment for this cluster grew slightly faster than all private employment between 2010 and 2014, it grew at a slower rate between 2014 and 2015.

Table 10. Advocacy cluster – private sector employment, metropolitan Washington, 2010, 2014, 2015

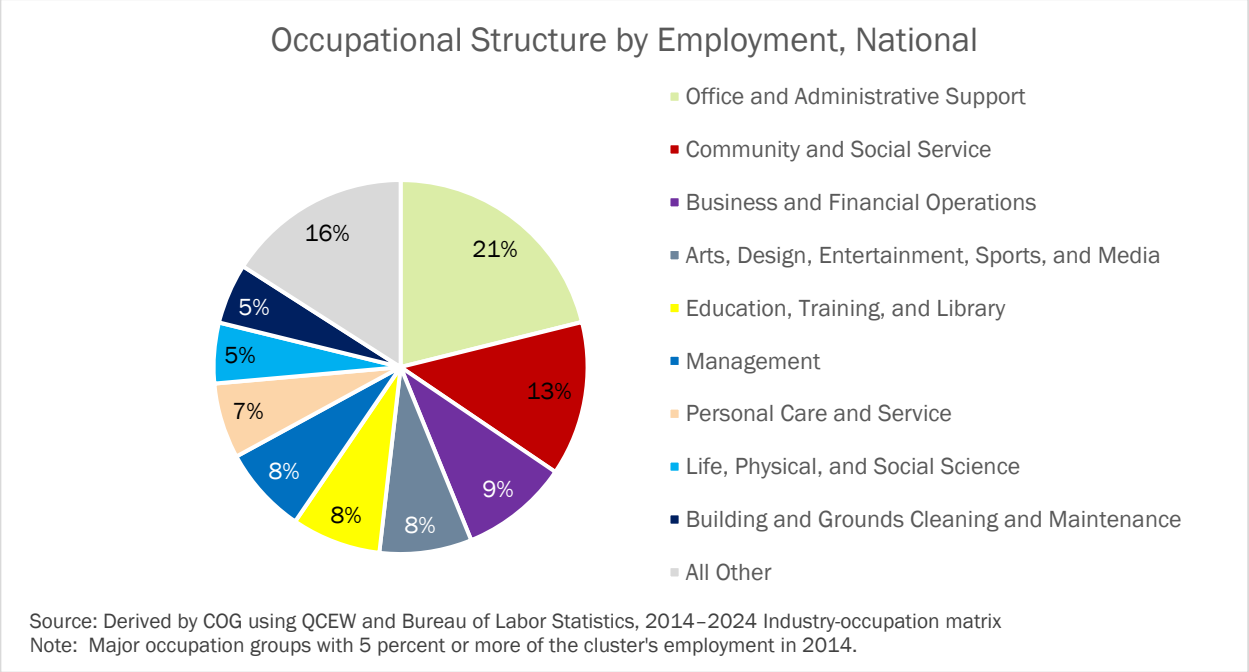
	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	2010	2014	2015	2010 - 2014	2014 - 2015	2010 - 2014	2014 - 2015
Social Science and Humanities Research	13,500	14,300	14,500	200	200	1%	1%
Public Relations Agencies	7,900	7,900	7,900	0	0	0%	0%
Marketing Research and Public Opinion Polling	2,100	2,300	2,300	50	0	2%	0%
Religious Organizations	3,600	3,900	4,000	75	100	2%	3%
Grantmaking Foundations	2,800	3,900	4,100	275	200	9%	5%
Voluntary Health Organizations	2,200	1,900	2,100	-75	200	-4%	11%
Other Grantmaking and Giving Services	2,100	2,200	2,200	25	0	1%	0%
Social Advocacy Organizations	18,900	21,900	22,200	750	300	4%	1%
Civic and Social Organizations	7,800	7,600	7,700	-50	100	-1%	1%
Business Associations	17,600	17,900	18,200	75	300	0%	2%
Professional Organizations	17,800	19,300	19,300	375	0	2%	0%
Labor Unions and Similar Labor Organizations	5,400	5,200	5,000	-50	-200	-1%	-4%
Political Organizations	1,500	1,600	1,400	25	-200	2%	-13%
Other Similar Organizations	2,700	2,600	2,800	-25	200	-1%	8%
Advocacy	**105,800**	**112,300**	**113,500**	**1,625**	**1,200**	**1.5%**	**1.1%**
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment (All Ownership Types)	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016

Notes: 1) May not sum to total due to rounding. 2) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request. 3) Due to availability and magnitude of adjacent year employment estimates and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2014 Arlington County Civic and social organizations.

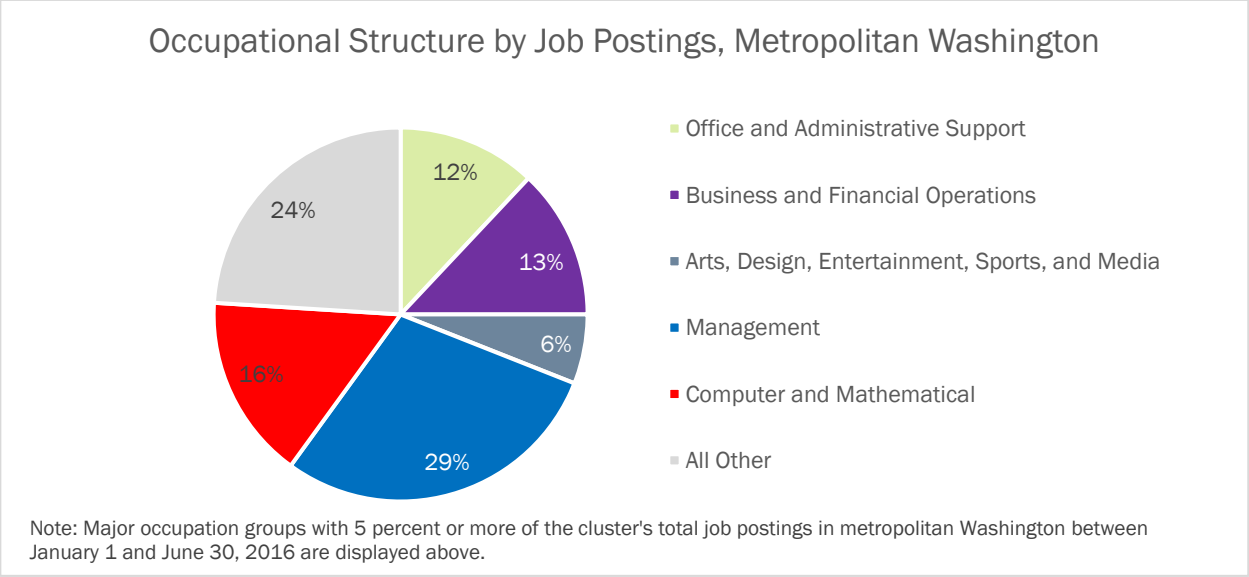
Occupational structure

The national occupational structure by employment for the Advocacy cluster is shown below. It is one of the most diverse key economic clusters in terms of its occupational composition. Due to the number of headquarters in metropolitan Washington, it is likely that this cluster has a greater share of management positions in this region. This appears to be reflected in Figure 8 which shows that 29 percent of the job postings in metropolitan Washington during the first half of 2016 were for management occupations.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–2024 Industry-occupation matrix
Note: Major occupation groups with 5 percent or more of the cluster's employment in 2014.

Figure 6. Occupational structure by employment



Note: Major occupation groups with 5 percent or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016 are displayed above.

Figure 7. Occupational structure by job postings

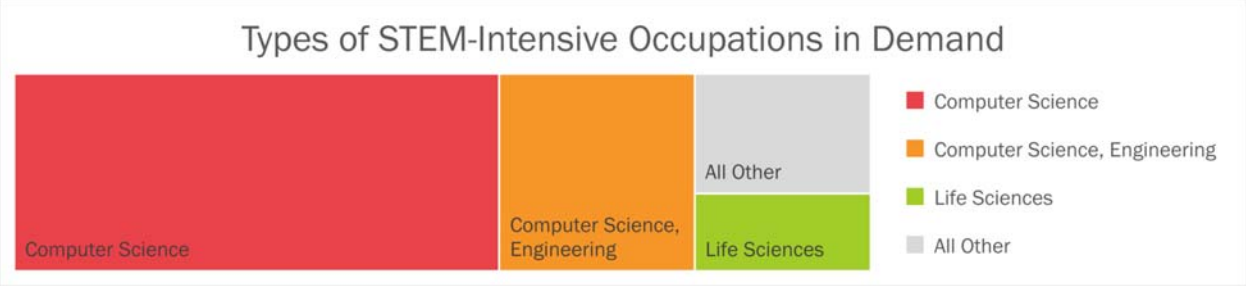
Who is recruiting?

Table 11. Advocacy cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
Pew Charitable Trusts	Grantmaking Foundations	250
National Academies	Professional Organizations	250
American Institute for Research	Social Science and Humanities Research	200
American Red Cross	Voluntary Health Organizations	200
AARP	Social Advocacy Organizations	200
American Diabetes Association	Voluntary Health Organizations	150
American Association for the Advancement of Science	Professional Organizations	150
FHI 360	Social Sciences and Humanities Research	100
United Way	Civic and Social Organizations	100
World Wildlife Fund	Social Advocacy Organizations	100

What STEM-intensive occupations are in demand?

Advocacy had the second lowest share of job postings for STEM-intensive occupations: 17 percent of the job postings placed during the first half of 2015 were for STEM-intensive occupations[xvii]. The vast majority of the job postings were for computer science jobs. The five STEM-intensive occupations with the greatest number of job postings were all computer occupations and included: Software Developers, Accountants, Computer User Support Specialists, Database Administrators, and Computer Systems Analysts.



Note: STEM-type defined by O*NET

Figure 8. Types of STEM-intensive occupations in demand

Overall, what occupations are in the greatest demand?

The top ten occupations include:

1. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, supply chain

2. **Public Relations and Fundraising Managers** – Plan, direct, or coordinate activities designed to create or maintain a favorable public image or raise issue awareness for their organization or

client; or if engaged in fundraising, plan, direct, or coordinate activities to solicit and maintain funds for special projects or nonprofit organizations.

3. **Human Resources Specialists** – Perform activities in the human resources area. Includes employment specialists who screen, recruit, interview, and place workers.

4. **Secretaries and Administrative Assistants (Except Legal, Medical, and Executive)** – Perform routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.

5. **Software Developers, Applications (STEM-intensive)**– Develop, create, and modify general computer applications

6. **Sales Representatives** – Sells goods or services to businesses or groups, or individuals. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon economic cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

7. **Marketing Managers** – Plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors, and identify potential customers.

8. **Medical and Health Services Managers** – Plan, direct, or coordinate medical and health services in hospitals, clinics, managed care organizations, public health agencies, or similar organizations.

9. **General and Operations Managers** – Plan, direct, or coordinate the operations of public or private sector organizations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services.

10. **Public Relations Specialists** – Engage in promoting or creating an intended public image for individuals, groups, or organizations. May write or select material for release to various communications media.

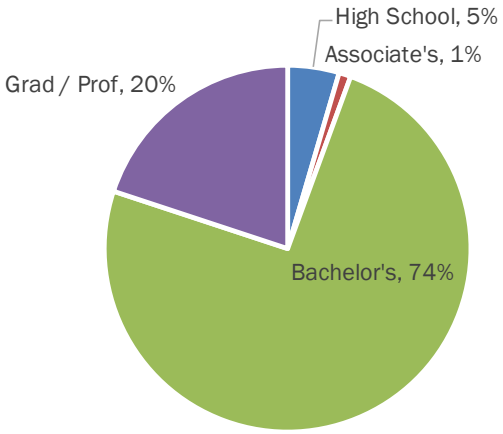
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 from the Bureau of Labor Statistics Occupational Employment Statistics (BLS OES) as well as a wage premium. The wage premium was derived using national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *Those occupations that are STEM-intensive have a light yellow background.*

1. Managers, All Other, $128,800

Advocacy Cluster: Wage Premium= -3%; Job Postings= 350

Education Requirements



Notes: 1) Education Requirements not specified in 27% of job postings; 2) Years of Experience not specified in 21% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

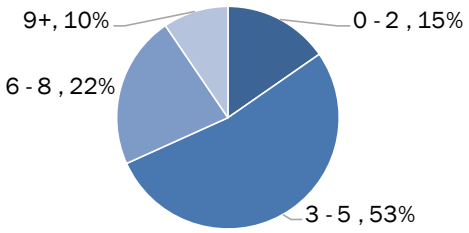
Titles

Titles were varied; none were associated with at least 5 percent of the job postings for this occupation.

Skills

1. Budgeting
2. Project Management
3. Staff Management
4. Supervisory Skills
5. Workshops
6. Contract Management
7. Multimedia
8. Performance Appraisals
9. Program Management
10. Scheduling

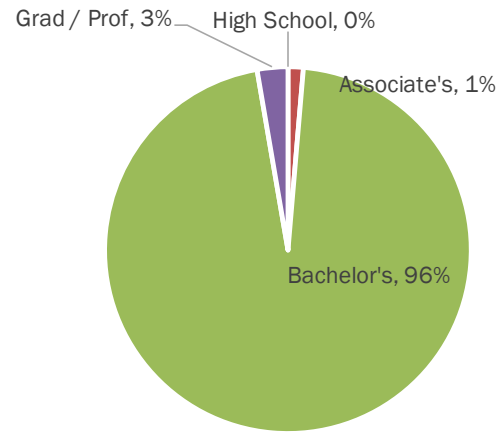
Years of Experience



2. Public Relations and Fundraising Managers, $138,800

Advocacy Cluster: Wage Premium= 0%; Job Postings= 150

Education Requirements



Notes: 1) Education Requirements not specified in 14% of job postings; 2) Years of experience not specified in 20% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

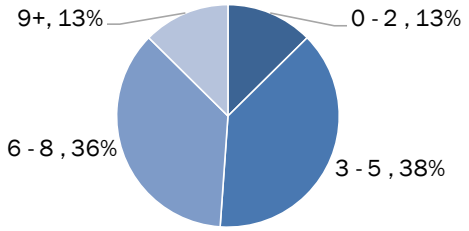
Titles

1. Communications Manager
2. Director of Communications

Skills

1. Fundraising
2. Social Media
3. Project Management
4. Budgeting
5. Newsletters
6. Business Development
7. Staff Management
8. Journalism
9. Media Relations
10. Supervisory Skills

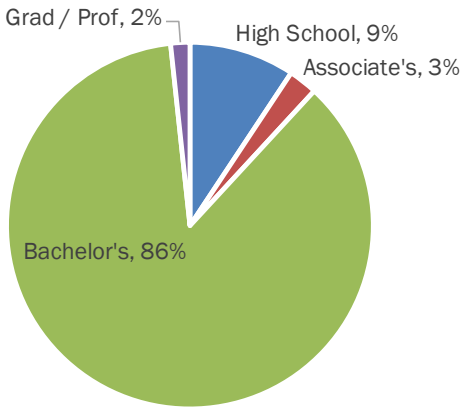
Years of Experience



3. Human Resources Specialists, $80,300

Advocacy Cluster: Wage Premium= +4%; Job Postings= 150

Education Requirements



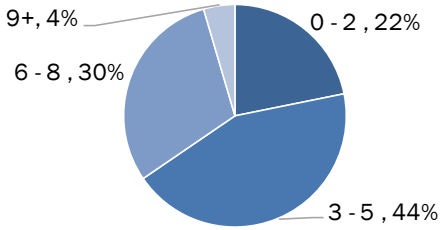
Titles

1. Recruiter
2. Human Resources Generalist
3. Human Resources Coordinator

Skills

1. Recruiting
2. Staff Management
3. Applicant Tracking System
4. HRIS
5. Employee Relations
6. Budgeting
7. Customer Service
8. Project Management
9. Onboarding
10. Performance Management

Years of Experience

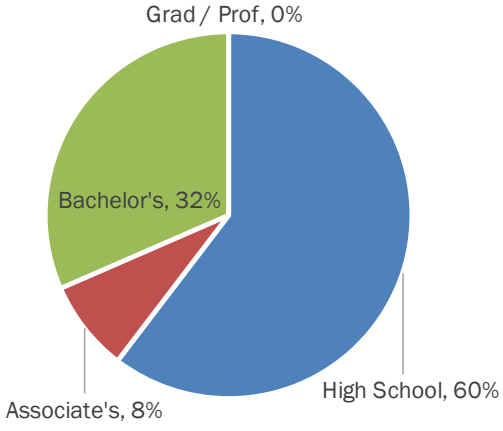


Notes: 1) Education Requirements not specified in 32% of job postings; 2) Years of experience not specified in 29% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Secretaries and Administrative Assistants, Except Legal, Medical, and Executive, $42,000

Advocacy Cluster: Wage Premium= -1%; Job Postings= 150

Education Requirements



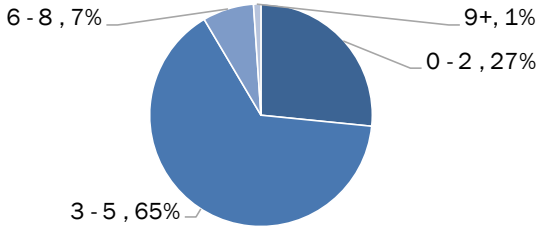
Titles

1. Administrative Assistant

Skills

1. Administrative Support
2. Expense Reports
3. Administrative Functions
4. Mailing
5. Staff Management
6. Workshops
7. Word Processing
8. Copying
9. Scheduling
10. Travel Arrangements

Years of Experience

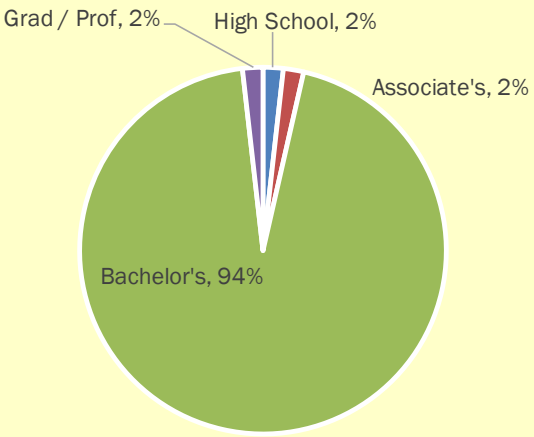


Notes: 1) Education Requirements not specified in 38% of job postings; 2) Years of experience not specified in 39% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Software Developers, Applications, $110,100

Advocacy Cluster: Wage Premium= -2%; Job Postings= 150

Education Requirements



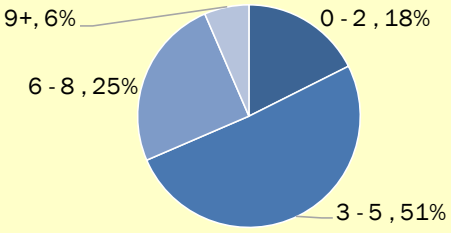
Titles

1. Software Development Engineer
2. Java Software Developer
3. Software Developer

Skills

1. Software Development
2. Software Engineering
3. SQL
4. JavaScript
5. JAVA
6. .NET Programming
7. Microsoft C#
8. ASP
9. Object-Oriented Analysis and Design (OOAD)
10. Extensible Markup Language (XML)

Years of Experience

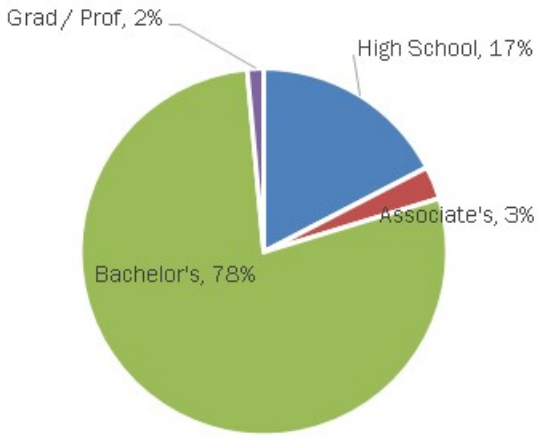


Notes: 1) Education Requirements not specified in 28% of job postings; 2) Years of experience not specified in 24% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

6. Sales Representatives, $66,900

Advocacy Cluster: Wage Premium= +3%; Job Postings= 100

Education Requirements



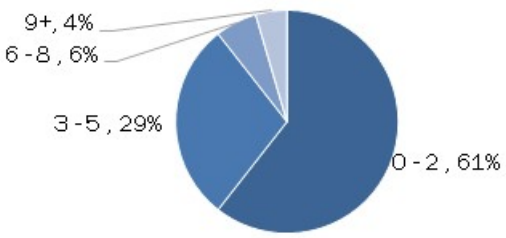
Titles

1. Account Manager
2. Business Consultant
3. Executive Assistant

Skills

1. Business Development
2. Customer Service
3. Social Media
4. Sales
5. Customer Contact
6. Budgeting
7. Account Management
8. Project Management
9. Media Relations
10. Journalism

Years of Experience

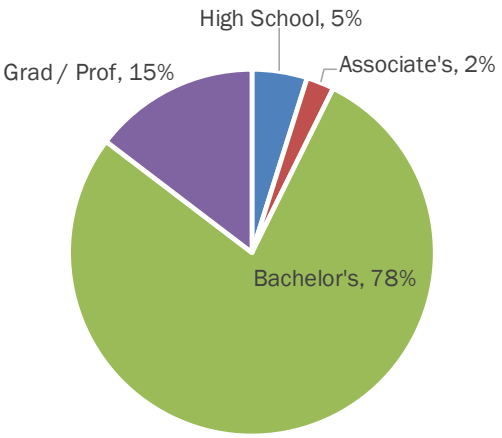


Notes: 1) Education Requirements not specified in 38% of job postings; 2) Years of experience not specified in 41% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

7. Marketing Managers, $148,300

Advocacy Cluster: Wage Premium= -14%; Job Postings= 100

Education Requirements



Notes: 1) Education Requirements not specified in 14% of job postings; 2) Years of experience not specified in 18% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

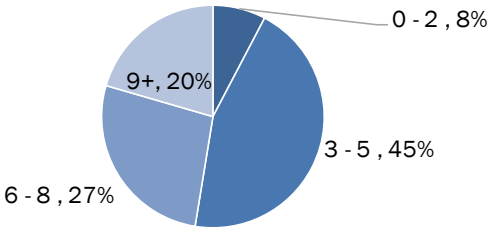
Titles

1. Marketing Manager
2. Digital Marketing Manager

Skills

1. Budgeting
2. Project Management
3. Social Media
4. Marketing
5. Business Development
6. Marketing Management
7. Market Strategy
8. Email Marketing
9. Market Research
10. Digital Marketing

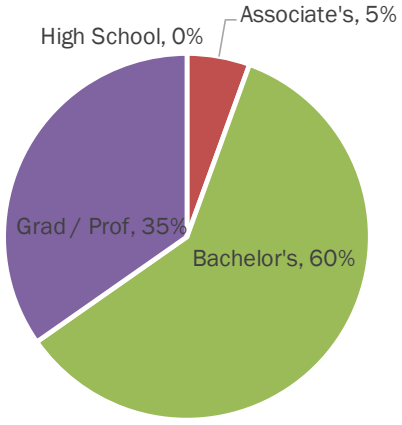
Years of Experience



8. Medical and Health Services Managers, $108,200

Advocacy Cluster: Wage Premium= +8%; Job Postings= 100

Education Requirements



Notes: 1) Education Requirements not specified in 23% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

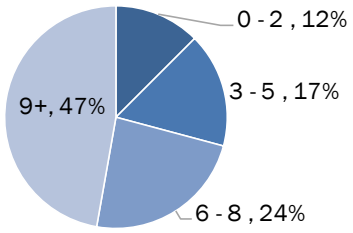
Titles

1. Health Director

Skills

1. Budgeting
2. Staff Management
3. Project Management
4. Supervisory Skills
5. Business Development
6. Fundraising
7. Financial Management
8. Scheduling
9. Business Planning
10. Economics

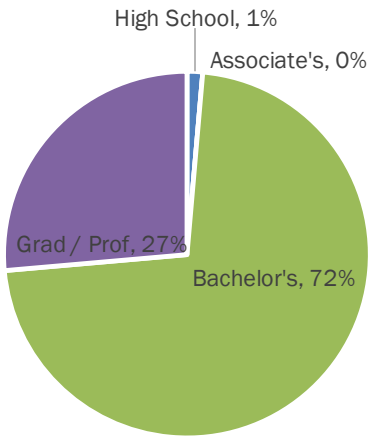
Years of Experience



9. General and Operations Managers, $132,400

Advocacy Cluster: Wage Premium= +8%; Job Postings= 100

Education Requirements



Notes: 1) Education Requirements not specified in 18% of job postings; 2) Years of experience not specified in 26% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

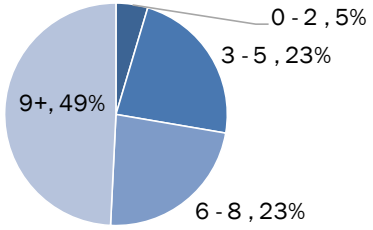
Titles

Titles were extremely varied; none were associated with at least 5 percent of the job postings for this occupation.

Skills

1. Budgeting
2. Staff Management
3. Project Management
4. Financial Management
5. Supervisory Skills
6. Contract Management
7. Business Development
8. Information Systems
9. Fundraising
10. Customer Service

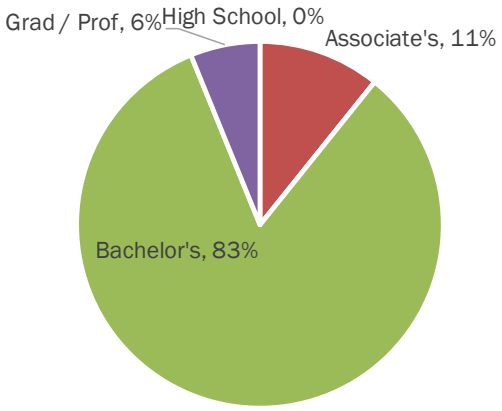
Years of Experience



10. Public Relations Specialists, $79,700

Advocacy Cluster: Wage Premium= +0%; Job Postings= 100

Education Requirements



Notes: 1) Education Requirements not specified in 19% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

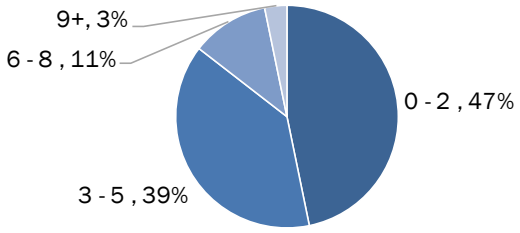
Titles

1. Communications Associate
2. Communications Specialist
3. Communications Coordinator
4. Public Relations Coordinator
5. Communications Assistant

Skills

1. Social Media
2. Journalism
3. Newsletters
4. Media Relations
5. Project Management
6. Mailing
7. Adobe Photoshop
8. Budgeting
9. Blog Posts
10. Event Planning

Years of Experience



INFORMATION AND COMMUNICATIONS TECHNOLOGY

Description

Organizations in this cluster develop hardware and software, process and host data, provide telecommunications, and offer computer programming and other services. Computer Systems Design Services grew by more jobs than any other industry in the cluster and it accounts for over half of the cluster's employment. There is considerable specialization in Computer Systems Design Services; in its August 2016 report on advanced industries, Brookings found that it, along with Customer Computer Programming, Computer Facilities Management Services, and Other Computer Related Services, contains the Washington MSA's largest concentration of advanced industries employment[xviii].

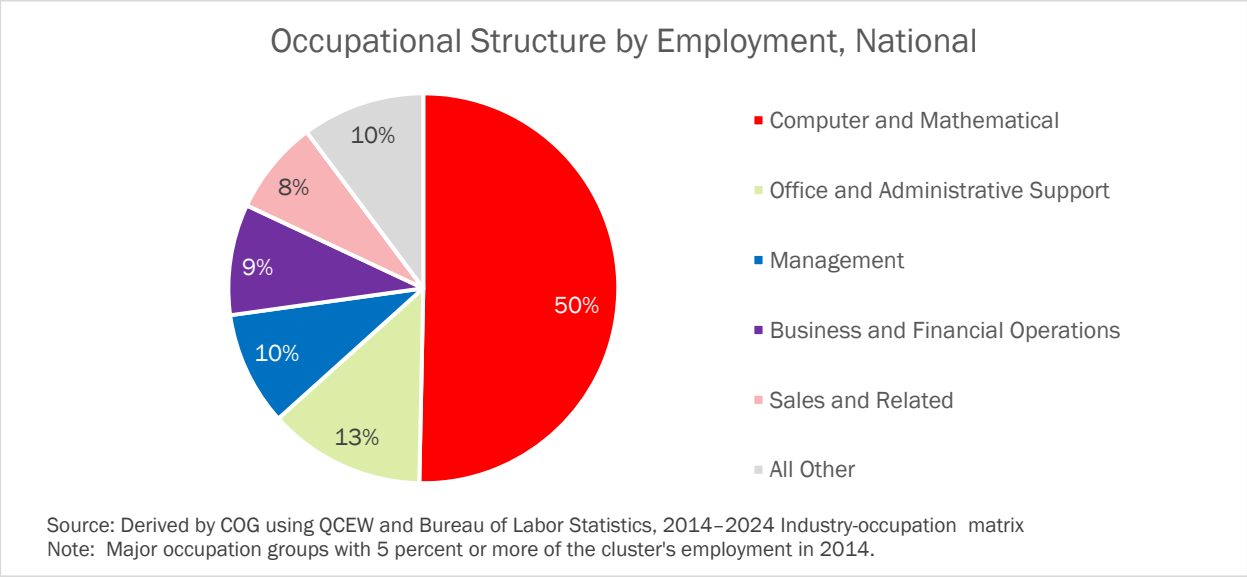
Table 12. Information and Communications Technology cluster – private sector employment, metropolitan Washington, 2010, 2014, 2015

	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	**2010**	**2014**	**2015**	**2010 - 2014**	**2014 - 2015**	**2010 - 2014**	**2014 - 2015**
Computer and Software Merchant Wholesalers	8,500	7,400	7,000	-275	-400	-3%	-5%
Software Publishers	5,400	6,200	5,900	200	-300	4%	-5%
Wired Telecommunications Carriers	20,100	18,800	16,600	-325	-2,200	-2%	-12%
Wireless Telecommunications Carriers	1,600	1,400	1,800	-50	400	-3%	29%
Satellite Telecommunications	1,300	500	400	-200	-100	-21%	-20%
Telecommunications Resellers	1,300	1,200	1,000	-25	-200	-2%	-17%
All Other Telecommunications	2,500	1,800	1,800	-175	0	-8%	0%
Data Processing, Hosting, and Related Services	9,100	10,500	11,400	350	900	4%	9%
Custom Computer Programming Services	44,000	42,600	44,500	-350	1,900	-1%	4%
Computer Systems Design Services	96,100	98,200	102,900	525	4,700	1%	5%
Computer Facilities Management Services	1,900	1,900	2,000	0	100	0%	5%
Other Computer Related Services	8,200	6,400	6,900	-450	500	-6%	8%
Computer Training	700	300	300	-100	0	-19%	0%
Information and Communications Technology	200,500	197,000	202,500	-875	5,500	-0.4%	2.8%
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016
Notes: 1) May not sum to total due to rounding.
2) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.
3) Due to availability and magnitude of adjacent year employment estimate and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2010 Loudoun County All Other Telecommunications.

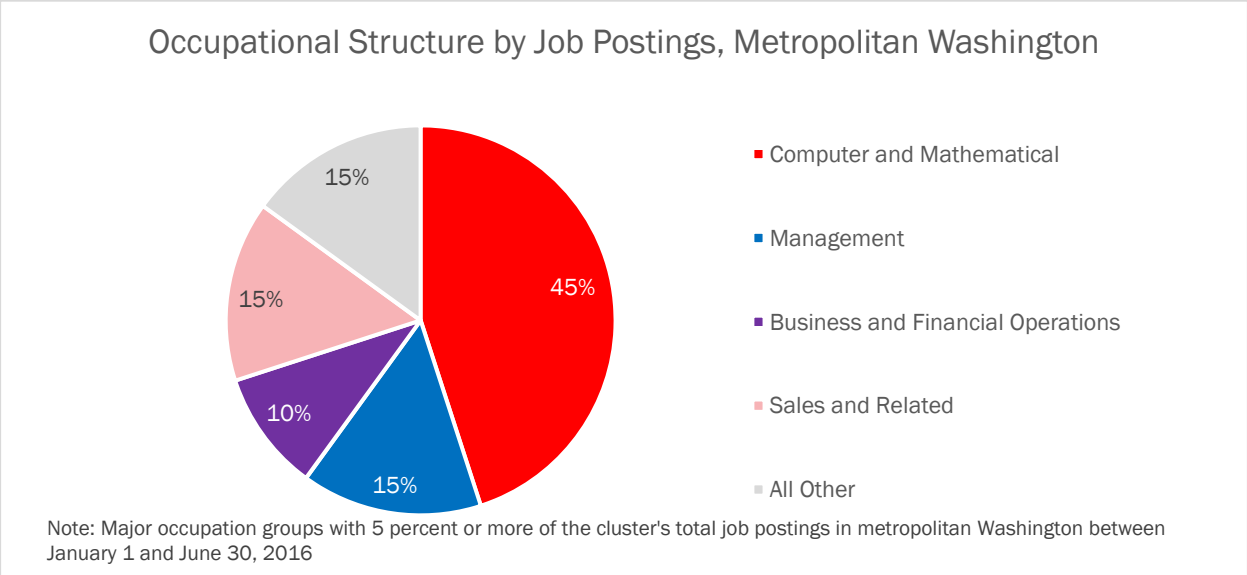
Occupational structure

The national occupational structure for the Information and Communications Technology cluster indicates that half of the employment in this cluster is in computer and mathematical occupations. According to the Bureau of Labor Statistics, between 2014 and 2024, Computer and Mathematical occupations are projected to grow at twice the rate of all occupations and will have a much lower replacement rates. Genuine growth is projected for these occupations. The occupational structure of the job postings placed in metropolitan Washington shows a similar structure except that less than five percent of the job postings were for office and administrative support occupations. There was also a greater share of job postings for management occupations and sales and related occupations.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–2024 Industry-occupation matrix
Note: Major occupation groups with 5 percent or more of the cluster's employment in 2014.

Figure 10. Occupational structure by employment



Note: Major occupation groups with 5 percent or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016

Figure 9. Occupational structure by job postings

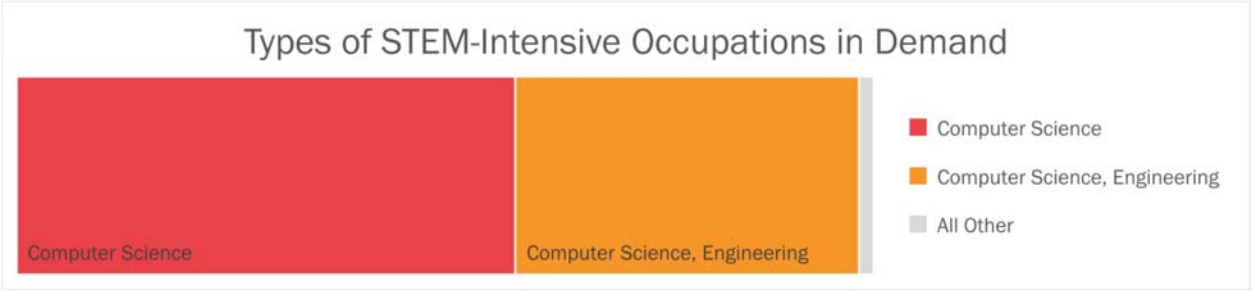
Who is recruiting?

Table 13. Information and Communications Technology cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
Oracle	Software Publishers	3,200
Mantech International	Computer Systems Design and Related Services	1,750
CACI	Computer Systems Design and Related Services	1,500
CGI Group	Computer Systems Design and Related Services	1,150
Verizon Communications Incorporated	Wired Telecommunications Carriers	900
MITRE Corporation	Computer Systems Design and Related Services	650
AT&T	Wireless Telecommunications Carriers	450
NTT Data	Computer Systems Design and Related Services	300
NCI Information Systems	Computer Systems Design and Related Services	300
Microsoft Corporation	Software Publishers	300

What STEM-intensive occupations are in demand?

During the first half of 2016, 32 percent of the Information and Communications Technology cluster's job postings were for STEM-intensive occupations[xix]. Almost all of these job postings were for computer occupations. The top five included: Software Developers, Information Security Analysts, Computer Systems Analysts, Database Administrators, and Computer Network Architects.



Note: STEM-type defined by O*NET

Figure 11. Types of STEM-intensive occupations in demand

Overall, what occupations are in the greatest demand?

The top ten occupations include:

1. **Software Developers, Applications (STEM-intensive)** – Develop, create, and modify general computer applications

2. **Sales Representatives** – Sells goods or services to businesses or groups, or individual. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon the economic cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

3. **Computer Systems Engineers/Architects** – Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions. Note: While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

4. **Information Security Analysts (STEM-intensive)** – Plan, implement, upgrade, or monitor security measures for protection of computer networks and information

5. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, and supply chain.

6. **Marketing Managers** – Plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors, and identify potential customers.

7. **Management Analysts** – Conduct organizational studies and evaluations, design systems and procedures, conduct work simplification and measurement studies, and prepare operations and procedures manuals to assist management in operating more efficient and effectively.

8. **Computer Systems Analysts (STEM-intensive)** – Analyze science, engineering, business, and other data processing problems to implement and improve computer systems.

9. **Sales Managers** – Plan, direct, or coordinate the actual distribution or movement of a product or service to the customer.

10. **Information Technology Project Managers** – Plan, initiate, and manage information technology (IT) projects. Lead and guide the work of technical staff. Serve as liaison between business and technical aspects of projects. Note: While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

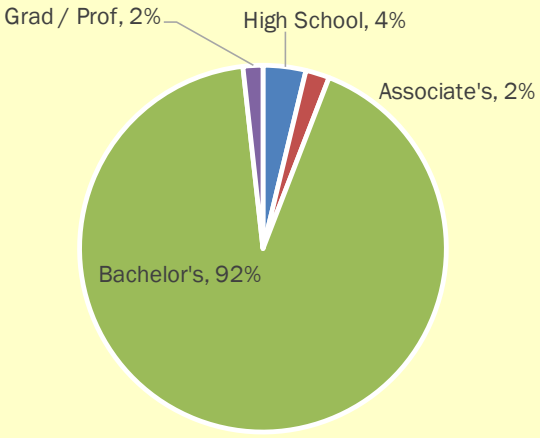
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 (BLS OES) as well as a wage premium. The wage premium was derived by COG from national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *STEM-intensive occupations are displayed with a light yellow background.*

1. Software Developers, Applications, $110,100

Information & Communications Technology Cluster: Wage Premium= -1%; Job Postings= 1,850

Education Requirements



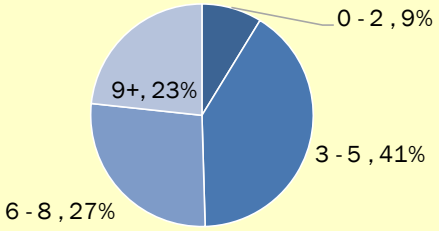
Titles

1. Software Development Engineer
2. Java Software Developer
3. Software Developer

Skills

1. Software Development
2. JAVA
3. SQL
4. Oracle
5. Software Engineering
6. JavaScript
7. LINUX
8. Extensible Markup Language (XML)
9. Object-Oriented Analysis and Design (OOAD)
10. Microsoft C#

Years of Experience

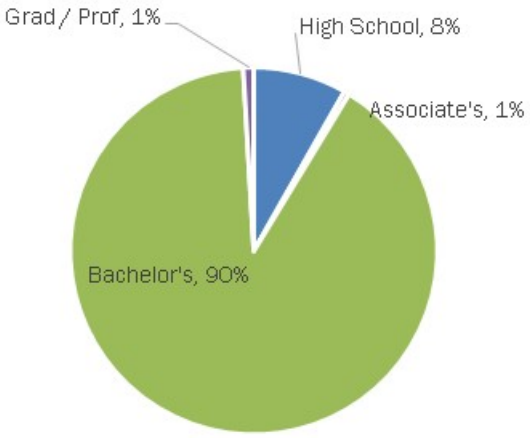


Notes: 1) Education Requirements not specified in 23% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

2. Sales Representatives, $66,900

Information & Communications Technology Cluster: Wage Premium= +11%; Job Postings= 1,800

Education Requirements



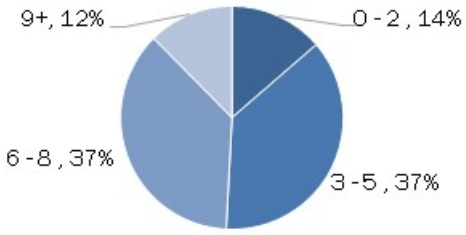
Titles

1. Sales Representative
2. Sales Consultant
3. Account Manager
4. Sales Executive

Skills

1. Sales
2. Oracle
3. Business Development
4. Prospecting
5. Product Sales
6. Sales Goals
7. Project Management
8. Account Development
9. Prospective Clients
10. Forecasting

Years of Experience

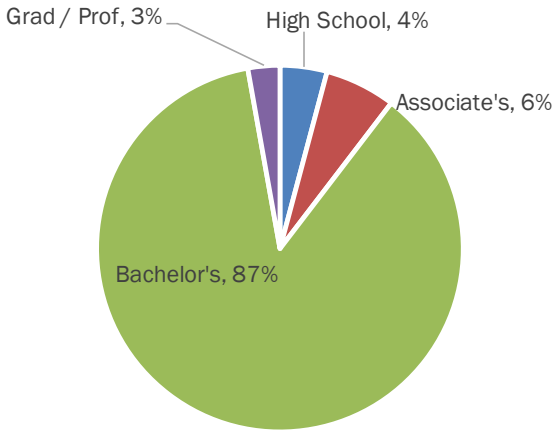


Notes: 1) Education Requirements not specified in 17% of job postings; 2) Years of experience not specified in 22% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

3. Computer Systems Engineers/Architects, $112,000

Information & Communications Technology Cluster: Wage Premium= +0%; Job Postings= 1,050

Education Requirements



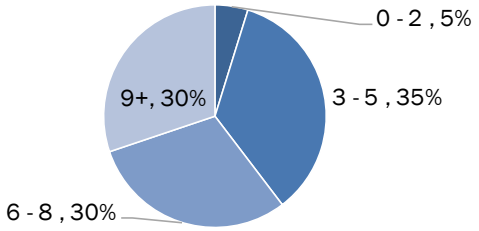
Titles

1. Systems Engineer
2. Solutions Architect
3. Senior Systems Engineer

Skills

1. Systems Engineering
2. LINUX
3. VMware
4. Oracle
5. SQL
6. Software Development
7. Information Systems
8. Cisco
9. JAVA
10. Mathematics

Years of Experience

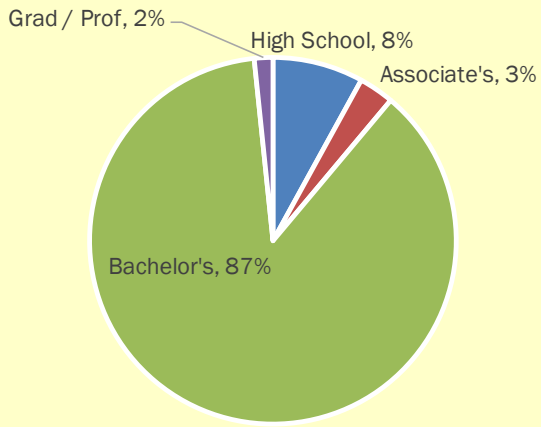


Notes: 1) Education Requirements not specified in 22% of job postings; 2) Years of experience not specified in 20% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Information Security Analysts, $106,800

Information & Communications Technology Cluster: Wage Premium= +3%; Job Postings= 700

Education Requirements



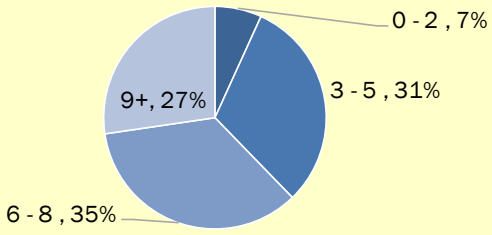
Titles

1. Security Engineer
2. Security Analyst
3. Information Security Engineer
4. Information Systems Security Officer

Skills

1. Information Security
2. Information Systems
3. Information Assurance
4. LINUX
5. Network Security
6. Cryptography
7. Mathematics
8. Telecommunications
9. Certification & Accreditation
10. Cisco

Years of Experience

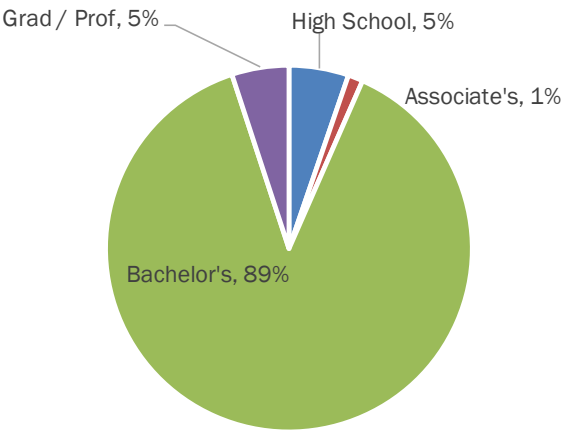


Notes: 1) Education Requirements not specified in 13% of job postings; 2) Years of experience not specified in 14% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Managers, All Other, $128,800

Information & Communications Technology Cluster: Wage Premium= +13%; Job Postings= 600

Education Requirements



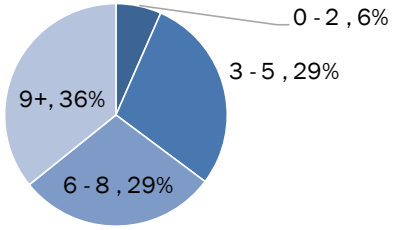
Titles

1. Program Manager
2. Project Manager

Skills

1. Project Management
2. Budgeting
3. Program Management
4. Scheduling
5. Oracle
6. Supervisory Skills
7. Customer Service
8. Contract Management
9. Microsoft Project
10. Staff Management

Years of Experience

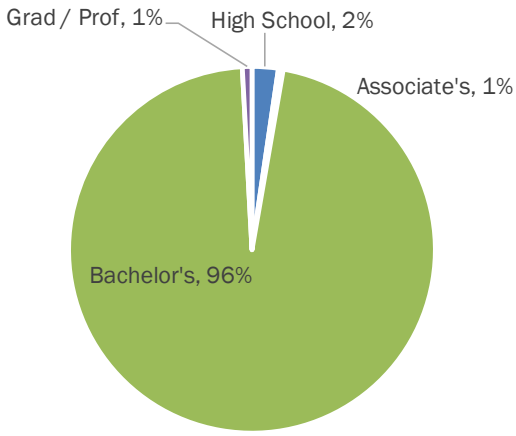


Notes: 1) Education Requirements not specified in 25% of job postings; 2) Years of experience not specified in 17% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

6. Marketing Managers, $148,300

Information & Communications Technology Cluster: Wage Premium= +7%; Job Postings= 550

Education Requirements



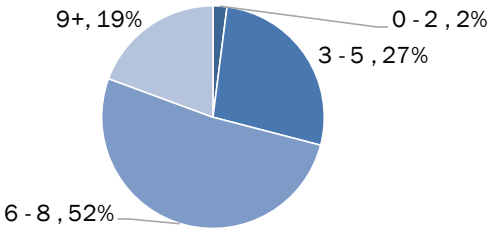
Titles

1. Director of Marketing
2. Product Marketing Manager
3. Marketing Manager

Skills

1. Product Management
2. Product Marketing
3. Oracle
4. Project Management
5. Product Development
6. Market Strategy
7. Business Planning
8. Budgeting
9. Description and Demonstration of Products
10. SAP

Years of Experience

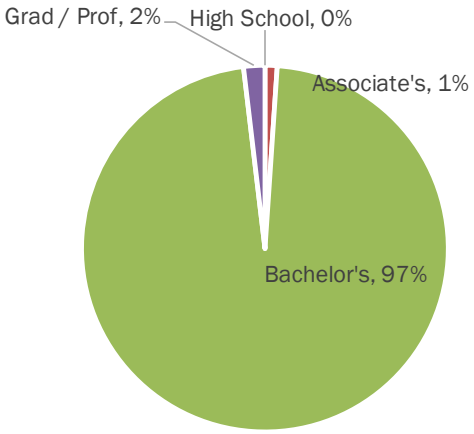


Notes: 1) Education Requirements not specified in 16% of job postings; 2) Years of experience not specified in 22% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

7. Management Analysts, $98,200

Information & Communications Technology Cluster: Wage Premium= +7%; Job Postings= 550

Education Requirements



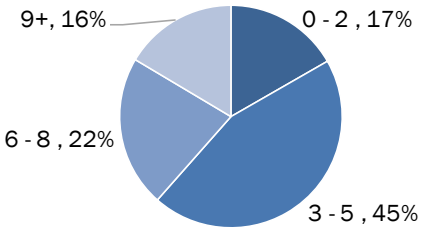
Titles

1. Business Analyst
2. Program Analyst
3. Management Analyst

Skills

1. Business Analysis
2. Project Management
3. Budgeting
4. Business Process
5. Oracle
6. Scheduling
7. Contract Management
8. Customer Contact
9. Business Administration
10. Software Development

Years of Experience

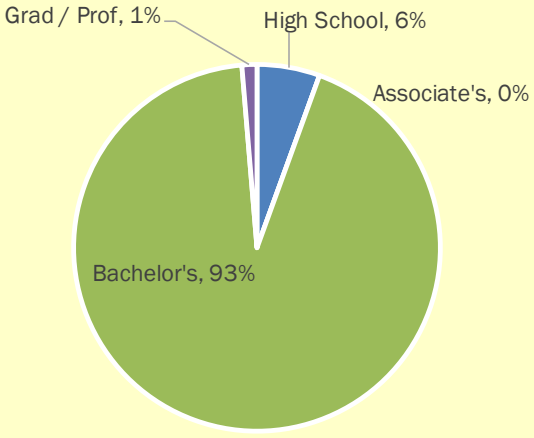


Notes: 1) Education Requirements not specified in 33% of job postings; 2) Years of experience not specified in 27% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

8. Computer Systems Analysts, $99,100

Information & Communications Technology Cluster: Wage Premium= +2%; Job Postings= 550

Education Requirements



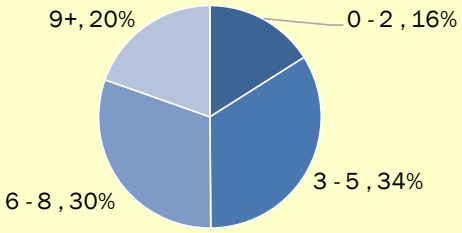
Titles

1. Systems Analyst
2. Business Systems Analyst
3. Technical Analyst

Skills

1. Oracle
2. Systems Analysis
3. Business Process
4. SQL
5. Project Management
6. Software Development
7. JAVA
8. Budgeting
9. Information Systems
10. Customer Service

Years of Experience

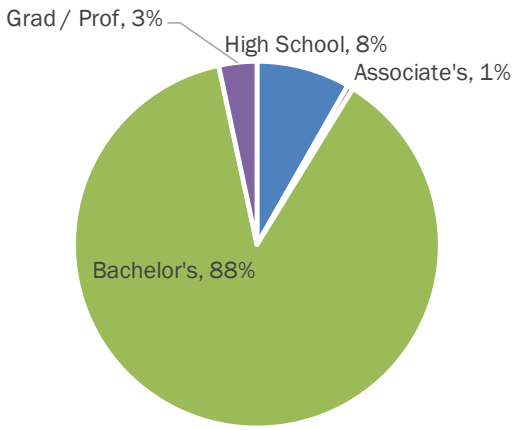


Notes: 1) Education Requirements not specified in 30% of job postings; 2) Years of experience not specified in 17% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

9. Sales Managers, $144,400

Information & Communications Technology Cluster: Wage Premium= +23%; Job Postings= 500

Education Requirements



Notes: 1) Education Requirements not specified in 25% of job postings; 2) Years of experience not specified in 44% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

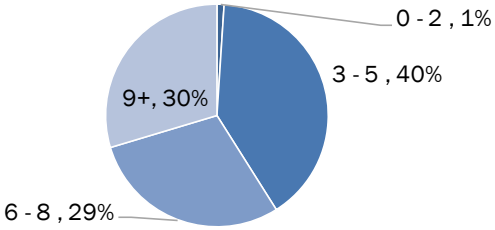
Titles

1. Sales Manager
2. Director of Sales
3. Business Development Director

Skills

1. Sales
2. Oracle
3. Sales Management
4. Business Development
5. Negotiation Skills
6. Sales Administration
7. Sales Cycle
8. Product Sales
9. Budgeting
10. Value Proposition

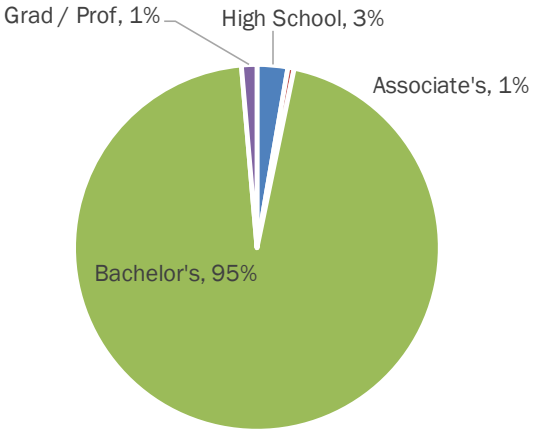
Years of Experience



10. Information Technology Project Managers, $112,000

Information & Communications Technology Cluster: Wage Premium= +0%; Job Postings= 500

Education Requirements



Notes: 1) Education Requirements not specified in 25% of job postings; 2) Years of experience not specified in 19% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

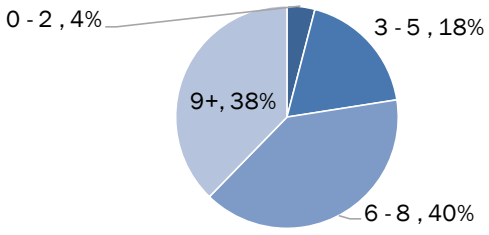
Titles

1. Technical Project Manager
2. Information Technology Manager

Skills

1. Project Management
2. Oracle
3. Software Development
4. Budgeting
5. Scheduling
6. Business Process
7. Systems Development Life Cycle (SDLC)
8. Scrum
9. Customer Service
10. Microsoft Project

Years of Experience



SCIENCE AND SECURITY TECHNOLOGY

Description

This cluster contains firms providing product and parts manufacturing for aerospace and other defense manufacturing, scientific research and services as well as security and emergency services. The below table reports the 2010, 2014, and 2015 private sector employment estimates for each industry in this cluster, except for Aerospace Product and Parts Manufacturing and Other Transportation Equipment Manufacturing which were not disclosed. The three largest industries are Engineering Services, Investigation and Security Services, and Scientific Research and Development Services. Investigation and Security Services grew by the greatest number of jobs between 2010 and 2015.

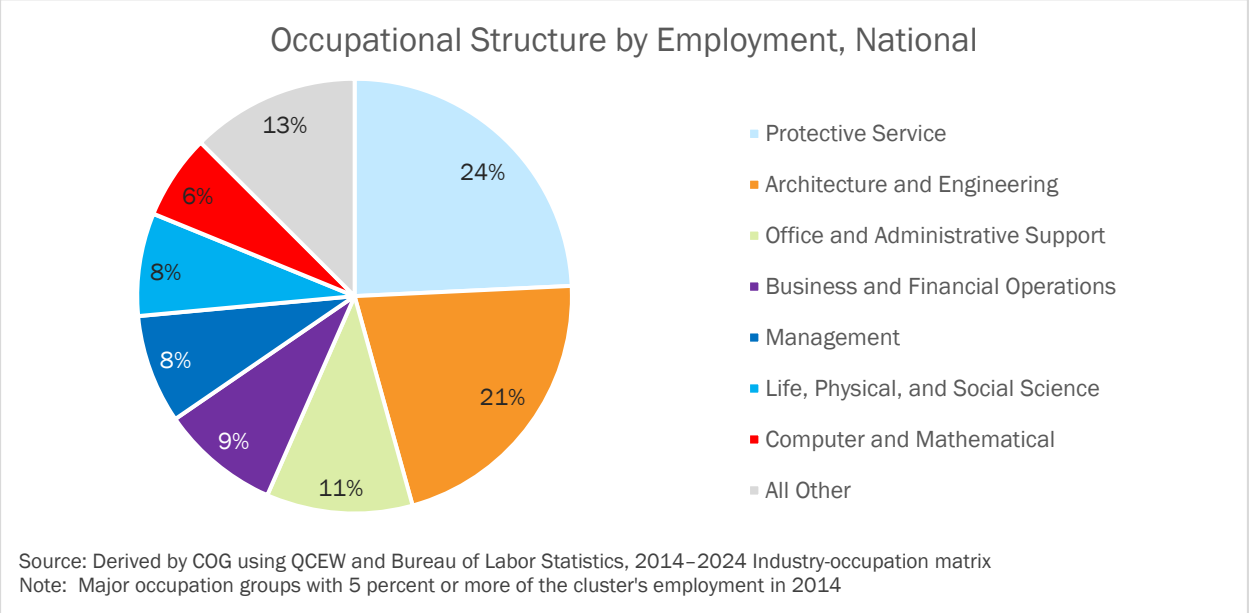
Table 14. Science and Security Technology cluster – private sector employment, metropolitan Washington, 2010, 2014, 2015

	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	**2010**	**2014**	**2015**	**2010 - 2014**	**2014 - 2015**	**2010 - 2014**	**2014 - 2015**
Aerospace Product and Parts Manufacturing		Not Disclosed					
Other Transportation Equipment Manufacturing		Not Disclosed					
Engineering Services	42,400	39,000	37,900	-850	-1,100	-2%	-3%
Environmental Consulting Services	3,700	3,700	3,800	0	100	0%	3%
Other Technical Consulting Services	7,300	10,300	11,000	750	700	9%	7%
Scientific Research and Development Services	24,800	22,300	22,900	-625	600	-2.6%	2.7%
Investigation and Security Services	28,500	31,900	33,300	850	1,400	3%	4%
Emergency and Other Relief Services	1,900	1,600	1,400	-75	-200	-4%	-13%
Science and Security Technology	108,600	108,700	110,200	25	1,500	0.0%	1.4%
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016
Notes: 1) May not sum to total due to rounding.
2) Not disclosed = Employment exists in some jurisdictions but it is not published by the Bureau of Labor Statistics. For the Washington MSA, 650 Aerospace Product and Parts Manufacturing jobs were estimated in 2015, down from 1,40 in 2010 and 100 Other Transportation Equipment and Manufacturing jobs were estimated in 2015, prior to 2013 employment was not disclosed for Other Transportation Equipment and Manufacturing.
3) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.
4) Due to availability and magnitude of adjacent year employment estimate and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2014 and 2015 Fairfax City Investigation and Security Services.
5) Scientific Research and Development Services does not include Research and Development in Biotechnology which is in Biology and Health Technology cluster and Social Science and Humanities Research which is in the Advocacy cluster.

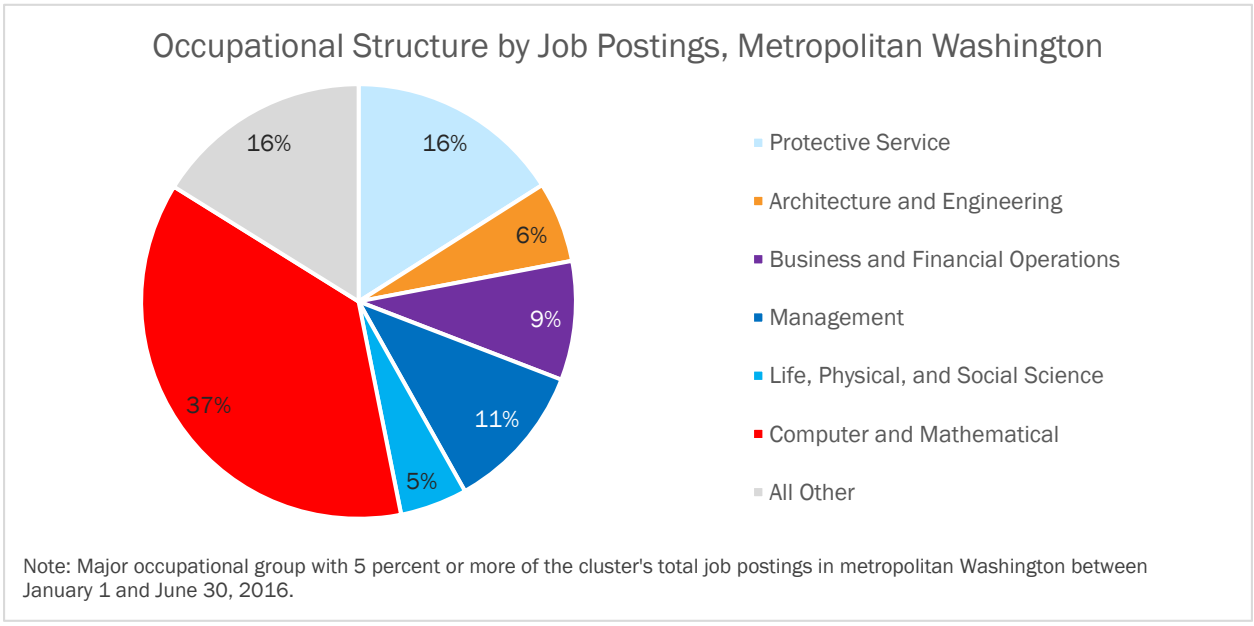
Occupational structure

At the national level, almost a quarter of this cluster consists of protective service occupations. In fact, Security Guards represent over 20 percent of the employment in this cluster across the United States. However, protective service occupations only accounted for 16 percent of the job postings in metropolitan Washington during the first half of 2016. Architecture and engineering occupations also made up a lower share of the job postings. A high proportion of the job postings were for computer and mathematical occupations; this likely reflects both metropolitan Washington's industrial structure as well as growth in these occupations.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–2024 Industry-occupation matrix
Note: Major occupation groups with 5 percent or more of the cluster's employment in 2014

Figure 12. Occupational structure by employment



Note: Major occupational group with 5 percent or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016.

Figure 13. Occupational structure by job postings

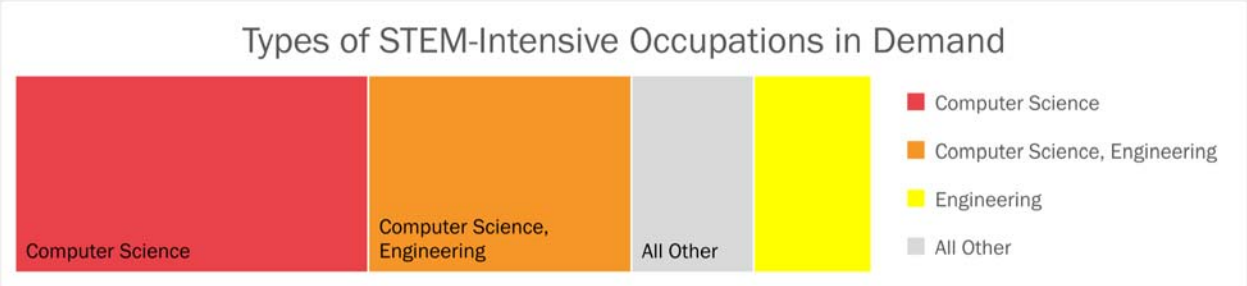
Who is recruiting?

Table 15. Science and Security Technology cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
Northrop Grumman	Aerospace Product and Parts Manufacturing	2,200
Lockheed Martin Corporation	Aerospace Product and Parts Manufacturing	900
AlliedBarton Security Services	Investigation and Security Services	500
Sotera Defense Solutions	Scientific Research and Development Services	300
The Boeing Company	Aerospace Product and Parts Manufacturing	250
Alliant Techsystems	Aerospace Product and Parts Manufacturing	250
Orbital Sciences Corporation	Aerospace Product and Parts Manufacturing	150
Universal Protection Corporation	Investigation and Security Services	150
Alion Science and Technology	Scientific Research and Development Services	150
Omniplex World Services Corporation	Investigation and security Services	150

What STEM-intensive occupations are in demand?

The Science and Security Technology Cluster placed 9,000 job postings during the first half of 2016. For the 90% of job postings where occupation was specified, approximately 34 percent were for the STEM-intensive occupations. The top five were all computer occupations and included: Software Developers, Information Security Analysts, Computer Systems Analysts, Computer Network Architects, and Database Administrators.



Note: STEM-type defined by O*NET

Figure 14. Types of STEM-Intensive Occupations in Demand

Overall, what occupations are in the greatest demand?

The top ten occupations include:

1. **Security Guards** – Guard, patrol, or monitor premises to prevent theft, violence, or infractions of rules. May operate x-ray and metal detector equipment.

2. **Software Developers, Applications (STEM-intensive)** – Develop, create, and modify general computer applications.

3. **Computer Systems Engineers/Architects** – Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions. Note: While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

4. **Information Security Analysts (STEM-intensive)** – Plan, implement, upgrade, or monitor security measures for protection of computer networks and information.

5. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, and supply chain.

6. **Sales Representatives** – Sells goods or services to businesses, groups or individuals. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon the economic cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

7. **Management Analysts** – Conduct organizational studies and evaluations, design systems and procedures, conduct work simplification and measurement studies, and prepare operations and procedures manuals to assist management in operating more efficient and effectively.

8. **Network and Computer Systems Administrators** – Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Note: While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

9. **Computer Systems Analysts (STEM-intensive)** – Analyze science, engineering, business, and other data processing problems to implement and improve computer systems.

10. **Intelligence Analysts** – Gather, analyze, or evaluate information from a variety of sources, such as law enforcement databases, surveillance, intelligence networks or geographic information systems. Use intelligence data to anticipate and prevent organized crime activities, such as terrorism. Note: While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

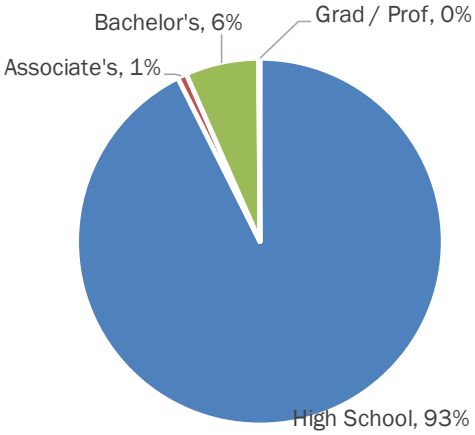
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 (BLS OES) as well as a wage premium. The wage premium was derived using national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *STEM-intensive occupations are displayed with a light yellow background.*

1. Security Guards, $35,600

Science and Security Technology Cluster: Wage Premium= +29%; Job Postings= 1,050

Education Requirements



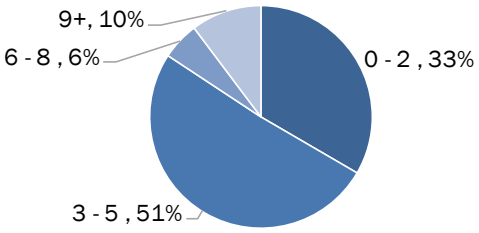
Titles

1. Security Officer
2. Unarmed Security Officer

Skills

1. Law Enforcement or Criminal Justice Experience
2. Handling of Crisis or Emergency Situations
3. Report Writing
4. Training Programs
5. Deterrence of Rule or Safety Violations
6. Asset Protection
7. Emergency Response
8. Compliance Management
9. Sales
10. Cardiopulmonary Resuscitation (CPR)

Years of Experience

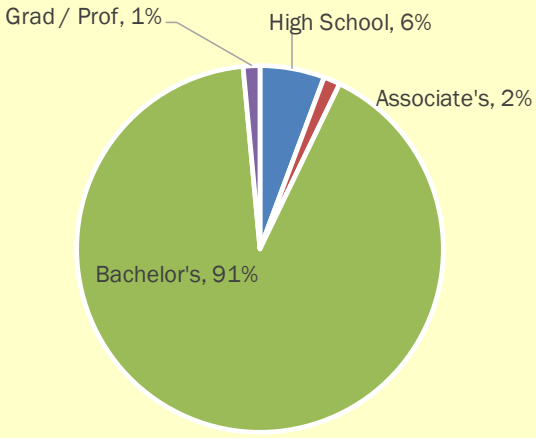


Notes: 1) Education Requirements not specified in 18% of job postings; 2) Years of experience not specified in 57% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

2. Software Developers, Applications, $110,100

Science and Security Technology Cluster: Wage Premium= -3%; Job Postings= 800

Education Requirements



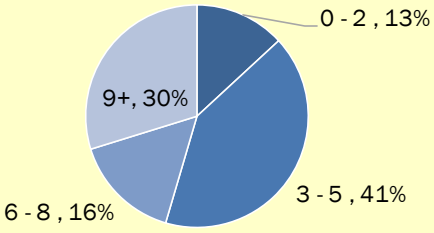
Titles

1. Software Development Engineer
2. Software Developer

Skills

1. Software Development
2. Software Engineering
3. JAVA
4. JavaScript
5. LINUX
6. SQL
7. Python
8. C++
9. Oracle
10. Extensible Markup Language (XML)

Years of Experience

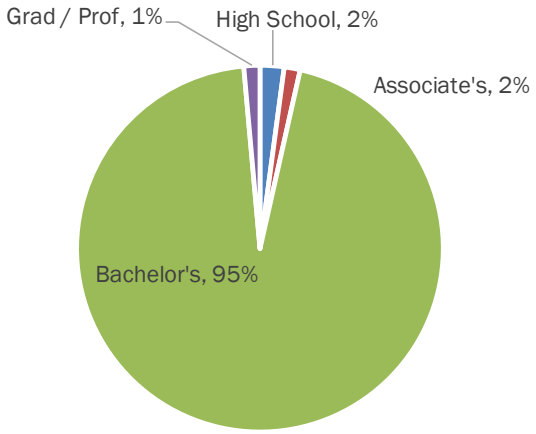


Notes: 1) Education Requirements not specified in 24% of job postings; 2) Years of experience not specified in 27% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

3. Computer Systems Engineers/Architects, $112,000

Science and Security Technology Cluster: Wage Premium= -5%; Job Postings= 600

Education Requirements



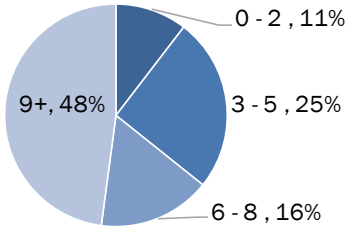
Titles

1. Systems Engineer
2. Senior Systems Engineer
3. Systems Architect

Skills

1. Systems Engineering
2. LINUX
3. Validation
4. Software Development
5. Systems Integration
6. System Architecture
7. Scheduling
8. UNIX
9. Project Management
10. Mathematics

Years of Experience

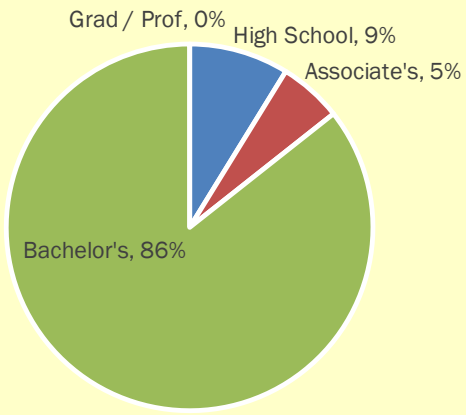


Notes: 1) Education Requirements not specified in 26% of job postings; 2) Years of experience not specified in 30% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Information Security Analysts, $106,800

Science and Security Technology Cluster: Wage Premium= +0%; Job Postings= 450

Education Requirements



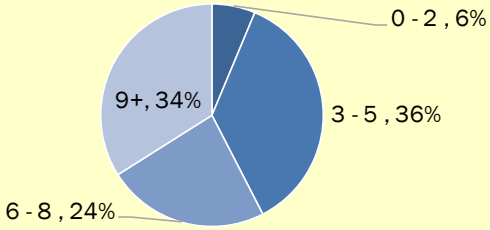
Titles

1. Information Systems Security Officer
2. Information Assurance Analyst
3. Information Assurance Engineer

Skills

1. Information Systems
2. Information Security
3. Information Assurance
4. LINUX
5. Certification & Accreditation
6. Network Security
7. System Security Plans
8. Scanners
9. Federal Information Security Management Act
10. Plan of Action and Milestone

Years of Experience

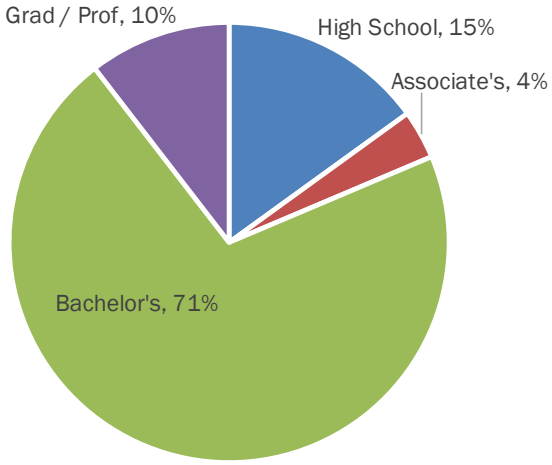


Notes: 1) Education Requirements not specified in 22% of job postings; 2) Years of experience not specified in 27% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Managers, All Other, $128,800

Science and Security Technology Cluster: Wage Premium= +7%; Job Postings= 350

Education Requirements



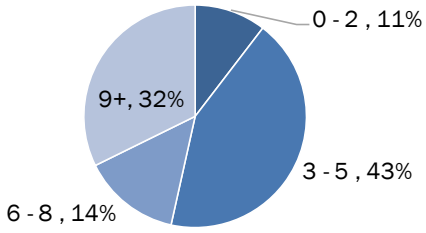
Titles

1. Program Manager
2. Project Manager

Skills

1. Project Management
2. Budgeting
3. Scheduling
4. Program Management
5. Supervisory Skills
6. Contract Management
7. Staff Management
8. Procurement
9. Microsoft Project
10. Customer Contact

Years of Experience

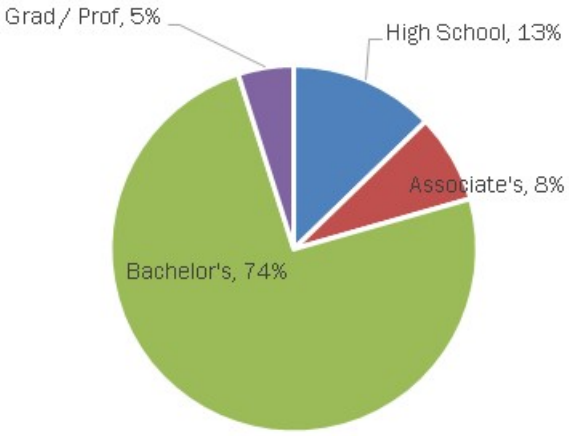


Notes: 1) Education Requirements not specified in 11% of job postings; 2) Years of experience not specified in 16% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

6. Sales Representatives, $66,900

Science and Security Technology Cluster: Wage Premium= +3%; Job Postings= 250

Education Requirements



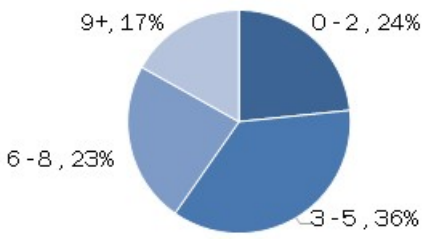
Titles

1. Account Manager
2. Sales Representative
3. Sales Executive

Skills

1. Sales
2. Business Development
3. Budgeting
4. Customer Service
5. Business Planning
6. Customer Contact
7. Scheduling
8. Contract Management
9. Account Management
10. Sales Goals

Years of Experience

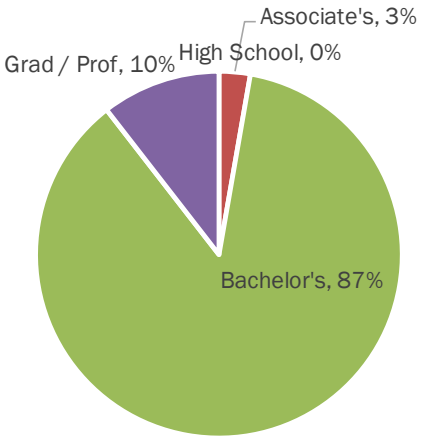


Notes: 1) Education Requirements not specified in 16% of job postings; 2) Years of experience not specified in 37% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

7. Management Analysts, $98,200

Science and Security Technology Cluster: Wage Premium= +5%; Job Postings= 250

Education Requirements



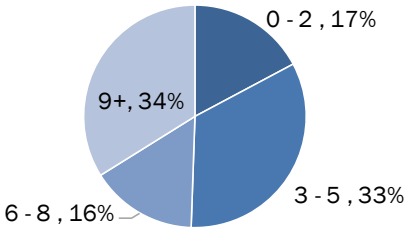
Titles

1. Program Analyst
2. Management Analyst
3. Business Process Analyst
4. Business Analyst

Skills

1. Business Process
2. Scheduling
3. Project Management
4. Budgeting
5. Data Analysis
6. Business Analysis
7. Microsoft SharePoint
8. Information Systems
9. Technical Writing / Editing
10. Business Development

Years of Experience

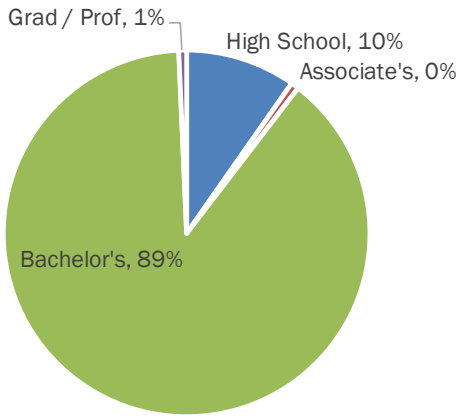


Notes: 1) Education Requirements not specified in 24% of job postings; 2) Years of experience not specified in 25% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

8. Network and Computer Systems Administrators, $96,700

Science and Security Technology Cluster: Wage Premium= +5%; Job Postings= 200

Education Requirements



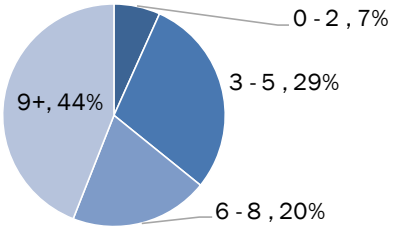
Titles

1. Systems Administrator
2. Senior Systems Administrator
3. Linux Systems Administrator

Skills

1. System Administration
2. LINUX
3. VMware
4. Hardware and Software Installation
5. Oracle
6. UNIX
7. Red Hat Linux
8. SQL
9. Technical Support
10. Windows Server

Years of Experience

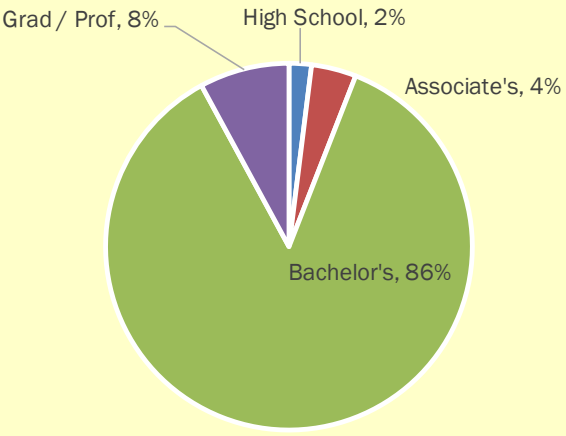


Notes: 1) Education Requirements not specified in 31% of job postings; 2) Years of experience not specified in 36% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

9. Computer Systems Analysts, $99,100

Science and Security Technology Cluster: Wage Premium= +2%; Job Postings= 150

Education Requirements



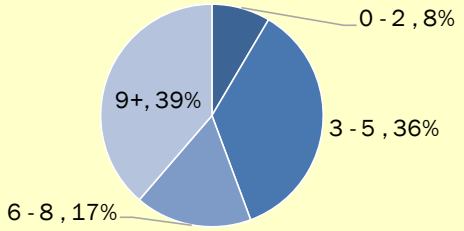
Titles

1. Software Development Engineer
2. Systems Analyst
3. Computer Systems Analyst
4. Systems Architect
5. Systems Integrator

Skills

1. Software Development
2. Oracle
3. Software Engineering
4. JAVA
5. JavaScript
6. SQL
7. Systems Analysis
8. Technical Support
9. MySQL
10. Information Systems

Years of Experience

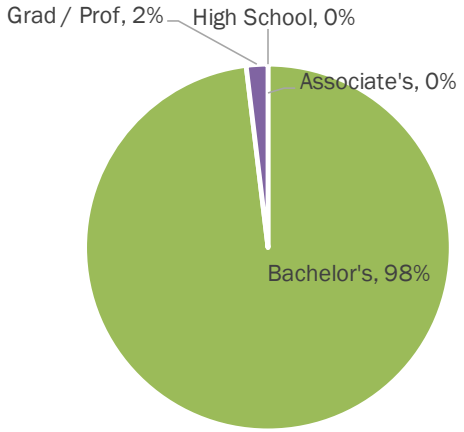


Notes: 1) Education Requirements not specified in 27% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

10. Intelligence Analysts, $124,900

Science and Security Technology Cluster: Wage Premium=+0%; Job Postings= 150

Education Requirements



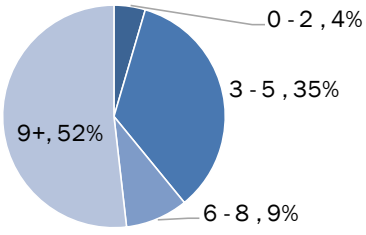
Titles

1. Intelligence Analyst

Skills

1. Intelligence Analysis
2. Human Intelligence
3. Counter Intelligence
4. Project Management
5. Signals Intelligence
6. Network Engineering
7. Scheduling
8. Intelligence Operations
9. Office Automation
10. Financial Analysis

Years of Experience



Notes: 1) Education Requirements not specified in 20% of job postings; 2) Years of experience not specified in 16% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

BIOLOGY AND HEALTH TECHNOLOGY

Description

Organizations in this cluster perform biology research and manufacturing primarily related to health. The below table reports the 2010, 2014, and 2015 private sector employment estimates for each industry in this cluster. This is the smallest cluster in terms of private employment; over three-quarters of the Biology and Health Technology cluster employment as defined by Inforum was government employment. The concentration of talent in the federal government may be leveraged to expand the private sector; for example, the Federal Laboratory Consortium actively works to support the transfer of laboratory mission technologies into commercial products for the global marketplace. The largest industries are Research and Development in Biotechnology and Pharmaceutical and Medicine Manufacturing.

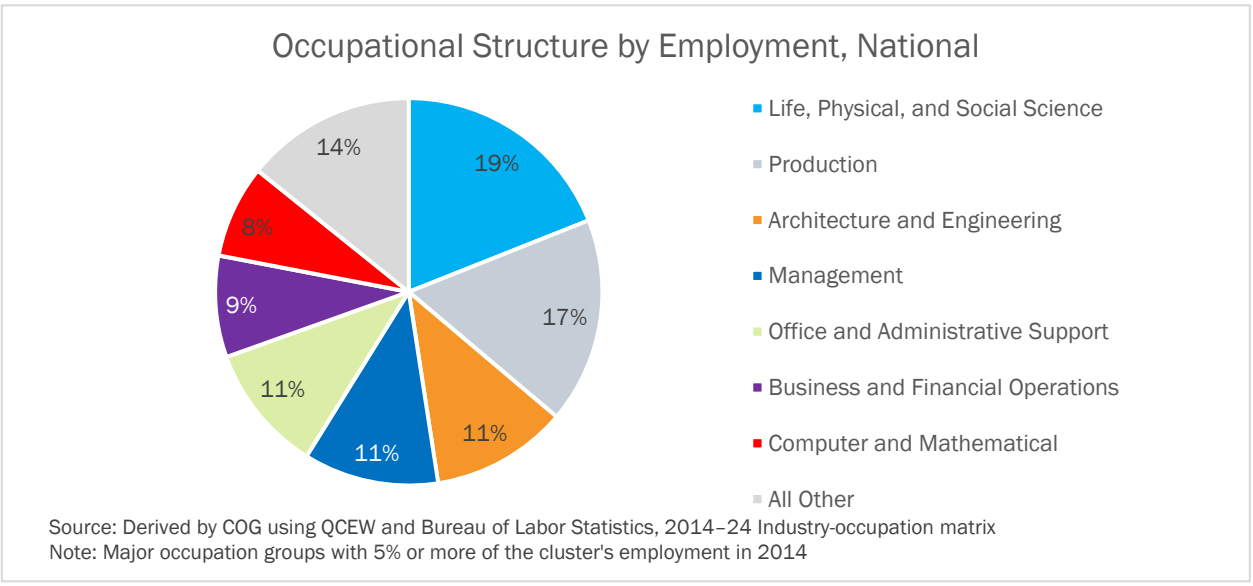
Table 16. Biology and Health Technology cluster – private sector employment, metropolitan Washington, 2010, 2014, 2015

	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	**2010**	**2014**	**2015**	**2010 - 2014**	**2014 - 2015**	**2010 - 2014**	**2014 - 2015**
Pharmaceutical and Medicine manufacturing	3,700	4,100	4,400	100	300	3%	7%
Medical equipment and Supplies Manufacturing	1,000	1,000	1,100	0	100	0%	10%
Druggists' Goods Merchant Wholesalers	1,100	700	800	-100	100	-11%	14%
Research and Development in Biotechnology	7,700	6,300	6,300	-350	0	-5%	0%
Biology and Health Technology	**13,500**	**12,100**	**12,500**	**-350**	**400**	**-2.7%**	**3.3%**
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016
Notes: 1) Due to non-disclosure, the industry group 3254 - Pharmaceutical and Medicine Manufacturing is reported, rather than smaller national industries selected by Inforum.
2) May not sum to total due to rounding.
3) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.
4) Due to availability and magnitude of adjacent year employment estimate and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2014 and 2015 Frederick County Pharmaceutical and Medicine Manufacturing and 2014 Loudoun County Medical Equipment and Supplies Manufacturing.

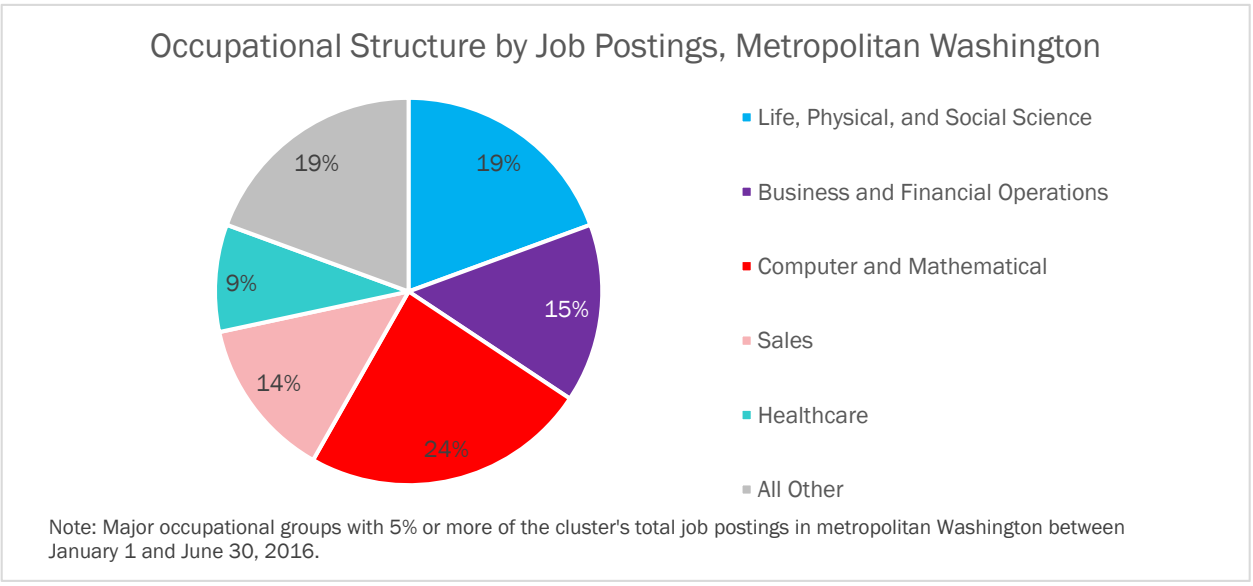
Occupational structure

The national occupational composition of this cluster is shown below. The most common occupations are in the life, physical, and social sciences. Compared to employment across the nation, job postings for metropolitan Washington were for a much larger share of management as well as computer and mathematical occupations. The job postings data also reflects more sales and healthcare occupations. Nearly a third of the job postings for healthcare occupations were placed by The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–24 Industry-occupation matrix
Note: Major occupation groups with 5% or more of the cluster's employment in 2014

Figure 15. Occupational structure by employment



Note: Major occupational groups with 5% or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016.

Figure 16. Occupational structure by job postings

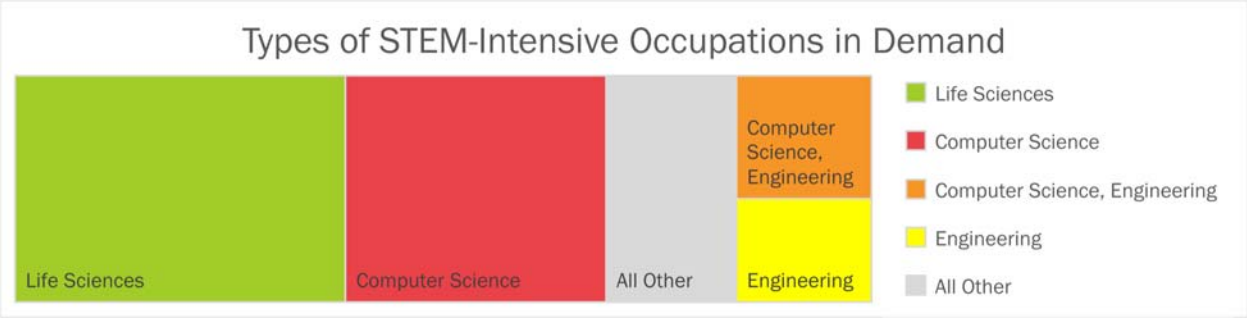
Who is recruiting?

Table 17. Biology and Health Technology cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
AstraZeneca/MedImmune	Scientific Research and Development Services	650
The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.	Scientific Research and Development Services	500
Advisory Board Company	Management, Scientific, and Technical Consulting Services	400
GlaxoSmithKline	Pharmaceutical and Medicine Manufacturing	250
Novavax Incorporated	Scientific Research and Development Services	200
Covance Incorporated	Scientific Research and Development Services	200
Macrogenics	Scientific Research and Development Services	100
Ortho Clinical Diagnostics	Scientific Research and Development Services	100
Pfizer	Pharmaceutical and Medicine Manufacturing	100
Technical Resources International Corporation	Scientific Research and Development Services	100

What STEM-intensive occupations are in demand?

During the first half of 2016, 26 percent of the Biology and Health clusters job postings were for STEM-intensive occupations[xx]. In comparison to the other key economic clusters, there was more variety in the types of STEM talent needed and the jobs varied from computer to chemistry to life sciences. The top five positions included Medical Scientists, Software Developers, Computer Systems Analysts, Chemists, and Business Intelligence Analysts.



Note: STEM-type defined by O*NET

Figure 17. Types of STEM-intensive occupations in demand

Overall, what occupations are in the greatest demand?

The top ten occupations include:

1. **Sales Representatives** – Sells goods or services to business, organizations, and/or individuals. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon the economic cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

2. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, and supply chain.

3. **Medical Scientists, Except Epidemiologists (STEM-intensive)** – Conduct research dealing with the understanding of human diseases and the improvement of human health. Engage in clinical investigation, research and development, or other related activities.

4. **Medical and Health Services Managers** – Plan, direct, or coordinate medical and health services in hospitals, clinics, managed care organizations, public health agencies, or similar organizations.

5. **Sales Managers** – Plan, direct, or coordinate the actual distribution or movement of a product or service to the customer.

6. **Administrative Services Managers** – Plan, direct, or coordinate one or more administrative services of an organization, such as records and information management, mail distribution, facilities planning and maintenance, custodial operations, and other office support services.

7. **Marketing Managers** – Plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors, and identify potential customers.

8. **Software Developers, Applications (STEM-intensive)** – Develop, create, and modify general computer applications.

9. **Human Resources Specialists** – Perform activities in the human resource area. Includes employment specialists who screen, recruit, interview, and place workers.

10. **Quality Control Analysts**- Conduct tests to determine quality of raw materials, bulk intermediate and finished products. May conduct stability sample tests.

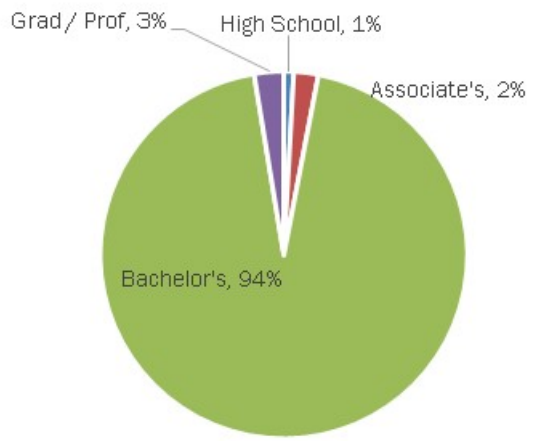
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 (BLS OES) as well as a wage premium. The wage premium was derived using national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *STEM-intensive occupations are displayed with a light yellow background.*

1. Sales Representatives, $66,900

Biology and Health Technology Cluster: Wage Premium= +15%; Job Postings= 250

Education Requirements



Notes: 1) Education Requirements not specified in 6% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

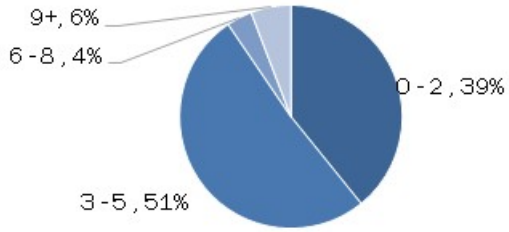
Titles

1. Sales Representative
2. Account Manager
3. Sales Specialist
4. Sales Consultant
5. Pharmaceutical Sales Representative

Skills

1. Sales
2. Product Sales
3. Budgeting
4. Pharmaceutical Sales
5. Business Planning
6. Account Management
7. Customer Service
8. Product Knowledge
9. Sales Management
10. Sales Goals

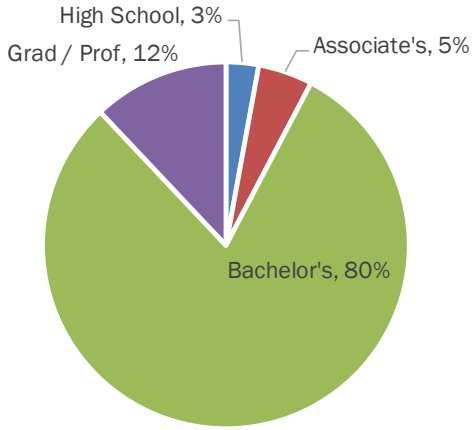
Years of Experience



2. Managers, All Other, $128,800

Biology and Health Technology Cluster: Wage Premium= +17%; Job Postings= 250

Education Requirements



Notes: 1) Education Requirements not specified in 11% of job postings; 2) Years of experience not specified in 24% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

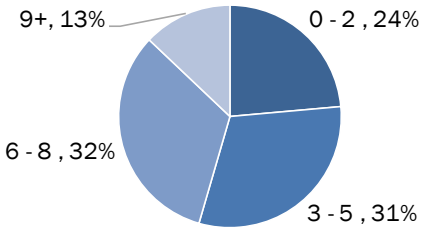
Titles

Titles were varied; no title was associated with at least 5% of the job postings for this occupation.

Skills

1. Project Management
2. Budgeting
3. Scheduling
4. Clinical Research
5. Supervisory Skills
6. Drug Development
7. Good Clinical Practices (GCP)
8. Biotechnology
9. Staff Management
10. Clinical Trials

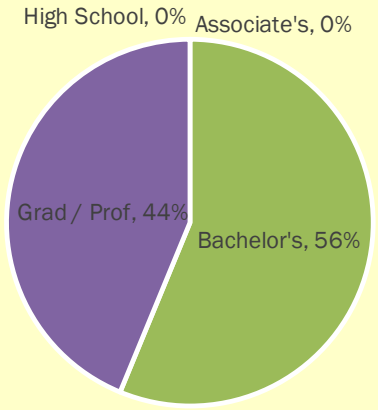
Years of Experience



3. Medical Scientists, Except Epidemiologists, $106,000

Biology and Health Technology Cluster: Wage Premium: +22%; Job Postings= 200

Education Requirements



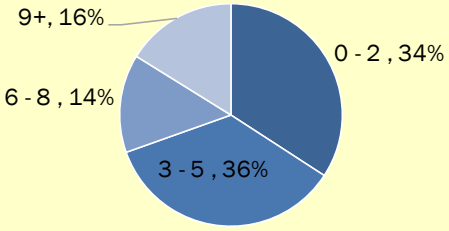
Titles

1. Clinical Research Associate

Skills

1. Clinical Research
2. Clinical Trials
3. Good Clinical Practices (GCP)
4. Drug Development
5. Immunology
6. Project Management
7. Data Management
8. Oncology
9. Clinical Development
10. Biotechnology

Years of Experience

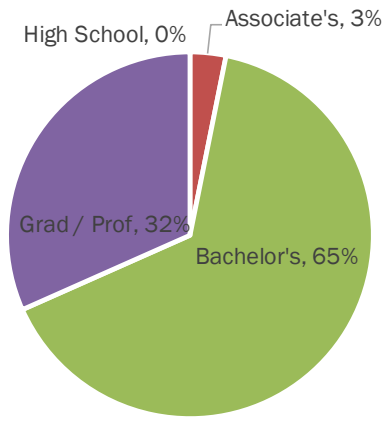


Notes: 1) Education Requirements not specified in 6% of job postings; 2) Years of experience not specified in 24% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Medical and Health Services Managers, $108,200

Biology and Health Technology Cluster: Wage Premium: +26%; Job Postings= 150

Education Requirements



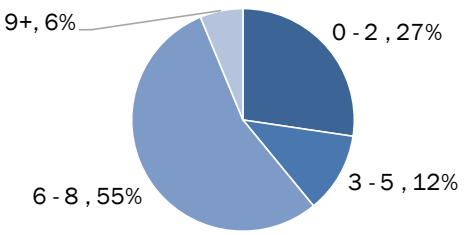
Titles

1. Clinical Manager
2. Director of Oncology
3. Account Manager
4. Medical Director

Skills

1. Budgeting
2. Oncology
3. Project Management
4. Clinical Development
5. Drug Development
6. Clinical Research
7. Clinical Trials
8. Pharmaceutical Industry Background
9. Business Planning
10. Product Development

Years of Experience

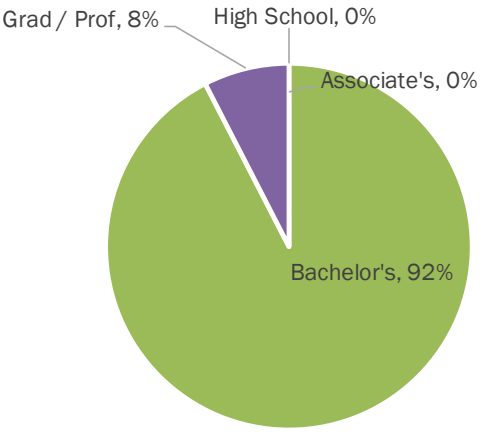


Notes: 1) Education Requirements not specified in 6% of job postings; 2) Years of experience not specified in 24% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Sales Managers, $144,400

Biology and Health Technology Cluster: Wage Premium: +18%; Job Postings= 100

Education Requirements



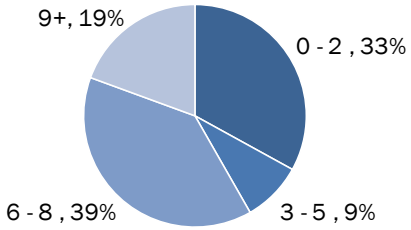
Titles

1. Director of Sales and Marketing
2. Regional Manager
3. Regional Sales Manager
4. Account Director
5. Director of Sales

Skills

1. Sales
2. Sales Goals
3. Account Management
4. Customer Service
5. Listening
6. Negotiation Skills
7. New Product Development
8. New Product Information
9. Marketing
10. Sales Management

Years of Experience

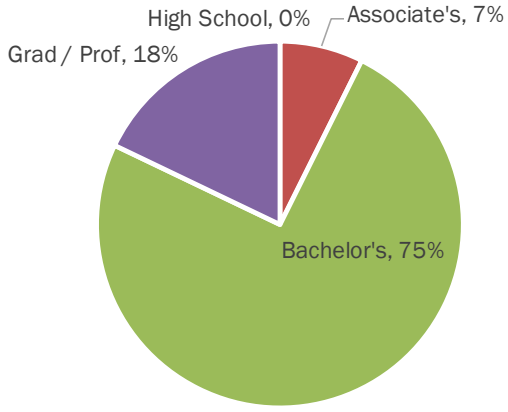


Notes: 1) Education Requirements not specified in 3% of job postings; 2) Years of experience not specified in 6% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

6. Administrative Services Managers, $99,900

Biology and Health Technology Cluster: Wage Premium: +10%; Job Postings= 100

Education Requirements



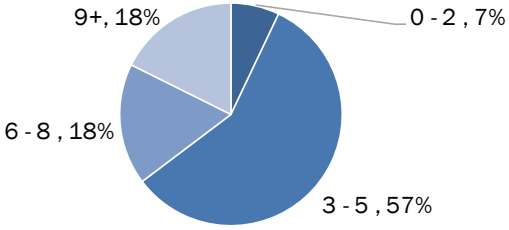
Titles

1. Development Associate
2. Account Director
3. Business Process and Solutions Director

Skills

1. Budgeting
2. Project Management
3. Clinical Development
4. Product Development
5. Clinical Research
6. Biotechnology
7. Sales
8. Oncology
9. Drug Development
10. Staff Management

Years of Experience

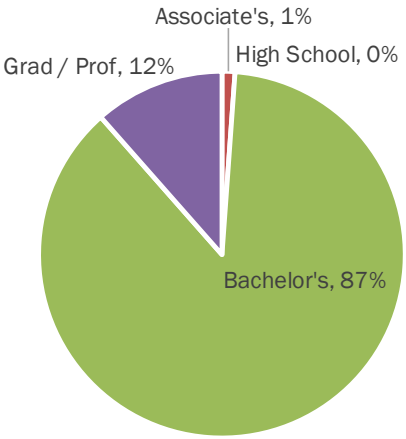


Notes: 1) Education Requirements not specified in 5% of job postings; 2) Years of experience not specified in 15% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

7. Marketing Managers, $148,300

Biology and Health Technology Cluster: Wage Premium: +5%; Job Postings= 200

Education Requirements



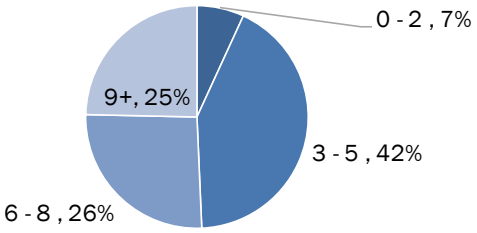
Titles

1. Director of Marketing
2. Marketing Manager
3. Marketing Associate

Skills

1. Marketing
2. Market Research
3. Budgeting
4. Product Management
5. Branding Strategy
6. Product Development
7. Project Management
8. Market Strategy
9. Sales
10. Strategic Marketing

Years of Experience

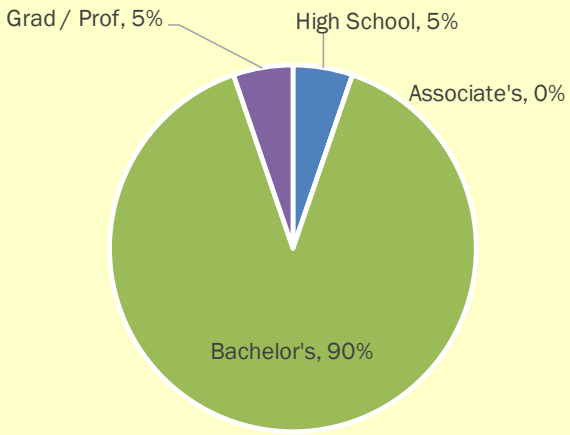


Notes: 1) Education Requirements not specified in 8% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

8. Software Developers, Applications, $110,100

Biology and Health Technology Cluster: Wage Premium: -4%; Job Postings= 100

Education Requirements



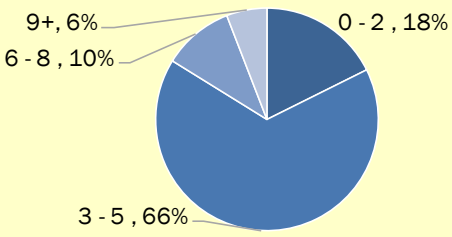
Titles

1. Software Development Engineer
2. Java Software Developer
3. SharePoint Developer

Skills

1. SQL
2. JAVA
3. Software Development
4. Software Engineering
5. JavaScript
6. jQuery
7. Python
8. SQL Server
9. HTML5
10. AJAX

Years of Experience

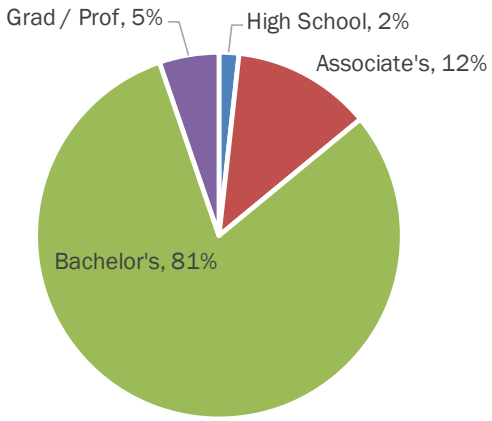


Notes: 1) Education Requirements not specified in 26% of job postings; 2) Years of experience not specified in 12% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

9. Human Resources Specialists, $80,300

Biology and Health Technology Cluster: Wage Premium: +10%; Job Postings= 50

Education Requirements



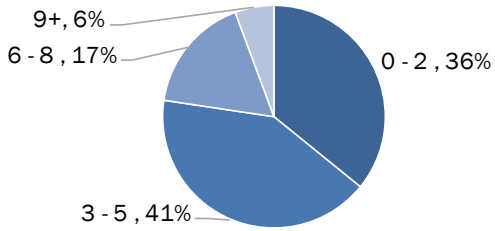
Titles

1. Human Resources Coordinator
2. Human Resources Generalist
3. Recruiting Coordinator
4. Recruiter

Skills

1. Recruiting
2. Applicant Tracking System
3. HRIS
4. Onboarding
5. Employee Relations
6. Performance Management
7. Talent Acquisition
8. Listening
9. Biotechnology
10. Customer Billing

Years of Experience

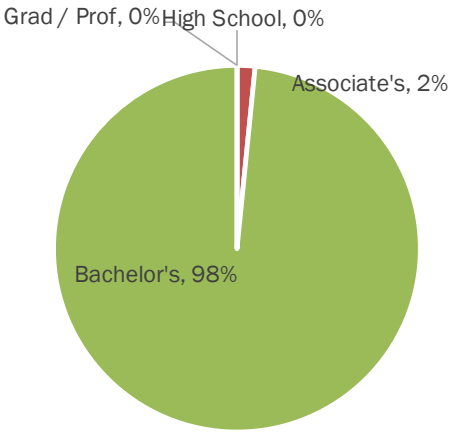


Notes: 1) Education Requirements not specified in 22% of job postings; 2) Years of experience not specified in 27% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

10. Quality Control Analysts, $55,700

Biology and Health Technology Cluster: Wage Premium: +2%; Job Postings= 50

Education Requirements



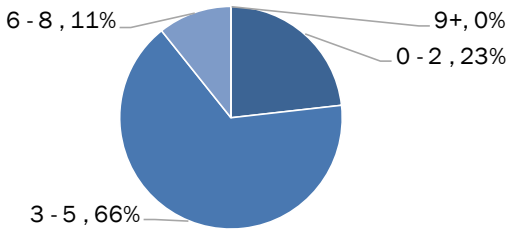
Titles

1. Quality Control Analyst
2. Quality Assurance Specialist
3. Quality Control Supervisor
4. Quality Control Specialist

Skills

1. Good Manufacturing Practices (GMP)
2. Current Good Manufacturing Practices (CGMP)
3. Validation
4. Chemistry
5. Biology
6. Microbiology
7. Experiments
8. Good Laboratory Practices (GLP)
9. Biotechnology
10. Biochemistry

Years of Experience



Notes: 1) Education Requirements not specified in 14% of job postings; 2) Years of experience not specified in 23% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

BUSINESS AND FINANCIAL SERVICES

Description

The below table reports the private sector employment estimates for each industry in this cluster, except for Security and Commodity Exchanges and Insurance and Employee Benefit Funds which were not disclosed. Management and Technical Consulting Services has more than twice the employment of any other industry; Brookings recently found that it had the second greatest share of advanced industries employment in the Washington MSA.

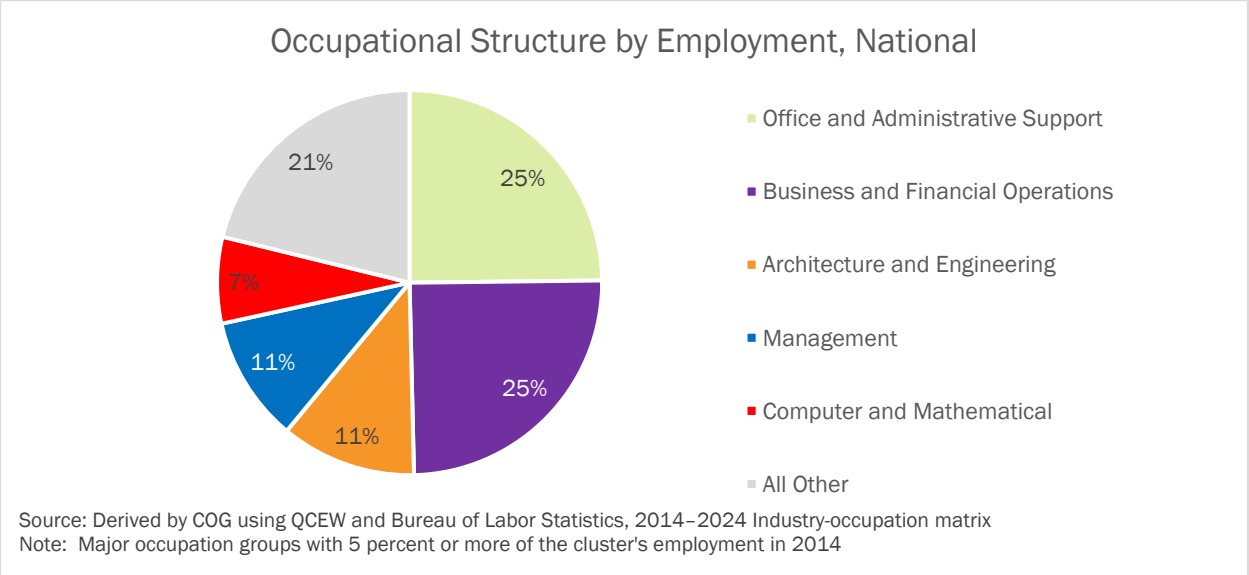
Table 18. Business and Financial Services cluster – private sector employment, metropolitan Washington, 2010, 2014, 2015

	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	**2010**	**2014**	**2015**	**2010 - 2014**	**2014 - 2015**	**2010 - 2014**	**2014 - 2015**
Nondepository Credit Intermediation	17,900	17,600	18,400	-75	800	0%	5%
Securities and Commodity Exchanges		Not Disclosed					
Insurance and Employee Benefit Funds	1,700	Not Disclosed					
Other Investment Pools and Funds	100	100	100	0	0	0%	0%
Accounting and Bookkeeping Services	24,900	29,000	31,300	1,025	2,300	4%	8%
Architectural Services	6,200	6,400	6,400	50	0	1%	0%
Specialized Design Services	2,700	2,900	2,600	50	-300	2%	-10%
Management and Technical Consulting Services	84,400	88,700	87,900	1,075	-800	1%	-1%
Other Professional and Technical Services	11,200	13,600	15,900	600	2,300	5%	17%
Management of Companies and Enterprises	37,000	36,700	35,700	-75	-1,000	0%	-3%
Employment Services	33,800	37,100	38,100	825	1,000	2%	3%
Business and Financial Services	220,000	232,100	236,400	3,025	4,300	1.3%	1.9%
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016
Notes: 1) May not sum to total due to rounding.
2) Not Disclosed=Employment exists in some jurisdictions but it is not disclosed. Securities and Commodity Exchanges employment is not disclosed for the Washington MSA. For the Washington MSA, Insurance and Employee Benefit Funds employment was estimated at 6,200 in 2010, it has not been disclosed since 2012.
3) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.
4) Due to availability and magnitude of adjacent year employment estimate and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2015 Manassas City Employment Services.
5) Management and Technical Consulting Services does not include Environmental Consulting Services and Other Technical Consulting Services which are in the Science and Security Technology cluster.
6) Other Professional and Technical Services omits Marketing Research and Public Opinion Polling, a part of the Advocacy cluster.

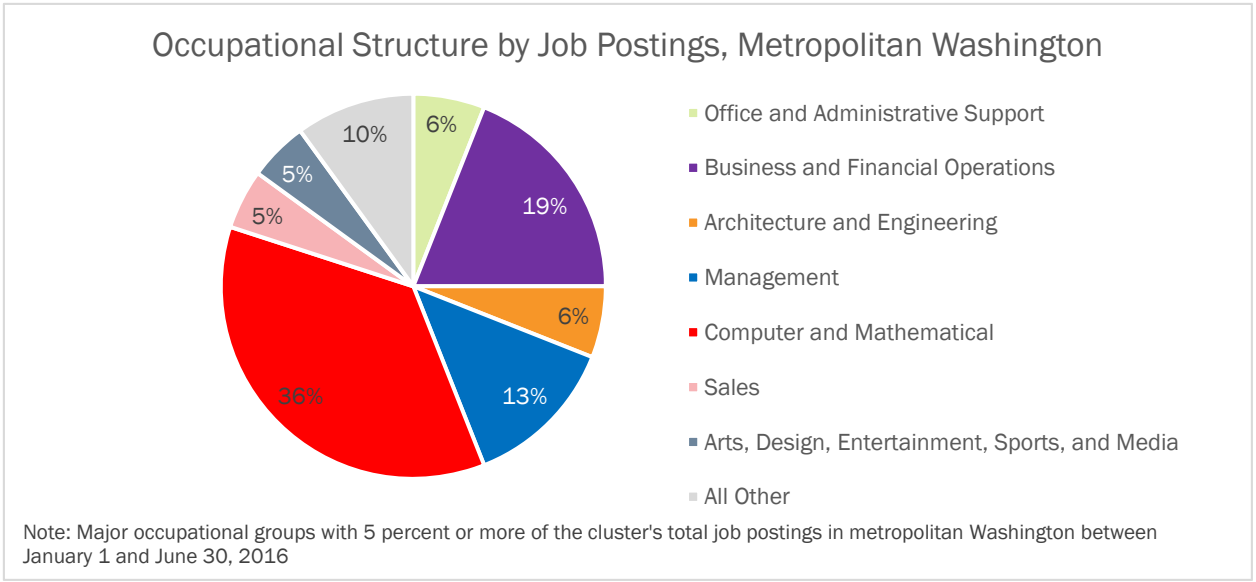
Occupational structure

At the national level, half of the employment in this cluster is in office and administrative support occupations or business and financial operations occupations. A much larger share of the job postings in metropolitan Washington were for computer and mathematical occupations, over a third. In addition, very few of the job postings were for office and administrative support occupations. This is consistent with the BLS projections that office and administrative support occupations will grow at less than a third of the rate of all occupations between 2014 and 2024 but may also reflect distinctions in metropolitan Washington's economy.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–2024 Industry-occupation matrix
Note: Major occupation groups with 5 percent or more of the cluster's employment in 2014

Figure 18. Occupational structure by employment



Note: Major occupational groups with 5 percent or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016

Figure 19. Occupational structure by job postings

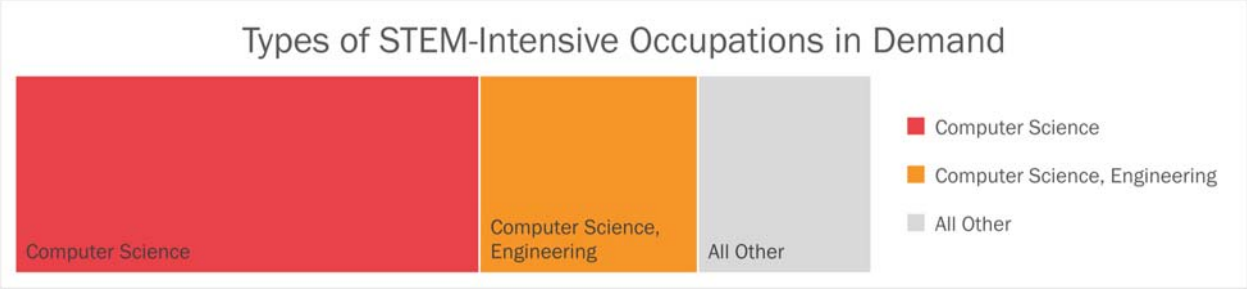
Who is recruiting?

Table 19. Business and Financial Services cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
Accenture	Management, Scientific, and Technical Consulting Services	8,050
Booz Allen Hamilton Inc.	Management, Scientific, and Technical Consulting Services	7,450
Leidos	Architectural, Engineering, and Related Services	3,750
PricewaterhouseCoopers	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	1,900
SRA International Incorporated	Management, Scientific, and Technical Consulting Services	1,800
IBM	Management, Scientific, and Technical Consulting Services	1,650
SAIC	Architectural, Engineering, and Related Services	1,550
URS Corporation	Architectural, Engineering, and Related Services	1,150
AECOM Technology Corporation	Architectural, Engineering, and Related Services	1,100
ICF International	Management, Scientific, and Technical Consulting Services	1,050

What STEM-intensive occupations are in demand?

The Business and Financial Services cluster had the greatest demand among the key economic clusters for STEM-intensive occupations during the first half of 2016 when 36 percent of its job postings were for these occupations[xxi]. The top five were all computer occupations and include Software Developers, Information Security Analysts, Computer Systems Analysts, Auditors, and Business Intelligence Analysts.



Note: STEM-type defined by O*NET

Figure 20. Types of STEM-intensive occupations in demand

What occupations are in the greatest demand?

The top ten occupations include:

1. **Software Developers, Applications (STEM-intensive)** – Develop, create, and modify general computer applications.

2. **Management Analysts** – Conduct organizational studies and evaluations, design systems and procedures, conduct work simplification and measurement studies, and prepare operations and procedures manuals to assist management in operating more efficient and effectively.

3. **Computer Systems Engineers/Architects** – Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions. While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

4. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, and supply chain.

5. **Information Security Analysts (STEM-intensive)** – Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information.

6. **Computer Systems Analysts (STEM-intensive)** – Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions.

7. **Sales Representatives** – Sells goods or services to business, organizations, and/or individuals. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon the industry cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

8. **Information Technology Product Managers** – Plan, initiate, and manage information technology (IT) projects. Lead and guide the work of technical staff. Serve as liaison between business and technical aspects of projects. While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

9. **Auditors (STEM-intensive)** – Examine and analyze accounting records to determine financial status of establishment and prepare financial reports concerning operating procedures.

10. **Market Research Analysts and Marketing Specialists** – Research market conditions in local, regional, or national areas, or gather information to determine potential sales of a product or service, or create a marketing campaign.

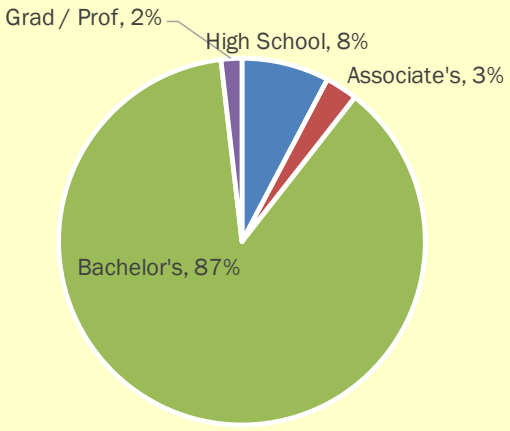
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 (BLS OES) as well as a wage premium. The wage premium was derived using national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *STEM-intensive occupations are displayed with a light yellow background.*

1. Software Developers, Applications, $110,100

Business and Financial Services Cluster: Wage Premium= -2%; Job Postings= 2,100

Education Requirements



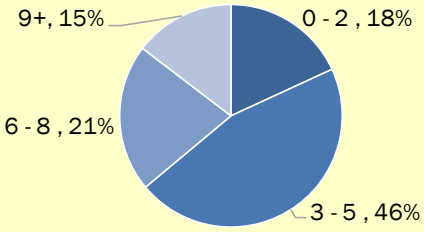
Titles

1. Software Development Engineer
2. Java Software Developer
3. Applications Developer
4. Software Developer
5. .Net Developer

Skills

1. JAVA
2. Software Development
3. SQL
4. JavaScript
5. Software Engineering
6. Oracle
7. Microsoft C#
8. Extensible Markup Language (XML)
9. LINUX
10. .NET Programming

Years of Experience

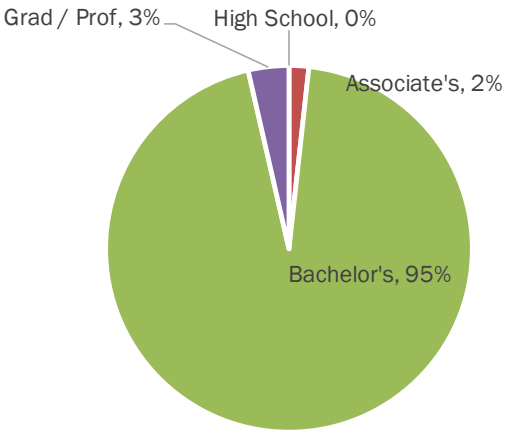


Notes: 1) Education Requirements not specified in 21% of job postings; 2) Years of experience not specified in 19% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

2. Management Analysts, $98,200

Business and Financial Services Cluster: Wage Premium= +5%; Job Postings= 1,250

Education Requirements



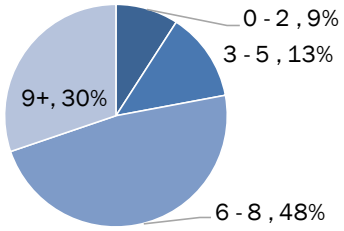
Titles

1. Business Analyst
2. Management Analyst
3. Program Analyst
4. Business Process Analyst
5. Business Consultant

Skills

1. Project Management
2. Business Process
3. Business Analysis
4. Information Systems
5. Budgeting
6. Management Consulting
7. Change Management
8. Customer Service
9. Business Development
10. Oracle

Years of Experience

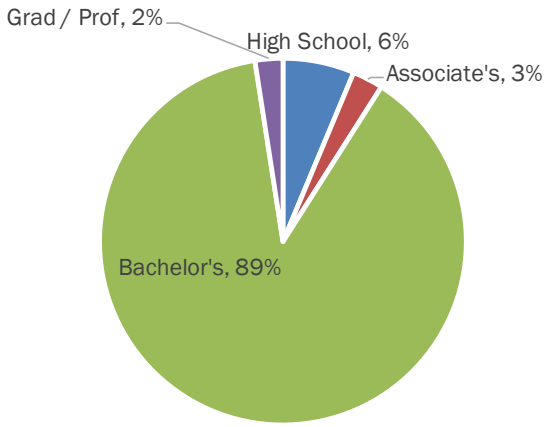


Notes: 1) Education Requirements not specified in 17% of job postings; 2) Years of experience not specified in 19% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

3. Computer Systems Engineers/Architects, $112,000

Business and Financial Services Cluster: Wage Premium= -3%; Job Postings= 1,000

Education Requirements



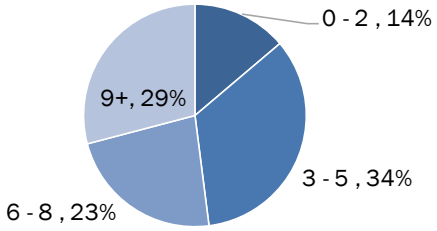
Titles

1. Systems Engineer
2. Solutions Architect
3. Senior Systems Engineer
4. Enterprise Architect
5. Systems Architect

Skills

1. Systems Engineering
2. LINUX
3. Information Systems
4. Project Management
5. Software Development
6. Oracle
7. System Design
8. System Architecture
9. Systems Integration
10. Business Process

Years of Experience

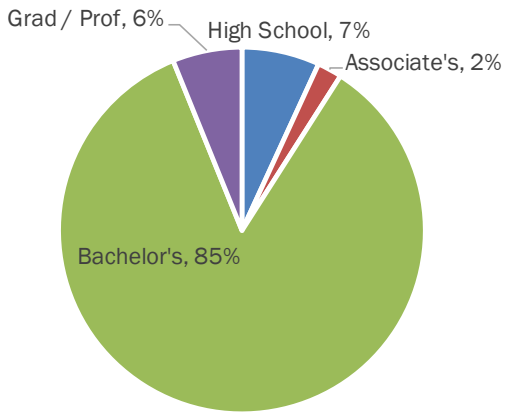


Notes: 1) Education Requirements not specified in 20% of job postings; 2) Years of experience not specified in 17% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Managers, All Other, $128,800

Business and Financial Services Cluster: Wage Premium= +10%; Job Postings= 1,000

Education Requirements



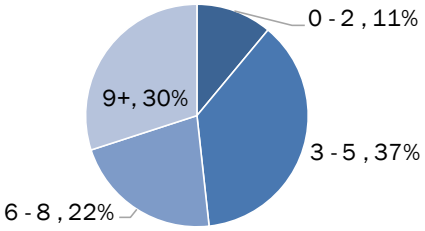
Titles

1. Project Manager
2. Program Manager

Skills

1. Project Management
2. Budgeting
3. Scheduling
4. Customer Service
5. Program Management
6. Contract Management
7. Supervisory Skills
8. Staff Management
9. Business Development
10. Customer Contact

Years of Experience

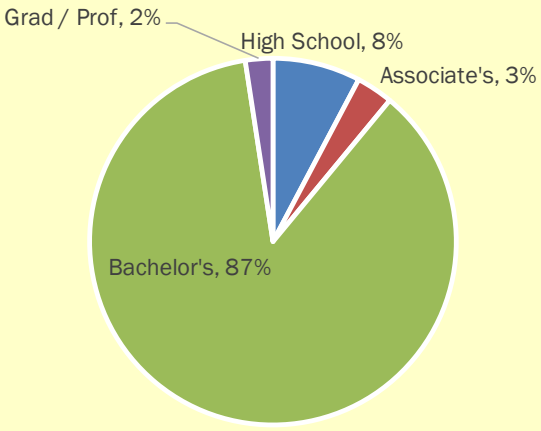


Notes: 1) Education Requirements not specified in 22% of job postings; 2) Years of experience not specified in 24% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Information Security Analysts, $106,800

Business and Financial Services Cluster: Wage Premium= +1%; Job Postings= 900

Education Requirements



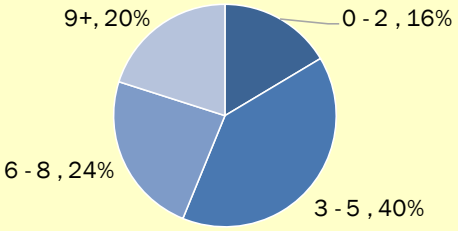
Titles

1. Security Engineer
2. Security Analyst
3. Information Security Engineer
4. Security Specialist
5. Information Assurance Engineer

Skills

1. Information Security
2. Information Systems
3. Information Assurance
4. LINUX
5. Network Security
6. Federal Information Security Management Act
7. Certification & Accreditation
8. Customer Service
9. Scanners
10. Security Operations

Years of Experience

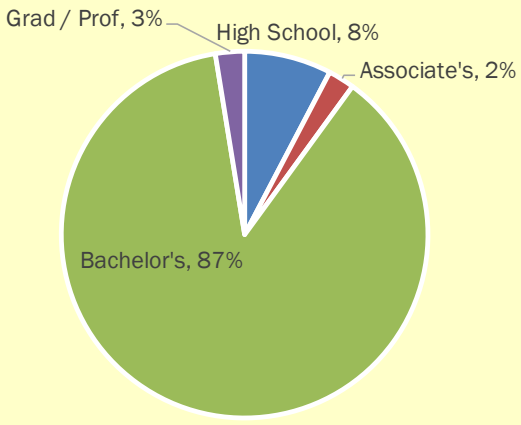


Notes: 1) Education Requirements not specified in 20% of job postings; 2) Years of experience not specified in 21% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

6. Computer Systems Analysts, $99,100

Business and Financial Services Cluster: Wage Premium= +2%; Job Postings= 700

Education Requirements



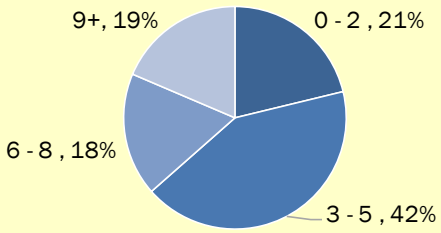
Titles

1. Systems Analyst
2. Business Systems Analyst
3. Systems Integrator
4. Information Technology Analyst
5. Technical Analyst

Skills

1. Systems Analysis
2. Project Management
3. Business Process
4. Oracle
5. SQL
6. Information Systems
7. Software Development
8. Customer Service
9. JAVA
10. Systems Development Life Cycle (SDLC)

Years of Experience

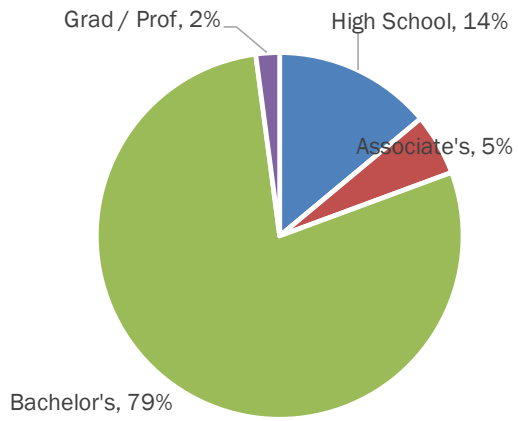


Notes: 1) Education Requirements not specified in 19% of job postings; 2) Years of experience not specified in 21% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

7. Sales Representatives, $66,900

Business and Financial Services Cluster: Wage Premium= +5%; Job Postings= 700

Education Requirements



Notes: 1) Education Requirements not specified in 38% of job postings; 2) Years of experience not specified in 38% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

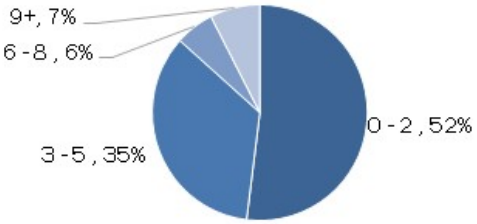
Titles

1. Sales Representative
2. Account Manager
3. Sales Specialist

Skills

1. Sales
2. Customer Service
3. Business Development
4. Sales Goals
5. Product Sales
6. Customer Contact
7. Outside Sales
8. Pharmaceutical Sales
9. Marketing
10. Prospective Clients

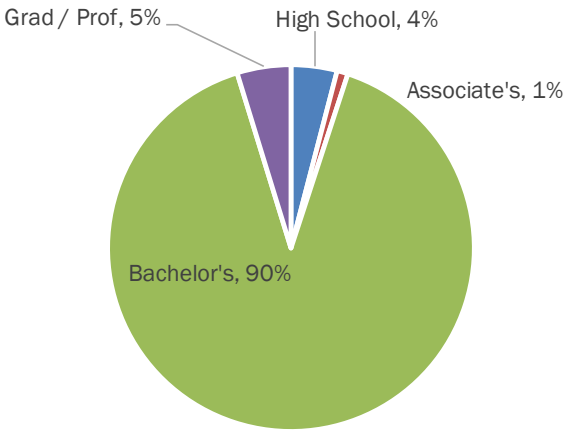
Years of Experience



8. Information Technology Project Managers, $112,000

Business and Financial Services Cluster: Wage Premium= -3%; Job Postings= 550

Education Requirements



Notes: 1) Education Requirements not specified in 20% of job postings; 2) Years of experience not specified in 19% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

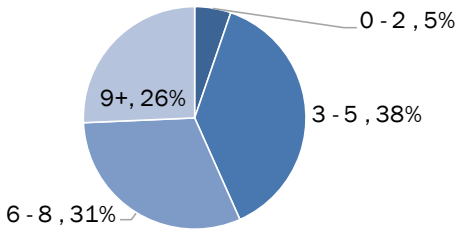
Titles

1. Information Technology Manager
2. Technology Manager
3. Information Technology Project Manager
4. Technical Project Manager
5. Project Manager

Skills

1. Project Management
2. Budgeting
3. Software Development
4. Scheduling
5. Customer Service
6. Business Development
7. Oracle
8. Systems Development Life Cycle (SDLC)
9. Business Process
10. Staff Management

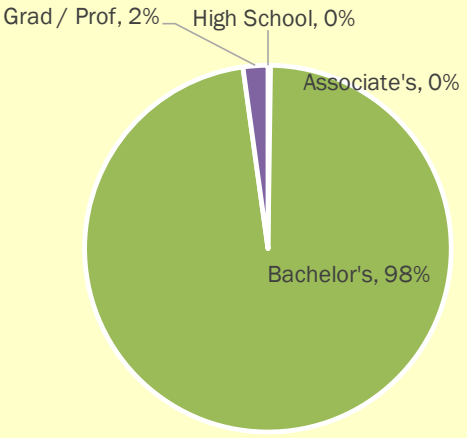
Years of Experience



9. Auditors, $82,900

Business and Financial Services Cluster: Wage Premium= +1%; Job Postings= 450

Education Requirements



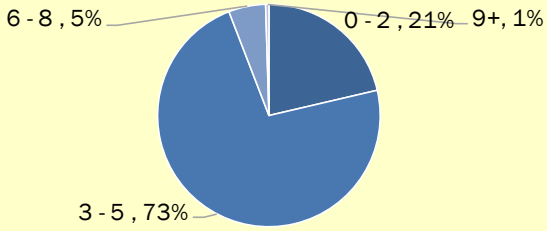
Titles

1. Audit Associate
2. Audit Manager
3. Audit Senior
4. Internal Auditor

Skills

1. Economics
2. Accounting
3. Business Process
4. Budgeting
5. Project Management
6. Internal Auditing
7. Oracle
8. Risk Management
9. Staff Management
10. Supervisory Skills

Years of Experience

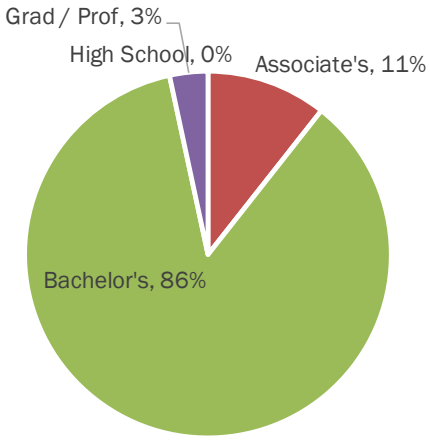


Notes: 1) Education Requirements not specified in 9% of job postings; 2) Years of experience not specified in 15% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

10. Market Research Analysts and Marketing Specialists, $69,200

Business and Financial Services Cluster: Wage Premium= -1%; Job Postings= 450

Education Requirements



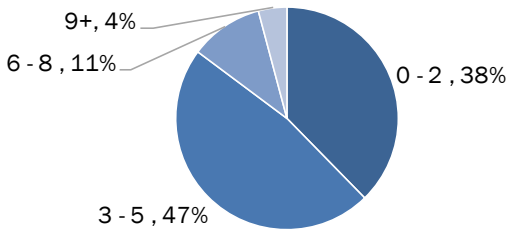
Titles

1. Marketing Analyst
2. Marketing Specialist
3. Marketing Coordinator/Assistant
4. Marketing Associate
5. Market Research Analyst

Skills

1. Marketing
2. Market Research
3. Social Media
4. Project Management
5. Business Development
6. Customer Service
7. Market Strategy
8. Budgeting
9. Scheduling
10. Adobe InDesign

Years of Experience



Notes: 1) Education Requirements not specified in 31% of job postings; 2) Years of experience not specified in 37% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

MEDIA AND INFORMATION SERVICES

Description

This cluster includes companies engaged in publishing, broadcasting, and archiving media ranging from periodicals to radio. The below table reports the 2010, 2014, and 2015 private sector employment estimates for each industry in this cluster. The cluster has declined in employment between 2010 and 2015. The two industries with the largest employment included Newspaper Publishers and Periodical Publishers.

Table 20. Media and Information Services cluster - private sector employment, metropolitan Washington, 2010, 2014, 2015

	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	2010	2014	2015	2010 - 2014	2014 - 2015	2010 - 2014	2014 - 2015
Books Printing		Not Disclosed					
Newspaper Publishers	6,100	5,100	4,700	-250	-400	-4%	-8%
Periodical Publishers	5,100	4,800	4,600	-75	-200	-2%	-4%
Book Publishers	600	400	400	-50	0	-10%	0%
Directory and Mailing List Publishers	200	Not Disclosed					
Other Publishers	100	100	100	0	0	0%	0%
Radio Networks	1,800	1,900	1,800	25	-100	1%	-5%
Radio Stations	300	500	700	50	200	14%	40%
Television Broadcasting	2,700	3,200	3,300	125	100	4%	3%
Cable and Other Subscription Programming	3,100	2,600	2,600	-125	0	-4%	0%
News Syndicates	2,000	2,100	2,000	25	-100	1%	-5%
Libraries and Archives	600	500	500	-25	0	-4%	0%
Internet Publishing and Web Search Portals	2,200	3,100	3,300	225	200	9%	6%
All Other Information Services	300	300	500	0	200	0%	67%
Media and Information Services	**25,000**	**24,600**	**24,500**	**-100**	**-100**	**-0.4%**	**-0.4%**
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016

Notes: 1) May not sum to total due to rounding.

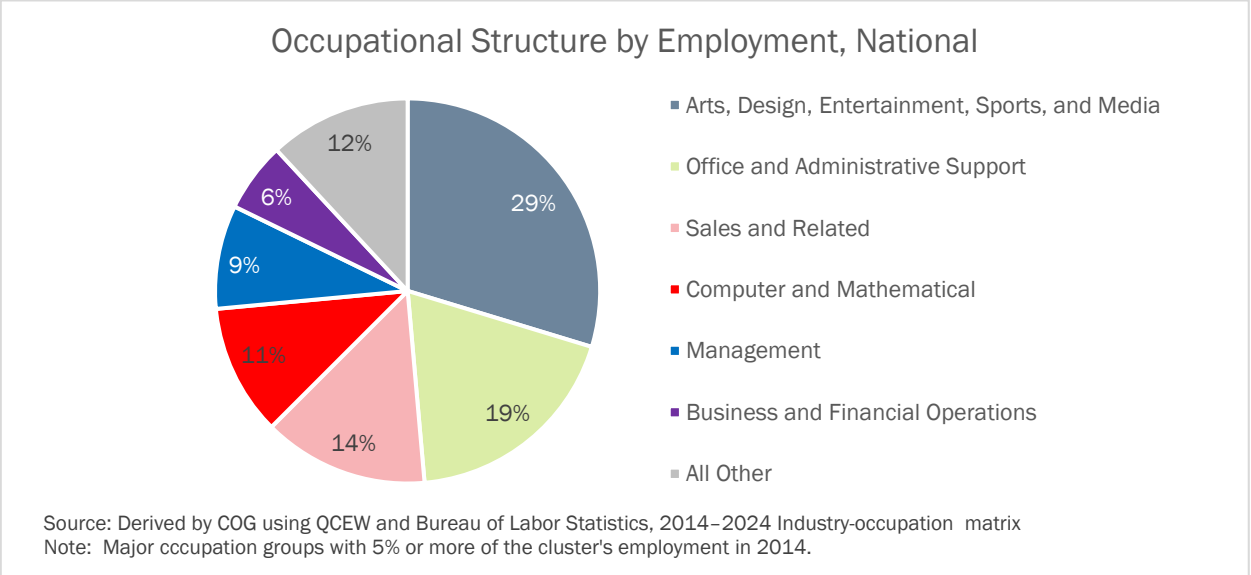
2) Not Disclosed = Employment exists in some jurisdictions but it is not published by the Bureau of Labor Statistics. For the Washington MSA, the following Books Printing Employment was estimated: 700 (2010), 500 (2014), and 500 (2015). Employment for Directory and Mailing List Publishers employment was not disclosed for the MSA in 2010, 2014, or 2015.

3) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.

4) Due to availability and magnitude of adjacent year employment estimate and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2010 and 2014 Arlington County Periodical Publishers and 2010 Montgomery County Cable and Other Subscription Programming.

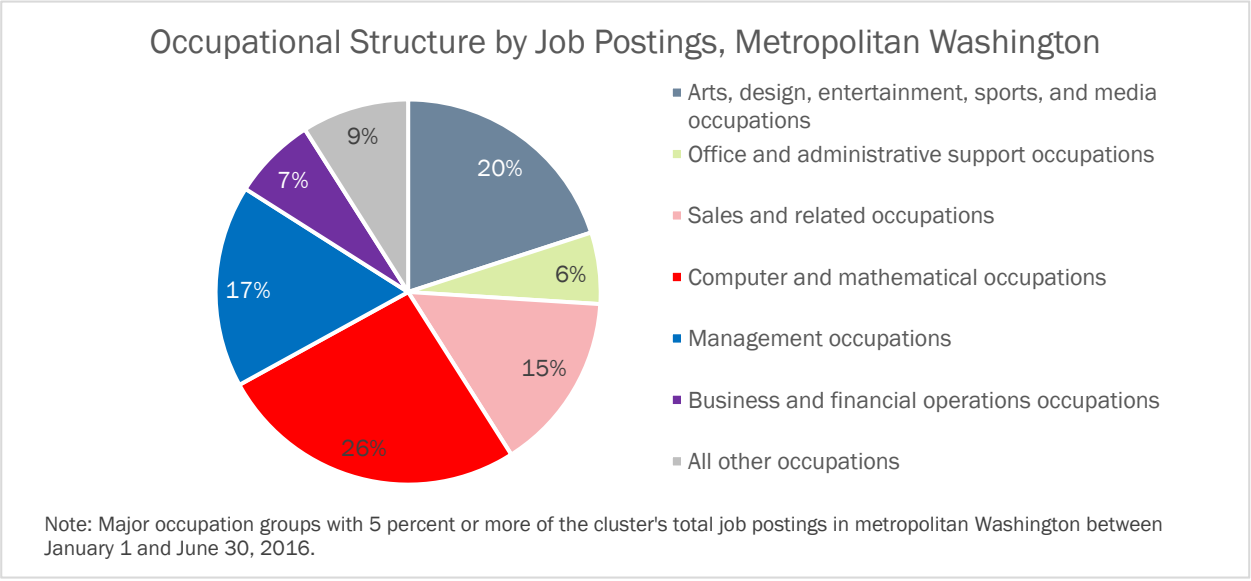
Occupational structure

Nationally, almost a third of the employment in this cluster is in arts, design, entertainment, sports, and media occupations. Office and administrative support as well as sales and related occupations are also common. In contrast, a lower share of job postings was placed for arts, design, entertainment, sports, and media occupations as well as office and administrative support occupations in metropolitan Washington. In addition, compared with national employment structure, job postings in metropolitan Washington had a much higher share of computer and mathematical as well as management occupations.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–2024 Industry-occupation matrix
Note: Major cccupation groups with 5% or more of the cluster's employment in 2014.

Figure 21. Occupational structure by employment



Note: Major occupation groups with 5 percent or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016.

Figure 22. Occupational structure by job postings

Who is recruiting?

Table 21. Media and Information Services Cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
Comcast	Cable and Other Subscription Programming	350
Gannett Company Incorporated	Newspaper, Periodical, Book, and Directory Publishers	200
Sinclair Broadcast Group	Radio and Television Broadcasting	200
Discovery Communications	Cable and Other Subscription Programming	200
CBS Broadcasting	Radio and Television Broadcasting	100
Sirius XM Radio	Radio and Television Broadcasting	100
DIRECTV Incorporated	Cable and Other Subscription Programming	100
Thomson Reuters	Other Information Services	100
N2 Publishing	Newspaper, Periodical, Book, and Directory Publishers	70
RR Donnelley	Printing and Related Support Activities	50

What STEM-intensive occupations are in demand?

Twenty-one percent of the Media and Information Services cluster's job postings were for STEM-intensive occupations during the first half of 2016[xxii]. The top five occupations were: Accountants, Architectural and Engineering Managers, Business Intelligence Analysts, Computer User Support Specialists, and Graphic Designers.

Note: STEM-type defined by O*NET

Figure 23. Types of STEM-intensive occupations in demand

What occupations are in the greatest demand?

The top ten occupations include:

1. **Sales Representatives** – Sells goods or services to businesses, organizations, and/or individuals. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon the economic cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

2. **Software Developers, Applications (STEM-intensive)**– Develop, create, and modify general computer applications.

3. **Editors** – Plan, coordinate, or edit content of material for publication.

4. **Reporters and Correspondents** – Collect and analyze facts about newsworthy events by interview, investigation, or observation.

5. **Producers** – Plan and coordinate various aspects of radio, television, stage, or motion picture production, such as selecting script, coordinating writing, directing and editing, and arranging financing.

6. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, and supply chain.

7. **Marketing Managers** – Plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors, and identify potential customers.

8. **Web Developers** – Design, create, and modify web sites.

9. **Computer Systems Engineers/Architects** – Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions. Note: While this occupation is not included on O*NET's current list of STEM-intensive occupations, it requires STEM training.

10. **Customer Service Representatives** – Interact with customers to provide information in response to inquiries about products and services and to handle and resolve complaints.

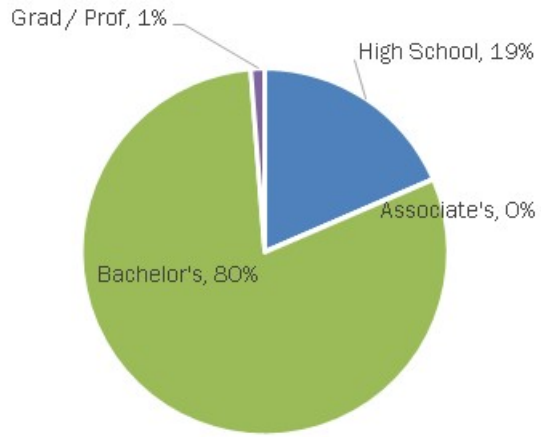
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 (BLS OES) as well as a wage premium. The wage premium was derived using national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *STEM-intensive occupations are designated with a light yellow background.*

1. Sales Representatives, $66,900

Media and Information Services Cluster: Wage Premium= -2%; Job Postings= 300

Education Requirements



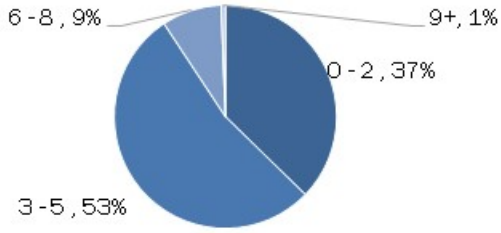
Titles

1. Outside Sales
2. Sales Executive
3. Sales Representative
4. Sales Account Executive

Skills

1. Sales
2. Sales Management
3. Direct Sales
4. Outside Sales
5. Sales Planning
6. Prospecting
7. Sales Administration
8. Layout Design
9. Content Management
10. B2B

Years of Experience

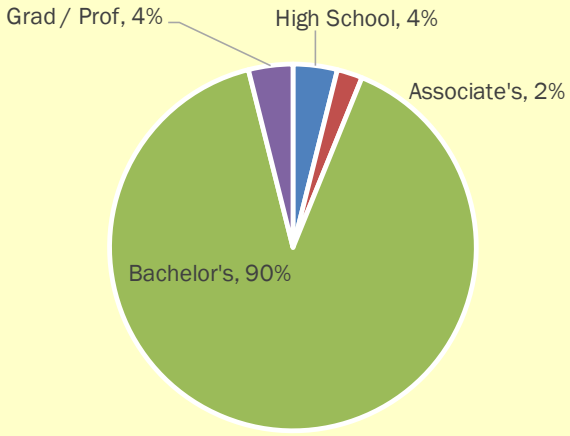


Notes: 1) Education Requirements not specified in 47% of job postings; 2) Years of experience not specified 47% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

2. Software Developers, Applications, $110,100

Media and Information Services Cluster: Wage Premium= +15%; Job Postings= 250

Education Requirements



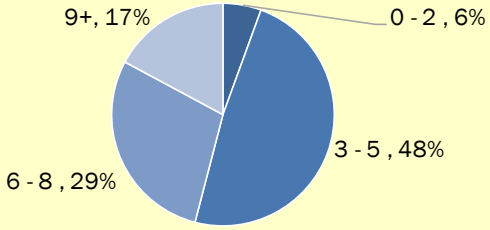
Titles

1. Software Development Engineer
2. Software Developer
3. .Net Developer
4. SharePoint Developer
5. Java Software Developer

Skills

1. Software Development
2. JAVA
3. SQL
4. JavaScript
5. Web Application Development
6. LINUX
7. Software Engineering
8. Git
9. Oracle
10. Budgeting

Years of Experience

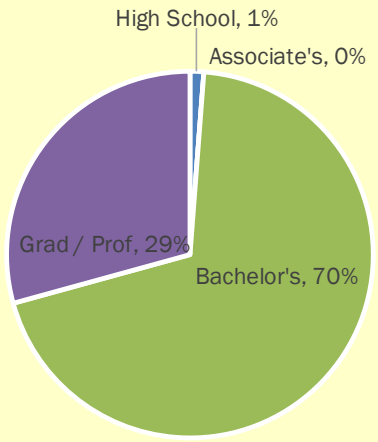


Notes: 1) Education Requirements not specified in 28% of job postings; 2) Years of experience not specified in 20% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

3. Editors, $72,500

Media and Information Services Cluster: Wage Premium= -3%; Job Postings= 100

Education Requirements



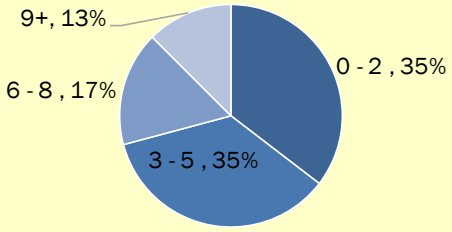
Titles

1. Assignment Editor
2. Managing Editor
3. Associate Editor
4. Online Content Editor
5. Assistant Editor

Skills

1. Journalism
2. Social Media
3. Facebook
4. Broadcast
5. Content Management
6. Content Management Systems (CMS)
7. Multimedia
8. Newspaper
9. Website Production
10. Instagram

Years of Experience

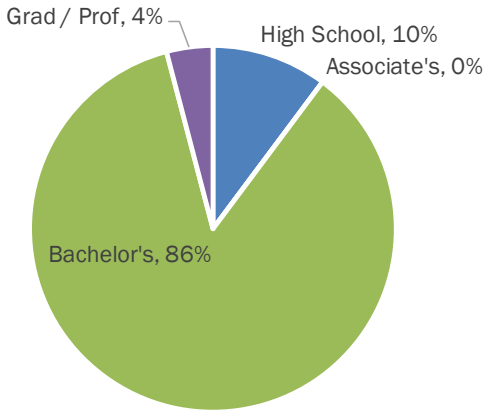


Notes: 1) Education Requirements not specified in 29% of job postings; 2) Years of experience not specified in 17% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Reporters and Correspondents, $68,200

Media and Information Services Cluster: Wage Premium= +13%; Job Postings= 100

Education Requirements



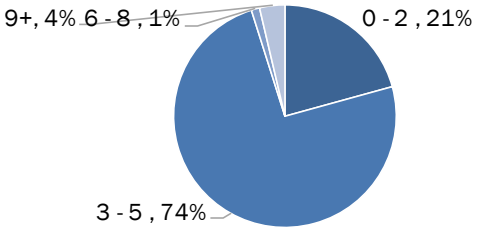
Titles

1. Reporter
2. Sports Anchor
3. Multimedia Journalist

Skills

1. Journalism
2. Social Media
3. Broadcast
4. Multimedia
5. Newspaper
6. Copy Editing
7. Facebook
8. Social Networking
9. Content Management Systems (CMS)
10. Social Media Platforms

Years of Experience

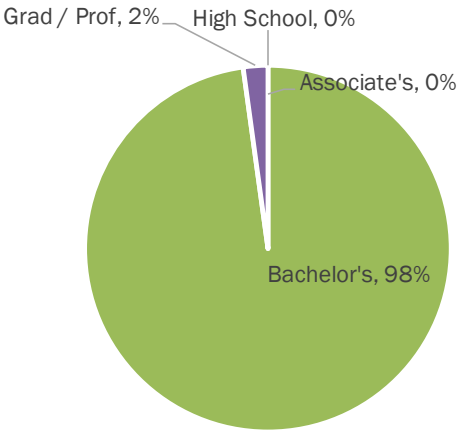


Notes: 1) Education Requirements not specified in 52% of job postings; 2) Years of experience not specified in 20% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Producers, $80,400

Media and Information Services Cluster: Wage Premium= -2%; Job Postings= 100

Education Requirements



Notes: 1) Education Requirements not specified in 53% of job postings; 2) Years of experience not specified in 28% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

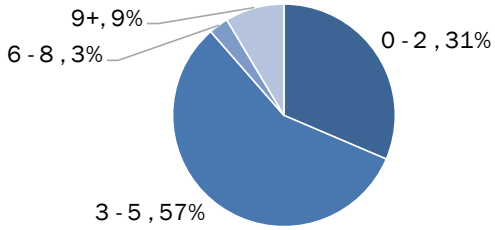
Titles

1. News Producer
2. Associate Producer
3. Associate Segment Producer
4. Segment Producer

Skills

1. Broadcast
2. Social Media
3. Journalism
4. Scheduling
5. Audio Editing
6. Content Development
7. Non-Linear Editing
8. Budgeting
9. Staff Management
10. Audio Board

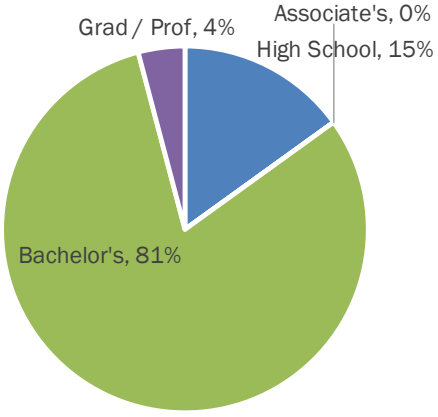
Years of Experience



6. Managers, All Other, $128,800

Media and Information Services Cluster: Wage Premium= +8%; Job Postings= 100

Education Requirements



Notes: 1) Education Requirements not specified in 14% of job postings; 2) Years of experience not specified in 19% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

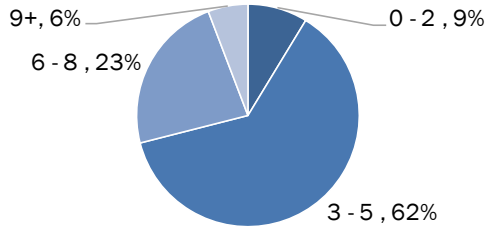
Titles

1. Project Manager

Skills

1. Project Management
2. Budgeting
3. Supervisory Skills
4. Customer Service
5. Scheduling
6. Content Management
7. Journalism
8. Microsoft Access
9. Program Management
10. Broadcast

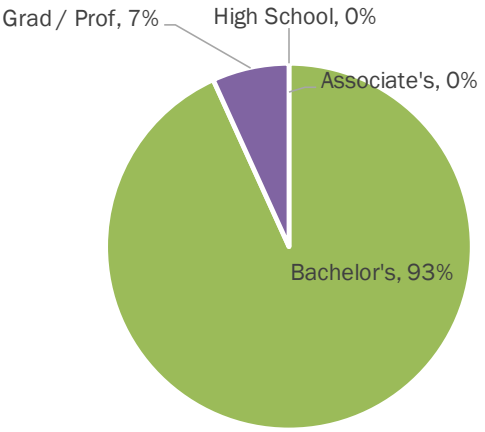
Years of Experience



7. Marketing Managers, $148,300

Media and Information Services Cluster: Wage Premium= +15%; Job Postings= 100

Education Requirements



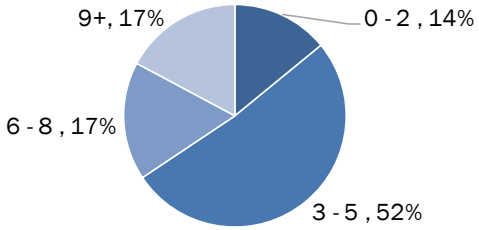
Titles

1. Marketing Manager
2. Digital Marketing Manager
3. Director of Marketing
4. Product Manager

Skills

1. Project Management
2. Product Management
3. Budgeting
4. Marketing
5. Social Media
6. Product Development
7. Key Performance Indicators
8. Business Development
9. Journalism
10. Google Analytics

Years of Experience

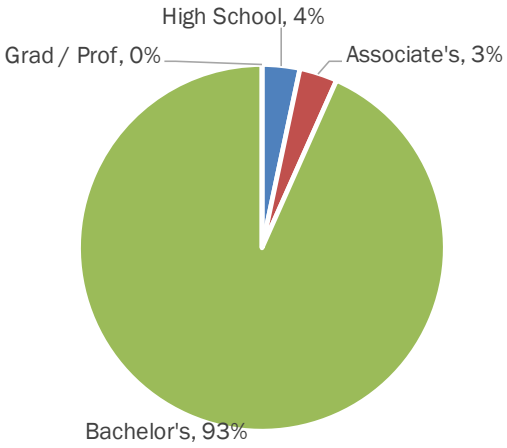


Notes: 1) Education Requirements not specified in 22% of job postings; 2) Years of experience not specified in 16% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

8. Web Developers, $83,100

Media and Information Services Cluster: Wage Premium= -1%; Job Postings= 50

Education Requirements



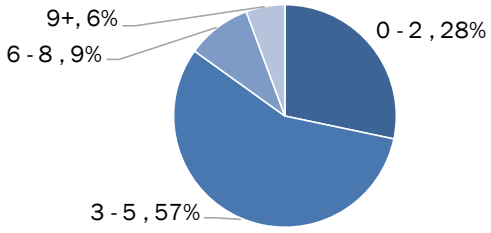
Titles

1. Front End Developer
2. Web Developer
3. User Experience (UX) Developer
4. User Experience (UX) Designer
5. Web Applications Developer

Skills

1. JavaScript
2. Web Development
3. Front-end Development
4. jQuery
5. HTML5
6. Adobe Photoshop
7. Hypertext Preprocessor (PHP)
8. JAVA
9. AJAX
10. Web Site Design

Years of Experience

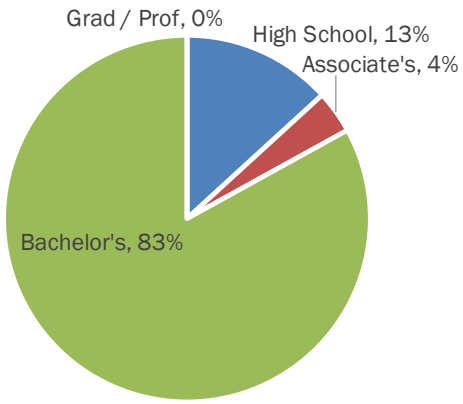


Notes: 1) Education Requirements not specified in 59% of job postings; 2) Years of experience not specified in 28% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

9. Computer Systems Engineers/Architects, $112,000

Media and Information Services Cluster: Wage Premium= -5%; Job Postings= 50

Education Requirements



Notes: 1) Education Requirements not specified in 21% of job postings; 2) Years of experience not specified in 37% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

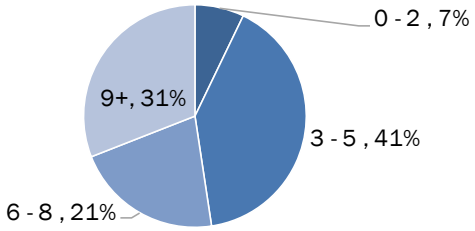
Titles

1. Systems Engineer
2. Senior Systems Engineer
3. Solutions Architect

Skills

1. Systems Engineering
2. LINUX
3. VMware
4. JAVA
5. Sales
6. System Design
7. Software Development
8. Citrix
9. Domain Name System (DNS)
10. SQL

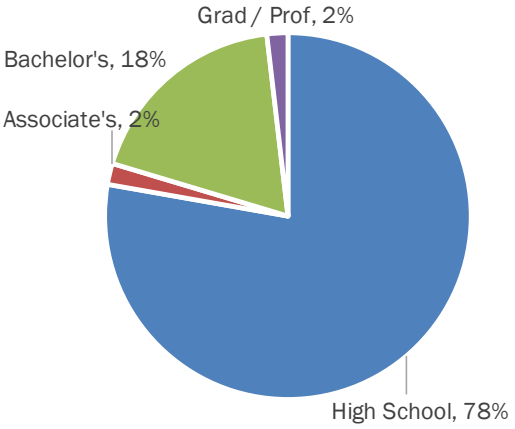
Years of Experience



10. Customer Service Representatives, $36,500

Media and Information Services Cluster: Wage Premium= +13%; Job Postings= 50

Education Requirements



Notes: 1) Education Requirements not specified in 10% of job postings; 2) Years of experience not specified in 17% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

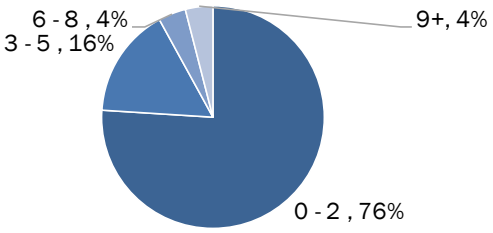
Titles

1. Customer Service Representative
2. Customer Service Manager
3. Sales Consultant

Skills

1. Customer Service
2. Sales
3. Store Management
4. Customer Contact
5. Product Sales
6. Process Equipment
7. Product Knowledge
8. Sales Presentation
9. Sales Management
10. Scheduling

Years of Experience



LEISURE AND BUSINESS HOSPITALITY SERVICES

Description

This cluster includes organizations providing goods and services associated with leisure and business travel to the nation's capital. The below table reports the 2010, 2014, and 2015 private sector employment estimates for each industry in this cluster. Half of the employment in this cluster is in Traveler Accommodation. The next largest industry, which has a third of the employment of Traveler Accommodation, is Air Transportation.

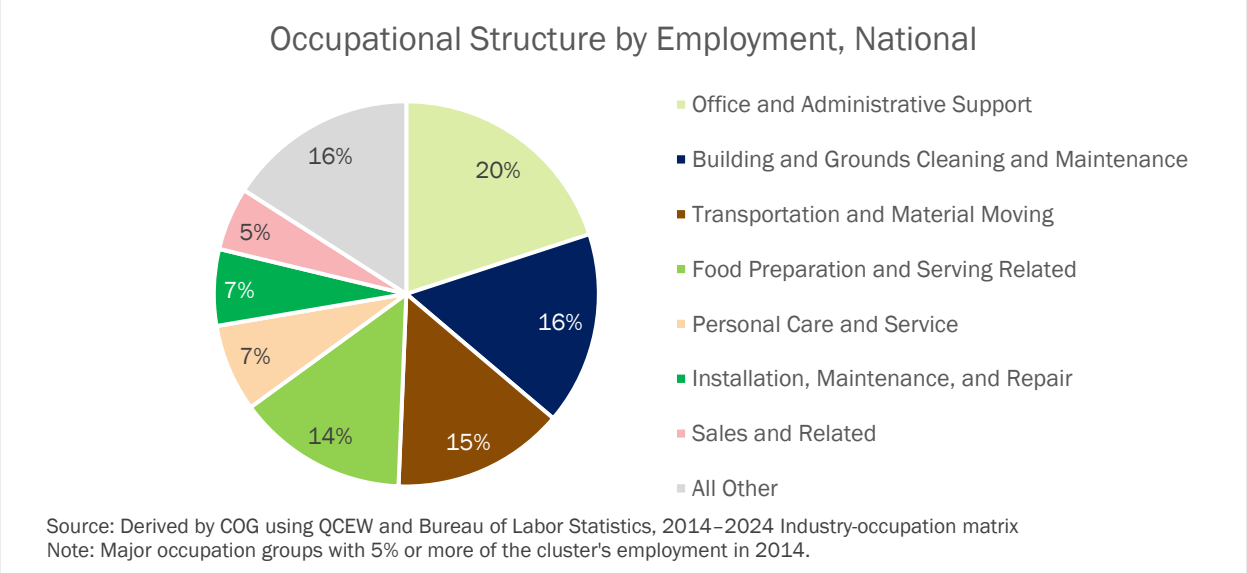
Table 22. Leisure and Business Hospitality Services cluster employment, 2010, 2014, 2015, metropolitan Washington

	Average Annual Employment			Average Annual Growth		Average Annual Growth Rate	
Industry Title	2010	2014	2015	2010 - 2014	2014 - 2015	2010 - 2014	2014 - 2015
Air Transportation	11,200	10,900	10,300	-75	-600	-1%	-6%
Taxi and Limousine Service	1,500	1,600	1,900	25	300	2%	19%
Charter Bus Industry	300	300	200	0	-100	0%	-33%
Scenic and Sightseeing Transportation	500	600	800	25	200	5%	33%
Support Activities for Air Transportation	3,100	3,500	3,900	100	400	3%	11%
Other Support Activities for Transportation	100	0	100	-25	100		
Travel Arrangement and Reservation Services	3,600	3,700	3,600	25	-100	1%	-3%
Performing Arts Companies	2,300	2,300	2,400	0	100	0%	4%
Spectator Sports	2,300	1,200	2,300	-275	1,100	-15%	92%
Promoters of Performing Arts and Sports	2,000	2,600	2,700	150	100	7%	4%
Museums, Historical Sites, Zoos, and Parks	1,800	1,700	1,800	-25	100	-1%	6%
Traveler Accommodation	30,900	32,700	33,000	450	300	1%	1%
Leisure and Business Hospitality Services	**59,500**	**61,200**	**63,000**	**425**	**1,800**	**0.7%**	**2.9%**
Total Private Employment	2,052,900	2,152,900	2,195,800	25,000	42,900	1.2%	2.0%
Total Employment	2,693,500	2,788,300	2,835,600	23,700	47,300	0.9%	1.7%

Source: BLS Quarterly Census for Employment and Wage, June 2016
Notes: 1) May not sum to total due to rounding.
2) A list of counties, by industry, where employment was not disclosed for 2010, 2014, and/or 2015 is available upon request.
3) Due to availability and magnitude of adjacent year employment estimate and estimates for Washington MSA, the following estimates were interpolated or extrapolated: 2010 Fairfax County Traveler Accommodation and 2014 and 2015 Alexandria City Traveler Accommodation.

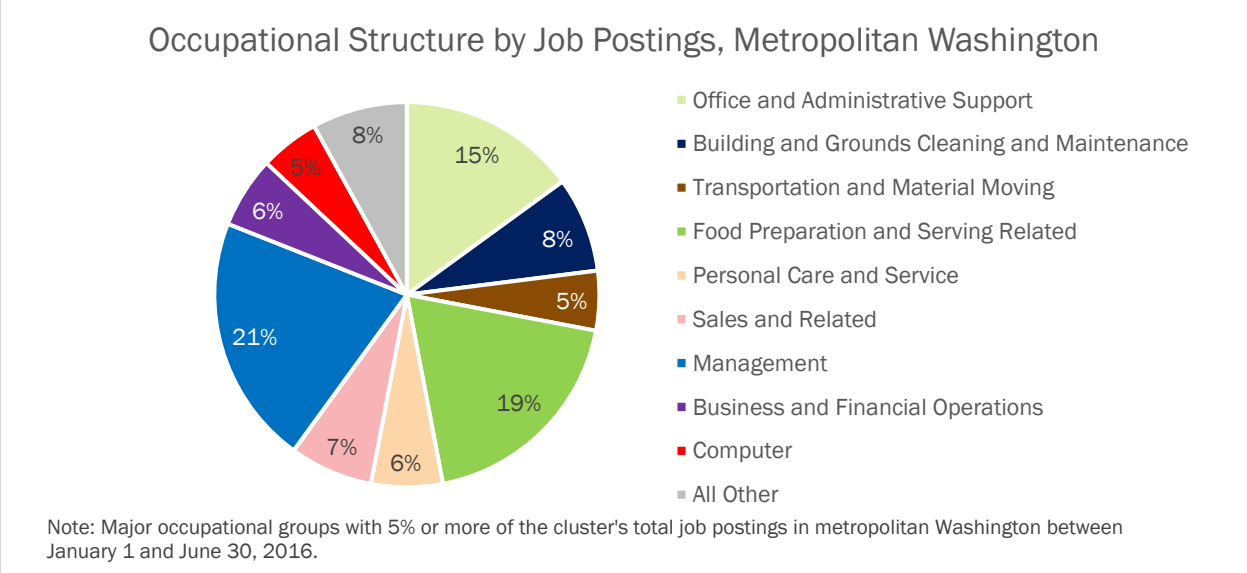
Occupational structure

The occupational structure of this cluster is distinct. To perform many of these occupations, workers must be physically active rather than behind a desk. Food preparation and serving related occupations have higher turnover rates; between 2014 and 2024, BLS projects replacement rates are 60 percent higher than the average for all occupations. While less than five percent of the employment in this cluster is management nationally, in metropolitan Washington, over 21 percent of the job postings were for management. A larger share of management occupations reflects that Marriott International, Choice Hotels, Hilton Worldwide, and Ritz-Carlton are all headquartered in this region.



Source: Derived by COG using QCEW and Bureau of Labor Statistics, 2014–2024 Industry-occupation matrix
Note: Major occupation groups with 5% or more of the cluster's employment in 2014.

Figure 24. Occupational structure by employment



Note: Major occupational groups with 5% or more of the cluster's total job postings in metropolitan Washington between January 1 and June 30, 2016.

Figure 25. Occupation Structure by job postings

Who is recruiting?

Table 23. Leisure and Business Hospitality cluster employers with greatest number of job postings (January 1 – June 30, 2016)

Employer	Industry	Job Postings
Marriott International Incorporated	Traveler Accommodation	2,050
Hilton Hotel Corporation	Traveler Accommodation	900
Hyatt	Traveler Accommodation	550
Kimpton Hotel & Restaurant Group	Traveler Accommodation	350
Ritz Carlton	Traveler Accommodation	250
Best Value	Traveler Accommodation	200
Interstate Hotels & Resorts	Traveler Accommodation	200
Homewood Suites	Traveler Accommodation	150
Choice Hotels International Incorporated	Traveler Accommodation	150
Salamander Hotels & Resorts	Traveler Accommodation	100

What STEM-intensive occupations are in demand?

This economic cluster is less reliant upon STEM-intensive occupations, only 9% of job postings were placed for STEM-intensive occupations in the first half of 2016[xxiii]. The STEM-intensive occupations in greatest demand was First-Line Supervisors of Food Preparation and Serving Workers followed by many of the occupations observed for the other key economic clusters: Software Developers, Accountants, Architectural and Engineering Managers, and Information Security Analysts.

Note: STEM-type defined by O*NET

Figure 26. Types of STEM-intensive occupations in demand

What occupations are in the greatest demand?

The top ten occupations include:

1. **Hotel, Motel, and Resort Desk Clerks** – Accommodate hotel, motel, and resort patrons by registering and assigning rooms to guests, issuing room keys or cards, transmitting and receiving messages, keeping records of occupied rooms and guests' accounts, making and confirming reservations, and presenting statements to and collecting payments from departing guests.

2. **Maids and Housekeeping Cleaners** – Perform any combination of light cleaning duties to maintain private households or commercial establishments, such as hotels and hospitals, in a clean and orderly manner. Duties may include making beds, replenishing linens, cleaning rooms and halls, and vacuuming.

3. **Lodging Managers** – Plan, direct, or coordinate activities of an organization or department that provides lodging and other accommodations.

4. **Waiters and Waitresses** – Take orders and serve food and beverages to patrons at tables in dining establishment.

5. **Cooks, Restaurant** – Prepare, season, and cook dishes such as soups, meats, vegetables, or desserts in restaurants. May order supplies, keep records and accounts, price items on menu, or plan menu.

6. **Sales Managers** – Plan, direct, or coordinate the actual distribution or movement of a product or service to the customer. Coordinate sales distribution by establishing sales territories, quotas, and goals and establish training programs for sales representatives. Analyze sales statistics gathered by staff to determine sales potential and inventory requirements and monitor the preferences of customers.

7. **Sales Representatives** – Sells goods or services to businesses, organizations, and/or individuals. Work requires substantial knowledge of items and services sold. Technical or scientific knowledge may be required. This is a broad occupation and it varies substantially based upon the industry cluster and specific industry. It includes: Advertising Sales Agents, Insurance Sales Agents, Securities, Commodities, and Financial Services Sales Agents, Travel Agents, and Technical and Scientific as well as Non-Technical Wholesale and Manufacturing Sales Representatives.

8. **Concierges** – Assist patrons at hotel, apartment, or office building with personal services. May take messages, arrange or give advice on transportation, business services or entertainment, or monitor guest requests for housekeeping and maintenance.

9. **First-Line Supervisors of Food Preparation and Serving Workers (STEM-intensive)** – Directly supervise and coordinate activities of workers engaged in preparing and serving food.

10. **Managers, All Other** – Plan, direct, or coordinate activities in industries such as regulatory affairs, compliance, investment funds, and supply chain.

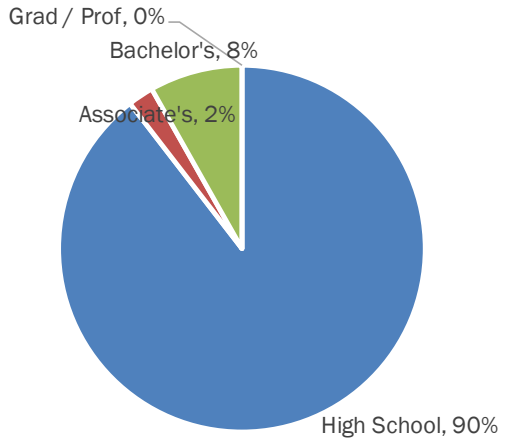
What education, experience, and skills are in demand?

The next ten figures provide more information about the occupations in greatest demand. The education requirements, titles, skills, and years of experience are obtained from job postings data. This is supplemented with the annual median wage paid in the Washington MSA in 2015 (BLS OES) as well as a wage premium. The wage premium was derived using national level employment statistics (BLS OES) and provides some indication of additional (and sometimes less) compensation a cluster may pay for a particular occupation. *STEM-intensive occupations are designated with a light yellow background.*

1. Hotel, Motel, and Resort Desk Clerks, $25,200

Leisure and Business Hospitality Services Cluster: Wage Premium= +0%; Job Postings= 700

Education Requirements



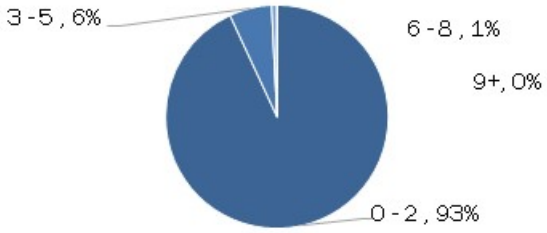
Titles

1. Front Desk Agent
2. Night Auditor
3. Guest Service Representative
4. Guest Service Agent
5. Front Desk Clerk

Skills

1. Guest Services
2. Customer Checkout
3. Front Office
4. Asset Protection
5. Cash Handling
6. Customer Billing
7. Loss Prevention
8. Customer Service
9. Scheduling
10. Laundry

Years of Experience

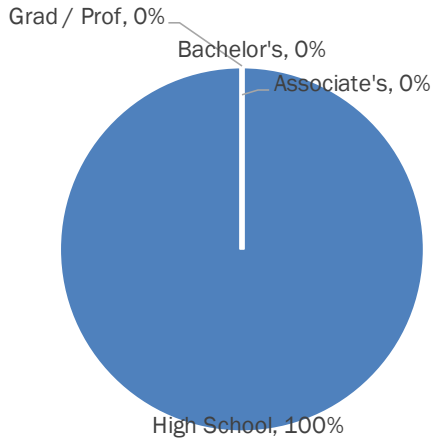


Notes: 1) Education Requirements not specified in 69% of job postings; 2) Years of experience not specified in 81% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

2. Maids and Housekeeping Cleaners, $24,000

Leisure and Business Hospitality Services Cluster: Wage Premium= -3%; Job Postings= 550

Education Requirements



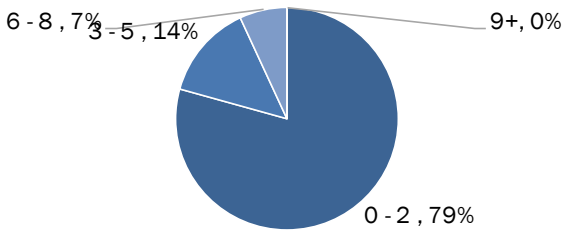
Titles

1. Housekeeper
2. Houseperson
3. Housekeeping Aide

Skills

1. Housekeeping
2. Cleaning
3. Repair
4. Bed Making and Linen Changes
5. Newspaper
6. Equipment Cleaning
7. Inspection
8. Laundry
9. Guest Services
10. Scheduling

Years of Experience

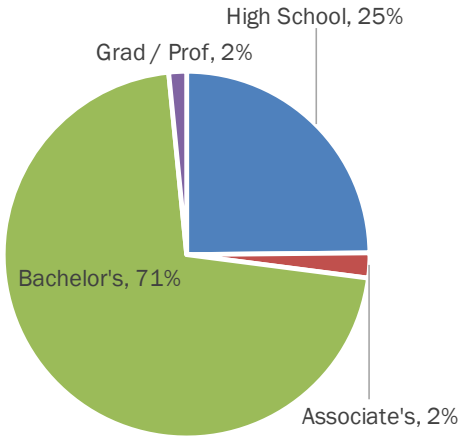


Notes: 1) Education Requirements not specified in 88% of job postings; 2) Years of experience not specified in 95% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

3. Lodging Managers, $83,200

Leisure and Business Hospitality Services Cluster: Wage Premium= +3%; Job Postings= 550

Education Requirements



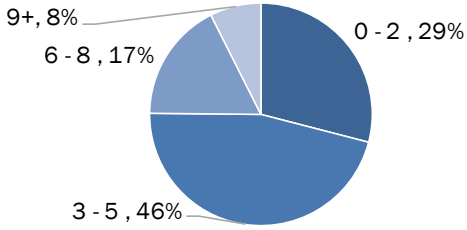
Titles

1. Assistant Manager
2. General Manager
3. Front Office Manager

Skills

1. Budgeting
2. Scheduling
3. Supervisory Skills
4. Guest Services
5. Project Management
6. Accounting
7. Cost Control
8. Forecasting
9. Front Office
10. Staff Management

Years of Experience

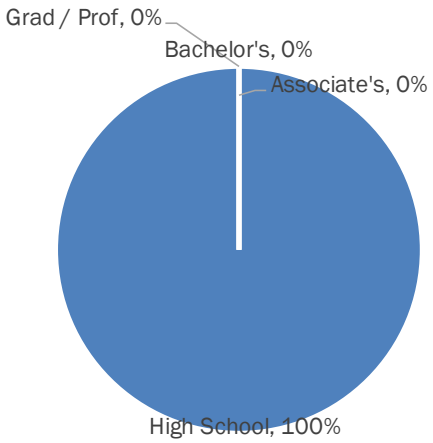


Notes: 1) Education Requirements not specified in 40% of job postings; 2) Years of experience not specified in 42% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

4. Waiters and Waitresses, $19,900

Leisure and Business Hospitality Services Cluster: Wage Premium= +3%; Job Postings= 400

Education Requirements



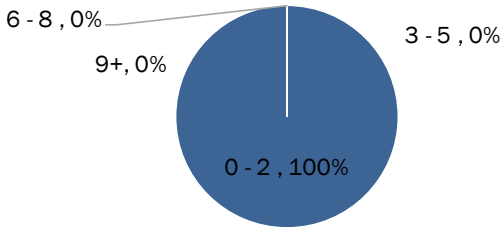
Titles

1. Banquet Server
2. Restaurant Server
3. Server
4. Lounge Server
5. Food Runner

Skills

1. Asset Protection
2. Allergies
3. Customer Checkout
4. Product Availability
5. Cleaning
6. Food Service Experience
7. Guest Services

Years of Experience

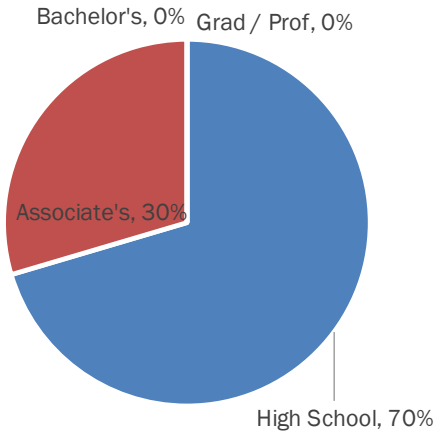


Notes: 1) Education Requirements not specified in 88% of job postings; 2) Years of experience not specified in 87% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

5. Cooks, Restaurant, $24,400

Leisure and Business Hospitality Services Cluster: Wage Premium= +15%; Job Postings= 300

Education Requirements



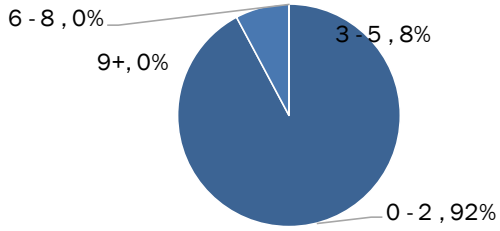
Titles

1. Cook
2. Line Cook

Skills

1. Cooking
2. Food Preparation
3. Asset Protection
4. Report Maintenance
5. Cleaning
6. Food Safety
7. Food Service Experience
8. Scheduling
9. Budgeting

Years of Experience

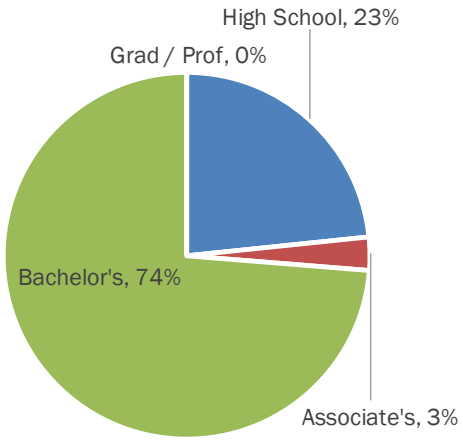


Notes: 1) Education Requirements not specified in 77% of job postings; 2) Years of experience not specified in 80% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

6. Sales Managers, $144,400

Leisure and Business Hospitality Services Cluster: Wage Premium= -23%; Job Postings= 300

Education Requirements



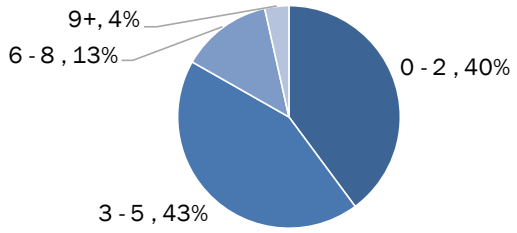
Titles

1. Sales Manager
2. Director of Sales

Skills

1. Sales
2. Sales Management
3. Budgeting
4. Customer Service
5. Sales Calls
6. Prospective Clients
7. Sales Goals
8. Business Administration
9. Contract Preparation
10. Restaurant Management

Years of Experience

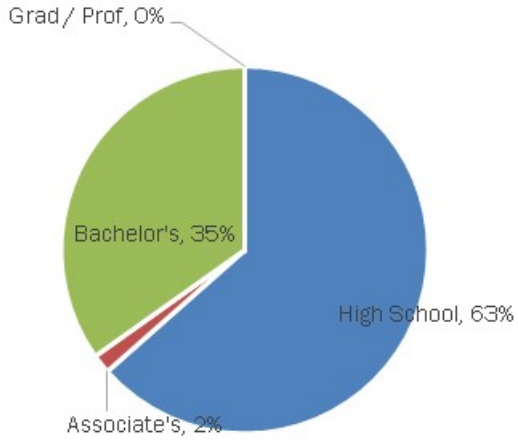


Notes: 1) Education Requirements not specified in 55% of job postings; 2) Years of experience not specified in 52% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

7. Sales Representatives, $66,900

Leisure and Business Hospitality Services Cluster: Wage Premium= -20%; Job Postings= 250

Education Requirements



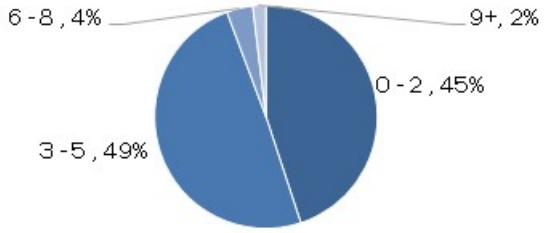
Titles

1. Sales Executive
2. Travel Agent
3. Account Manager

Skills

1. Sales
2. Customer Service
3. Sales Channels
4. Restaurant Management
5. Business Administration
6. Guest Services
7. Budgeting
8. Complex Sales
9. Enterprise Sales
10. Client Base Retention

Years of Experience

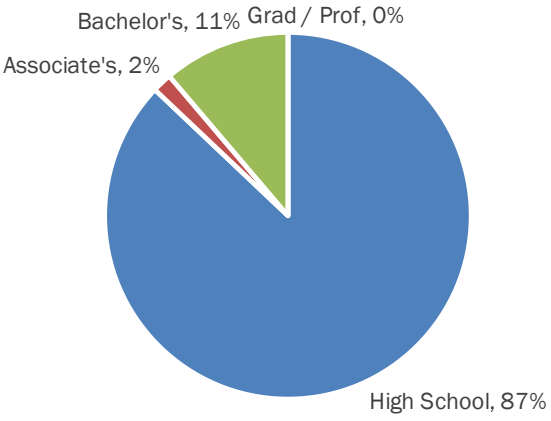


Notes: 1) Education Requirements not specified in 30% of job postings; 2) Years of experience not specified in 38% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

8. Concierges, $32,500

Leisure and Business Hospitality Services Cluster: Wage Premium= +10%; Job Postings= 250

Education Requirements



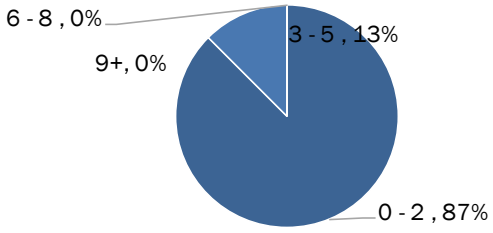
Titles

1. Concierge

Skills

1. Guest Services
2. Customer Service
3. Property Management
4. Listening
5. Customer Contact
6. Taking Messages
7. Cleaning
8. Data Entry
9. Mail Sorting
10. Asset Protection

Years of Experience

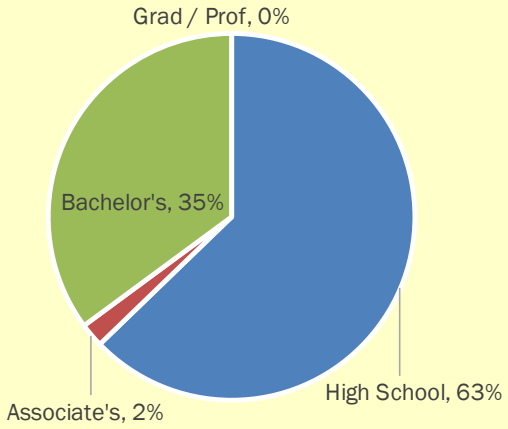


Notes: 1) Education Requirements not specified in 53% of job postings; 2) Years of experience not specified in 74% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

9. First-Line Supervisors of Food Preparation and Serving Workers, $37,100

Leisure and Business Hospitality Services Cluster: Wage Premium= +18%; Job Postings= 200

Education Requirements



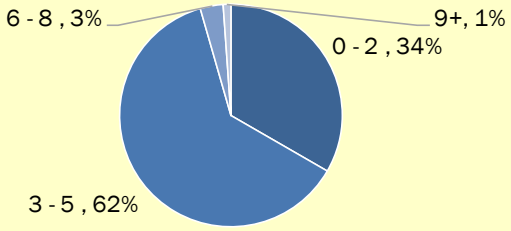
Titles

1. Restaurant Manager
2. Banquet Captain
3. Restaurant Supervisor
4. Banquet Manager

Skills

1. Restaurant Management
2. Scheduling
3. Budgeting
4. Guest Services
5. Customer Service
6. Supervisory Skills
7. Business Administration
8. Cost Control
9. Staff Management
10. Forecasting

Years of Experience

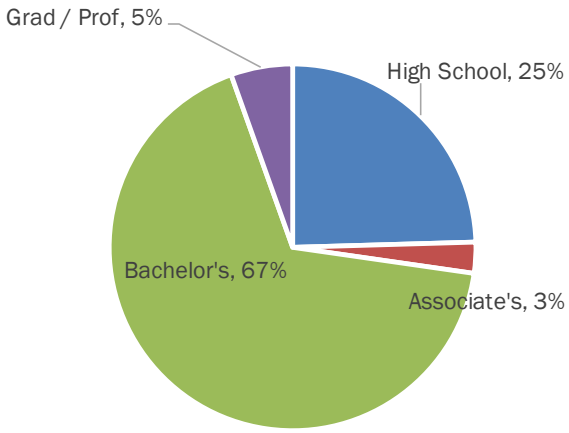


Notes: 1) Education Requirements not specified in 58% of job postings; 2) Years of experience not specified in 60% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above.

10. Managers, All Other, $128,800

Leisure and Business Hospitality Services Cluster: Wage Premium= -21%; Job Postings= 200

Education Requirements



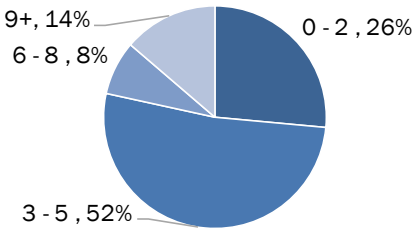
Titles

Titles were varied; no title was associated with at least 5% of the job postings for this occupation.

Skills

1. Project Management
2. Budgeting
3. Scheduling
4. Supervisory Skills
5. Customer Service
6. Emergency Preparedness
7. Staff Management
8. Program Management
9. Procurement
10. Contract Management

Years of Experience



Notes: 1) Education Requirements not specified in 40% of job postings; 2) Years of experience not specified in 45% of job postings; 3) Only those skills and titles which were included in at least 5% of job postings are reported above

CONCLUSIONS

This report provides information and insight about the seven key economic clusters from a workforce perspective. Job postings data as well as federal employment statistics are utilized to provide insight about the innovative as well as more comprehensive talent needs of the key economic clusters. The first part of the report is focused on the link between economic prosperity and an innovative workforce. The second part of the report considers the talent needs of each key economic cluster separately.

1. **Currently there is a mixed story about the state of metropolitan Washington's economy as well as its advanced industries jobs.**

While year-over-year job growth in metropolitan Washington has outpaced the rest of the nation for the last four quarters, there are reasons to be concerned. Federal employment, with employees that are compensated more than those in private, state government, and local government employment, has been growing at a slower rate. With over 30 percent of the federal workforce eligible to retire by 2017, it is possible that the share of federal employment will decline and the region's annual pay may grow at a slower rate in the future.

Advanced industries jobs are associated with sustainable growth and innovation. While the Washington MSA has the third greatest number of advanced industries jobs, again, there are reasons for concern. Metropolitan Washington's advanced industries are considerably specialized with three-quarters of these jobs in three industries, but that also means they are less diverse and more vulnerable to ups and downs. In addition, while ranked among the ten metro areas with the highest advanced industries share of all jobs, metropolitan Washington's advanced industries employment are growing at the second lowest rate.

2. **Overall, the seven key economic clusters performed well between 2014 and 2015 and include many advanced industries. Efforts to support the key economic clusters may also help metropolitan Washington's advanced industries.**

Overall, private employment for the key economic clusters grew faster than total employment for the region between 2014 and 2015. In 2015, all of the key economic clusters, except for Leisure and Business Hospitality Services, paid higher wage rates. Further, except for Leisure and Business Hospitality Services, each cluster includes one or more advanced industries.

3. **STEM-intensive occupations, associated with innovation, are needed by all of the key economic clusters**

One of the requirements for an industry to be considered "advanced" is that at least 20 percent of their workforce be in STEM-intensive occupations. According to the Economics and Statistics Administration, these "workers drive our nation's innovation and competitiveness by generating new ideas, new companies and new industries."[xxiv]

In metropolitan Washington during the first half of 2016, all of the key economic clusters placed job postings for STEM-intensive occupations. Seven out of the top ten STEM-occupations in greatest demand were computer occupations, two were in business and financial operations, and one was for an architectural and engineering manager. Only one of the occupations, Auditors, was ranked within the top ten by only one of the key economic clusters.

4. **The key economic clusters also have other, more comprehensive needs for talent**

For those occupations that were in greatest demand during the first half of 2016, nine of top ten also ranked within the top ten for more than one key economic cluster. Five of the top ten were for computer occupations, three of these are designated as STEM-intensive by O*NET. The rest were among the twenty most common occupations in 2015.

5. **In many cases, the key economic clusters are looking for the same talent**

Many occupations were ranked within the top ten for demand by more than one cluster. When the top ten STEM-intensive occupations for each of the key economic clusters were deduplicated, 25 occupations remained. For the comprehensive talent needs, after the top ten occupations for each of the key economic clusters were deduplicated, 36 unique occupations remained.

6. **Workers trained to perform computer occupations are in high demand by the key economic clusters**

Workers trained to perform computer occupations are in high demand by the key economic clusters. Seven of the top ten STEM-intensive occupations and five of the top ten occupations were computer occupations.

7. **While educational requirements tended to be high, there were also opportunities with lower educational barriers.**

For most of the occupations, a high level of education was requested. Seventy-three percent or more of the job postings for 60 of the 70 occupations requested a Bachelor's degree or higher. Most of the ten other occupations, with lower education barriers, were within the Leisure and Business Hospitality Services cluster. While they also pay lower wages, they provide opportunities to job seekers searching for a position with lower entrance barriers.

In conclusion, utilizing job postings data for the first half of 2016 as well as data from the Bureau of Labor Statistics, this report is intended to inform metropolitan Washington about the talent it needs to support the seven key economic clusters. This report is intended to be a tool to help with decision-making related to workforce development as the region works to diversify away from the federal government.

METHODS AND LIMITATIONS

Unless otherwise noted, metropolitan Washington, is defined as COG's 22 local jurisdictions: District of Columbia; Maryland: Town of Bladensburg, City of Bowie, Charles County, City of College Park, City of Frederick, Frederick County, City of Gaithersburg, City of Greenbelt, Montgomery County, Prince George's County, City of Rockville, and City of Takoma Park; Virginia: City of Alexandria, Arlington County, City of Fairfax, Fairfax County, City of Falls Church, Loudoun County, City of Manassas, City of Manassas Park, and Prince William County.

Wage premiums were derived using the national level employment statistics (BLS OES). A wage premium is the ratio of what the economic cluster pays for a certain occupation to what all industries pay for the same occupations. An economic cluster may pay more or less than the national average for a certain occupation. To develop this premium, for each occupation, a weighted average was developed using the median wage each industry and its employment in metropolitan Washington. Next, the weighted average was divided by the national average median wage for that occupation for all industries.

The occupational structure for each economic cluster was derived using the BLS' 2014-2024 Industry-occupation matrix. Each industry's contribution was weighted based upon its employment in metropolitan Washington.

Job posting data for the Demand Overview section was extracted from Burning Glass' Labor Insight database in July 2016.

To produce the Labor Insight database, Burning Glass gathers millions of job openings daily from more than 40,000 websites, and mines the text. While real–time data are relevant and help provide up–to–date job information, there are intrinsic limitations to the data:

- A job posting expresses an interest in applicants for a specific position but is not equal to a job opening. Job postings serve varied purposes beyond filling a new positions or replacing a departing worker in an existing position. For example, a job may be posted to identify a geographic area has adequate talent.

- Job postings are not standardized. Employers typically include job-specific details in job postings according to their needs and purpose. Information varies and may include: job title, location, employer, industry, level of education, certifications, skills, experience, compensation, and specific pre-hire conditions, such as background check.

- Recruiters frequently place job postings on multiple websites to reach as many candidates as possible. As a result, when job postings are initially extracted from the internet, there are typically multiple iterations of any posting. Burning Glass has developed data deduplication practices to remove duplicate or redundant information. Using a 60-day time frame, approximately 80 percent of the job postings are removed. Due to the variety and volume of data produced on a daily basis, it is not possible to completely eliminate duplication.

[i] Bureau of Labor Statistic's Quarterly Census of Employment and Wages and computations by COG.

[ii] GAO Highlights. Federal Workforce, Recent Trends in Federal Civilian Employment and Compensation, January 2014, http://www.gao.gov/assets/670/660450.pdf

[iii] Bureau of Labor Statistics, Quarterly Census for Employment and Wages and Current Employment Statistics and COG calculations.

[iv] Bureau of Labor Statistics, Quarterly Census for Employment and Wages and COG calculations.

[v] Brookings, America's Advanced Industries: What They Are, Where They Are, and Why They Matter, https://www.brookings.edu/research/americas-advanced-industries-what-they-are-where-they-are-and-why-they-matter/

[vi] Fuller, Stephen S. (July 9, 2015). "Road Map for the Washington Region's Economic Future"

[vii] GAO Highlights. Federal Workforce, Recent Trends in Federal Civilian Employment and Compensation, January 2014, http://www.gao.gov/assets/670/660450.pdf

[viii] Bureau of Labor Statistics, Current Employment Statistics and COG calculations

[ix] Brookings, America's Advanced Industries: New trends, https://www.brookings.edu/research/americas-advanced-industries-new-trends/

[x] Economics and Statistics Administration, *STEM: Good Jobs Now and For the Future*, http://www.esa.doc.gov/reports/stem-good-jobs-now-and-future

[xi] Interindustry Forecasting at the University of Maryland, Roadmap for the Washington Region's Economic Future: Seven Key Economic Clusters, http://2030roadmap.com/wp-content/uploads/2016/02/2030Roadmap_Seven_Key_Economic_Clusters.pdf

[xii] American University, The Roadmap for Washington Region's Economic Future: A State and Local Level Economic Development Policy Gap Analysis, http://2030roadmap.com/wp-content/uploads/2016/02/2030Roadmap_State_and_Local_Policy_Gap-Analysis.pdf

[xiii] Power generation, which is not represented in the key economic clusters, is metropolitan Washington's eighth highest ranking advanced industry in terms of employment, but it only includes 1.3% of the region's total advanced industries employment. The modernization of utilities, including distributed generation and solar power, may displace imports of energy from outside of our region with power that is generated locally. Reliable and affordable energy is a pillar that supports many of the key economic clusters. While employment may increase in this industry, it is unlikely that it will substantially help diversify the region's economy away from the federal government.

[xiv] O*NET – All STEM Disciplines, https://www.onetonline.org/find/stem?t=0&g=Go

[xv] To obtain the rank for Sales Representatives, the employment estimates for Sales Representatives, All Other, Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Produces, and Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products are summed together.

[xvi] According to the BLS employment projections and industry-occupation matrix, a 48% replacement rate is projected for Waiters and Waitresses and a 52% replacement rate is projected for Hotel, motel, and resort desk clerks over the next ten years.

[xvii] For those job postings where occupation was specified (80% of 5,200 job postings).

[xviii] Brookings, *America's Advanced Industries: New trends*, https://www.brookings.edu/research/americas-advanced-industries-new-trends/

[xix] For those job postings where occupation was specified (93% of 17,200 job postings).

[xx] For those job postings where occupation was specified (89% of 4,000 job postings).

[xxi] For those job postings where occupation was specified (89% of 26,500 job postings).

[xxii] For those job postings where occupation was specified (93% of 2,800 job postings).

[xxiii] For those job postings where occupation was specified (94% of 9,200 job postings).

[xxiv] Economics and Statistics Administration, *STEM: Good Jobs Now and for the Future*, http://www.esa.doc.gov/reports/stem-good-jobs-now-and-future

Appendix A. Stem-Intensive Occupations in Greatest Demand, Metropolitan Washington, January 1 – June 30, 2016

Occupation	Annual Median Wages, Metropolitan Washington	# of Job Postings (and Rank[1] within Advanced Industry Cluster)							# of Clusters Ranked in Top Ten	Advanced Industry Clusters - # of Job Postings & Rank	All Industries - # of Job Postings & Rank[1]
		Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services			
Management Occupations											
Computer and Information Systems Managers	$154,000	Less than 50	100 Rank=10	50	Less than 50	100	Less than 50	50 Rank=6	2	250	800
Construction Managers	$99,500	Less than 50	0	Less than 50	Less than 50	100	0	Less than 50 Rank=8	1	150	1,050
Architectural and Engineering Managers	$144,800	0	50	50	0	150	0 Rank=7	50 Rank=4	2	350 Rank=10	1,050
Business and Financial Operations Occupations											
Security Management Specialists	$90,200	Less than 50	100 Rank=9	100	0	150	Less than 50	0	1	250	900
Accountants	$82,900	50 Rank=2	50	50	Less than 50	300 Rank=9	Less than 50 Rank=6	100 Rank=3	4	2,200 Rank=8	4,000 Rank=5
Auditors	$82,900	Less than 50	Less than 50	Less than 50	Less than 50	450 Rank=4	Less than 50	Less than 50	1	500 Rank=9	1,500 Rank=10
Computer and Mathematical Occupations											
Computer and Information Research Scientists	$125,000	Less than 50	50	50	50 Rank=8	150	Less than 50	0	1	350	950
Computer Systems Analysts	$99,100	50 Rank=5	550 Rank=3	150 Rank=3	50 Rank=3	700 Rank=3	50 Rank=2	50 Rank=7	7	1,550 Rank=3	5,250 Rank=3
Information Security Analysts	$106,800	50 Rank=6	700 Rank=2	450 Rank=2	0	900 Rank=2	50 Rank=4	50 Rank=5	6	2,150 Rank=2	7,350 Rank=2
Computer Programmers	$96,200	Less than 50	150 Rank=7	50	0	100	0	0	1	350	1,250
Software Developers, Applications	$110,100	150 Rank=1	1,850 Rank=1	800 Rank=1	100 Rank=2	2,100 Rank=1	250 Rank=1	100 Rank=2	7	5,400 Rank=1	24,000 Rank=1
Database Administrators	$100,600	50 Rank=4	350 Rank=4	100 Rank=5	0	400 Rank=6	50 Rank=5	0	5	900 Rank=4	3,950 Rank=6
Computer Network Architects	$112,000	Less than 50 Rank=9	350 Rank=5	100 Rank=4	0	350 Rank=7	50 Rank=3	Less than 50	5	850 Rank=5	3,300 Rank=7

Occupation	Annual Median Wages, Metropolitan Washington	# of Job Postings (and Rank[1] within Advanced Industry Cluster)							# of Clusters Ranked in Top Ten	Advanced Industry Clusters - # of Job Postings & Rank	All Industries - # of Job Postings & Rank[1]
		Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services			
Computer User Support Specialists	$58,200	50 Rank=3	200 Rank=6	50	50 Rank=9	350 Rank=8	Less than 50 Rank=9	Less than 50	5	700 Rank=7	4,250 Rank=4
Business Intelligence Analysts	$112,000	50 Rank=7	150 Rank=8	100 Rank=9	50 Rank=5	400 Rank=5	Less than 50 Rank=8	Less than 50 Rank=9	7	700 Rank=6	2,400 Rank=9
Biostatisticians	$99,900	Less than 50	0	0	50 Rank=6	0	0	0	1	50	100
Statisticians	$99,900	Less than 50	Less than 50	Less than 50	50 Rank=10	50	0	0	1	100	600
Architecture and Engineering Occupations											
Civil Engineers	$87,100	Less than 50	Less than 50	Less than 50	Less than 50	250 Rank=10	Less than 50	Less than 50	1	300	900
Electrical Engineers	$108,000	Less than 50	50	100 Rank=6	Less than 50	200	Less than 50	Less than 50	1	350	1,050
Mechanical Engineers	$104,600	Less than 50	50	100 Rank=7	Less than 50	150	Less than 50	Less than 50 Rank=10	2	300	950
Life, Physical, and Social Science Occupations											
Biologists	$92,000	0	0	100 Rank=10	50 Rank=7	Less than 50	0	0	2	150	300
Medical Scientists, Except Epidemiologists	$106,000	50 Rank=8	Less than 50	100 Rank=8	200 Rank=1	50	Less than 50	0	3	350	1,000
Chemists	$118,100	Less than 50	0	50	50 Rank=4	0	0	0	1	100	250
Arts, Design, Entertainment, Sports, and Media Occupations											
Graphic Designers	$64,100	Less than 50 Rank=10	50	Less than 50	Less than 50	150	Less than 50 Rank=10	0	2	200	800
Food Preparation and Serving Related Occupations											
First-Line Supervisors of Food Preparation and Serving Workers	$37,100	Less than 50	Less than 50	Less than 50	Less than 50	50	0	200 Rank=1	1	300	3,050 Rank=8

Note: [1] Rank only included for those occupations within top ten. May not sum to total due to rounding.
Sources: Average Annual Wages from the Bureau of Labor Statistics Occupation Employment Survey all other data from Burning Glass Labor Insight.

Appendix B. Occupations in Greatest Demand, Metropolitan Washington, January 1 – June 30, 2016

Occupation	Annual Median Wages, Metropolitan Washington	# of Job Postings (and Rank within Advanced Industry Cluster)							# of Clusters Ranked in Top Ten	Advanced Industry Clusters - # of Job Postings & Rank	All Industries - # of Job Postings & Rank
		Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services			
Management Occupations											
General and Operations Managers	$132,400	100 Rank=9	200	50	50	200	50	100	1	700	2,900
Marketing Managers	$148,300	100 Rank=7	550 Rank=6	50	100 Rank=7	300	100 Rank=7	100	4	1,300	2,950
Sales Managers	$144,400	50	500 Rank=9	100	100 Rank=5	350	50	300 Rank=6	3	1,450 Rank=8	4,150
Public Relations and Fundraising Managers	$138,800	150 Rank=2	50	Less than 50	50	50	Less than 50	50	1	400	1,700
Administrative Services Managers	$99,900	50	50	50	100 Rank=6	100	Less than 50	Less than 50	1	300	1,250
Lodging Managers	$83,200	0	0	0	0	0	0	550 Rank=3	1	550	550
Medical and Health Services Managers	$108,200	100 Rank=8	100	50	150 Rank=4	100	50	50	2	600	3,550
Managers, All Other	$128,800	350 Rank=1	600 Rank=5	350 Rank=5	250 Rank=2	1,000 Rank=4	100 Rank=6	200 Rank=10	7	2,800 Rank=4	10,800 Rank=4
Business and Financial Operations Occupations											
Human Resources Specialists	$80,300	150 Rank=3	150	100	50 Rank=9	400	Less than 50	50	2	1,000	5,600
Management Analysts	$98,200	50	550 Rank=7	250 Rank=7	50	1,250 Rank=2	Less than 50	50	3	2,200 Rank=5	8,000 Rank=6
Market Research Analysts and Marketing Specialists	$69,200	50	150	50	50	450 Rank=10	50	50	1	850	2,600
Auditors	$82,900	Less than 50	Less than 50	Less than 50	Less than 50	450 Rank=9	Less than 50	Less than 50	1	500	1,500
Computer and Mathematical Occupations											
Computer Systems Analysts	$99,100	50	550 Rank=8	150 Rank=9	50	700 Rank=6	50	50	3	1,550 Rank=7	5,250
Information Security Analysts	$106,800	50	700 Rank=4	450 Rank=4	Less than 50	900 Rank=5	50	50	3	2,150 Rank=6	7,350 Rank=7

Occupation	Annual Median Wages, Metropolitan Washington	# of Job Postings (and Rank within Advanced Industry Cluster)							# of Clusters Ranked in Top Ten	Advanced Industry Clusters - # of Job Postings & Rank	All Industries - # of Job Postings & Rank
		Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services			
Software Developers, Applications	$110,100	150 Rank=5	1,850 Rank=1	800 Rank=2	100 Rank=8	2,100 Rank=1	250 Rank=2	100	6	5,400 Rank=1	24,000 Rank=1
Web Developers	$83,100	50	200	50	Less than 50	400	50 Rank=8	Less than 50	1	800	4,800
Network and Computer Systems Administrators	$96,700	50	450	200 Rank=8	Less than 50	400	50	Less than 50	1	1,150	5,400
Computer Systems Engineers/Architects	$112,000	50	1050 Rank=3	600 Rank=3	50	1,000 Rank=3	100 Rank=9	Less than 50	4	2,800 Rank=3	9,300 Rank=5
Information Technology Project Managers	$112,000	50	500 Rank=10	100	50	550 Rank=8	50	50	2	1,350 Rank=9	5,000
Life, Physical, and Social Science Occupations											
Medical Scientists, Except Epidemiologists	$106,000	50	0	100	200 Rank=3	50	Less than 50	0	1	350	1,000
Quality Control Analysts	$55,700	Less than 50	50	50	50 Rank=10	50	0	0	1	250	700
Arts, Design, Entertainment, Sports, and Media Occupations											
Producers	$80,400	Less than 50	Less than 50	0	0	0	100 Rank=5	0	1	100	250
Reporters and Correspondents	$68,200	Less than 50	0	0	0	0	100 Rank=4	0	1	100	350
Public Relations Specialists	$79,700	100 Rank=10	50	50	Less than 50	200	50	50	1	450	1,800
Editors	$72,500	50	50	Less than 50	Less than 50	50	100 Rank=3	Less than 50	1	300	1,050
Healthcare Practitioners and Technical Occupations											
Registered Nurses	$76,000	50	Less than 50	Less than 50	Less than 50	100	Less than 50	Less than 50		250	11,600 Rank=3
Protective Service Occupations											
Intelligence Analysts	$124,900	0	100	150 Rank=10	0	200	0	Less than 50	1	450	1,200
Security Guards	$35,600	Less than 50	150	1050 Rank=1		100		50	1	1,300 Rank=10	2,050

Occupation	Annual Median Wages, Metropolitan Washington	# of Job Postings (and Rank within Advanced Industry Cluster)							# of Clusters Ranked in Top Ten	Advanced Industry Clusters - # of Job Postings & Rank	All Industries - # of Job Postings & Rank
		Advocacy	Information and Communications Technology	Science and Security Technology	Biology and Health Technology	Business and Financial Services	Media and Information Services	Leisure and Business Hospitality Services			
Food Preparation and Serving Related Occupations											
First-Line Supervisors of Food Preparation and Serving Workers	$37,100	0	Less than 50	Less than 50	0	50	0	200 Rank=9	1	300	3,050
Cooks, Restaurant	$24,400	0	0	0	0	0	0	300 Rank=5	1	300	1,550
Waiters and Waitresses	$19,900	0	0	0	0	0	0	400 Rank=4	1	400	1,400
Building and Grounds Cleaning and Maintenance Occupations											
Maids and Housekeeping Cleaners	$24,000	0	0	0	0	0	0	550 Rank=2	1	550	1,200
Personal Care and Service Occupations											
Concierges	$32,500	0	0	0	0	0	0	250 Rank=8	1	250	350
Sales and Related Occupations											
Retail Salespersons	$22,200	Less than 50	350	Less than 50	Less than 50	200	Less than 50	50	0	700	7,000 Rank=8
Sales Representatives	$66,900	100 Rank=6	1,800 Rank=2	250 Rank=6	250 Rank=1	700 Rank=7	300 Rank=1	250 Rank=7	7	3,650 Rank=2	13,850 Rank=2
Office and Administrative Support Occupations											
Customer Service Representatives	$36,500	50	150	Less than 50	Less than 50	200	50 Rank=10	50	1	500	4,650
Hotel, Motel, and Resort Desk Clerks	$25,200	0	Less than 50	0	0	Less than 50	0	700 Rank=1	1	750	1,150
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	$42,000	150 Rank=4	200	100	50	350	Less than 50	150	1	1,000	5,800 Rank=9
Transportation and Material Moving Occupations											
Heavy and Tractor-Trailer Truck Drivers	$40,900	0	Less than 50	0	0	50	0	100	0	150	5,700 Rank=10

Note: May not sum to total due to rounding.
Sources: Average Annual Wages from the Bureau of Labor Statistics Occupation Employment Survey all other data from Burning Glass Labor Insight.