Who are Montana's Tech-Related Workers?

By Emily Trautman, Senior Economist

In Montana, businesses across all industries rely on workers with strong tech skills. At the highest end of the tech skills spectrum are traditional information technology workers who code software, create websites, or provide technical assistance to computer users. These jobs – software engineers, computer programmers, website developers, and computer user support specialists – are common examples of tech occupations, and are generally known for creating new technology. In addition to this traditional tech work, many businesses rely on workers who are relatively advanced users of technology, and therefore require tech skills. For example, surveying and mapping technicians, statisticians, and operations research analysts tend to be knowledgeable across a wide range of computer software programs and may understand a variety of programming languages to perform their jobs effectively.

Although tech skills are in-demand, there is not a defined occupational group for "tech jobs," making information about this group of work limited. In addition, most jobs require some use of technology, suggesting that a range of tech skills are needed across a variety of occupations, both within and outside of traditional information technology work. To provide information on the range of tech work in Montana, this EAG looks at the level of computer and electronics knowledge generally needed for each occupation. In this article, occupations at the highest level of knowledge are considered tech-related.[1]
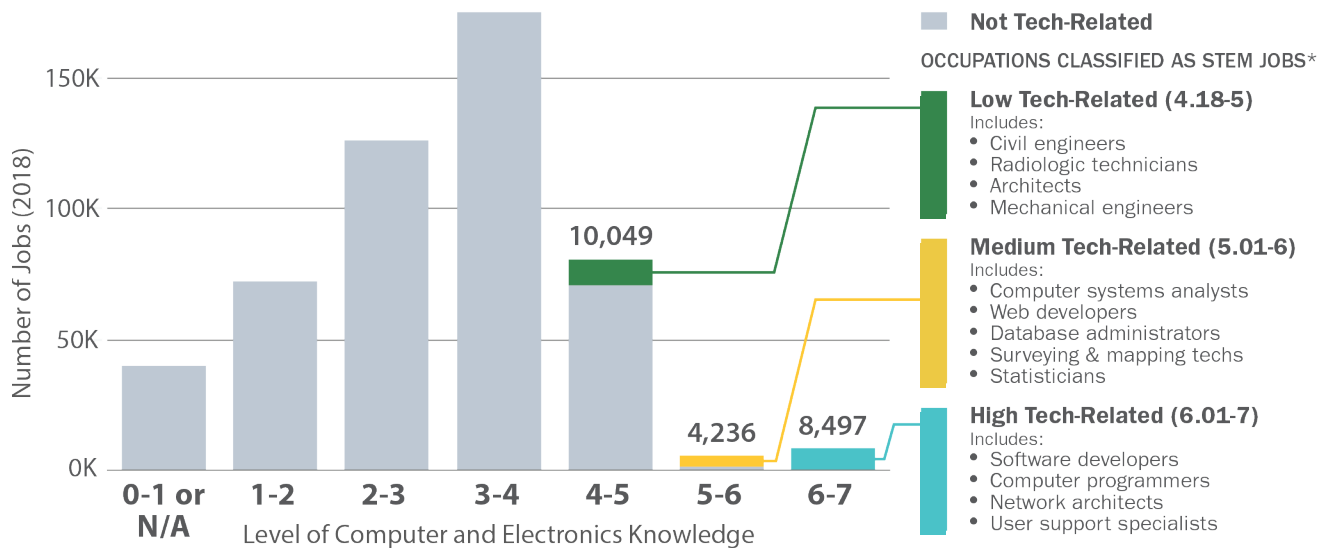
Montana's Tech-Related Jobs

Most jobs require some interaction with technology. As such, each job requires a different level of knowledge of computers and electronics based on the responsibilities of the job, as shown in **Figure 1**. Level of knowledge ranges from zero to seven and is based on the understanding of computer hardware, software, and programming needed for each occupation.[2] Most jobs fall into a level of computer knowledge between three and four, which includes hotel desk clerks, law teachers, loan officers, registered nurses, and insurance underwriters.

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1 *Level of computer and electronics knowledge is used as an indicator of tech skills needed in different occupations. It is not a formal definition of tech occupations.*

2 *O*NET Online defines computer and electronics knowledge to be the knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.*

Number of Jobs by Level of Computer and Electronics Knowledge

Not Tech-Related

OCCUPATIONS CLASSIFIED AS STEM JOBS*

Low Tech-Related (4.18-5)
Includes:
- Civil engineers
- Radiologic technicians
- Architects
- Mechanical engineers

Medium Tech-Related (5.01-6)
Includes:
- Computer systems analysts
- Web developers
- Database administrators
- Surveying & mapping techs
- Statisticians

High Tech-Related (6.01-7)
Includes:
- Software developers
- Computer programmers
- Network architects
- User support specialists

*Source: 2018 MT DLI Employment Projections (includes estimate for self-employed jobs). *Jobs meeting the STEM requirements according to the U.S. Bureau of Labor Statistics. Tech-Related jobs estimated based O*NET Online's level of computer and electronics knowledge required per job.*

Tech-related occupations require high levels of computer and electronics knowledge. This article considers high levels to be any occupation in the highest quartile of required computer and electronics knowledge, which is between 4.18 and 7. To ensure the inclusion of the most technical occupations, this article also limits tech-related occupations to those that are also categorized as STEM. Therefore, this article defines Montana's tech-related occupations as STEM occupations in the highest quartile of required computer and electronics knowledge.[3] This estimate limits tech-related work to 85 different occupations. There are approximately 22,780 people working in these occupations across the state, making up 4.5% of total employment. **Figure 1** highlights the number of tech-related jobs, and breaks them down further by high, medium, and low tech-related jobs.[4]

Occupations requiring the highest levels of computer knowledge (labeled high tech-related in **Figure 1**)

are the occupations commonly associated with tech work, such as software engineers, computer programmers, network architects, and computer user support specialists. There are 13 different occupations in the high tech-related category with 8,500 people working in one of these occupations.

Computer systems analysts, web developers, and database administrators are also commonly categorized as tech work. These occupations are grouped in the medium tech-related category. Occupations outside of jobs typically found in a company's information technology department are also in the medium tech-related and the low tech-related group including electrical engineers, mapping technicians, statisticians, operations research analysts, and civil engineers. At these lower levels of tech-related work, these occupations tend to focus on processing information or analyzing data. For example, most occupations in the medium tech-related and low tech-related categories report

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3 The fourth-quartile includes levels 4.18 to 7. Low, medium, and high tech-related categories are not based on an official definition. For this article, low tech-related refers to jobs with a level of knowledge between 4.18 and 5. Medium tech-related refers to levels 5.01 to 6. High tech-related refers to levels 6.01 to 7.

4 Occupations based on the 2010 Standard Occupational Classification (SOC) system. Number of jobs throughout this article are calculated using 2018-2028 projections data, which includes estimates for 2018 payroll and self-employed jobs.

the use of analytical or scientific software, and query software. There are 22 occupations and 4,230 workers in the medium tech-related group, and 50 occupations with 10,050 workers in the lowest tech-related group.
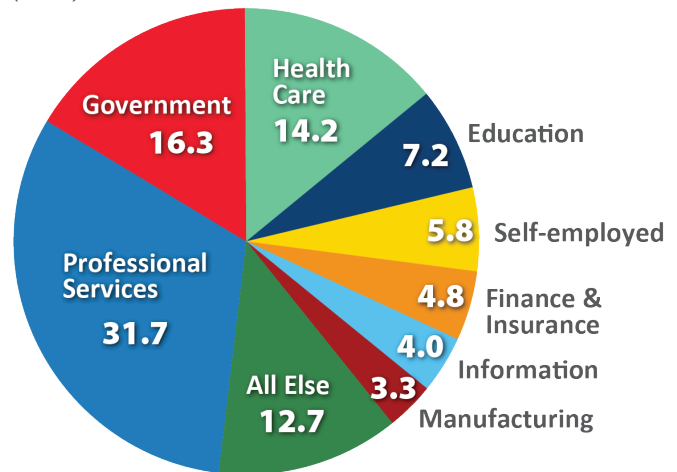
Every Industry has Tech-Related Jobs

For many types of workers, finding the industries they work in is simple. Most healthcare occupations fall in the healthcare industry. Most construction jobs are in the construction industry. And most teachers fall into the education industry. However, there is not a specific "tech industry" that includes most tech-related jobs.[5] Instead, tech-related workers are distributed across all industries because businesses in all fields may take advantage of technology in their operations.

Figure 2 shows how tech-related jobs are distributed across industries in Montana. Nearly one-third of these jobs are found in the professional, scientific, and technical services industry. This industry includes many traditional tech firms that employ computer programmers, website developers, database administrators, and other high tech-related jobs. The next three largest industries for tech-related workers include government, healthcare, and educational services.[6] Government and healthcare commonly employ low and medium tech-related workers to analyze their large administrative databases in addition to the jobs within their traditional information technology departments.

Tech-Related Work Across Montana

Just as tech-related jobs are found throughout all industries, these jobs can be found throughout Montana. However, the urban areas tend to have the

Source: Number of jobs using 2018 MT DLI Employment Projections data. Tech-Related are STEM jobs requiring a level of computer and electronics knowledge of 4.18 and higher.
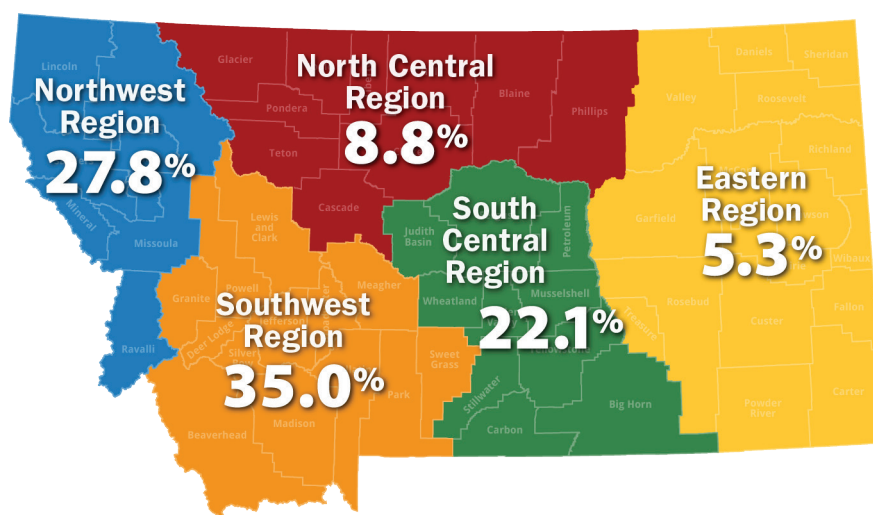
highest share of these jobs, as shown in **Figure 3**. The Southwest Region has the highest share of tech-related jobs compared to all other regions of the state. This region's share of tech-related workers (35%) is higher than their overall share across all jobs (30%), demonstrating the strong tech presence in Bozeman.

The Northwest Region has the second highest share of tech-related jobs at 28%, and many of these jobs are at the high tech-related levels. Like the Southwest Region, employment in the South Central Region is more concentrated in tech-related jobs than other regions, with 22% of tech-related jobs compared with its 20% share across all jobs. Many of the tech-related jobs in the South Central Region are outside of the high tech-related group of occupations. Tech-related jobs also exist in the more rural areas of the state, the North Central and Eastern Regions, but they make up a smaller share of employment than in other more urban regions.

5 Based on the NAICS classification.
6 Public employment is included in the healthcare and education industries. All other public employment is included in the government industry.
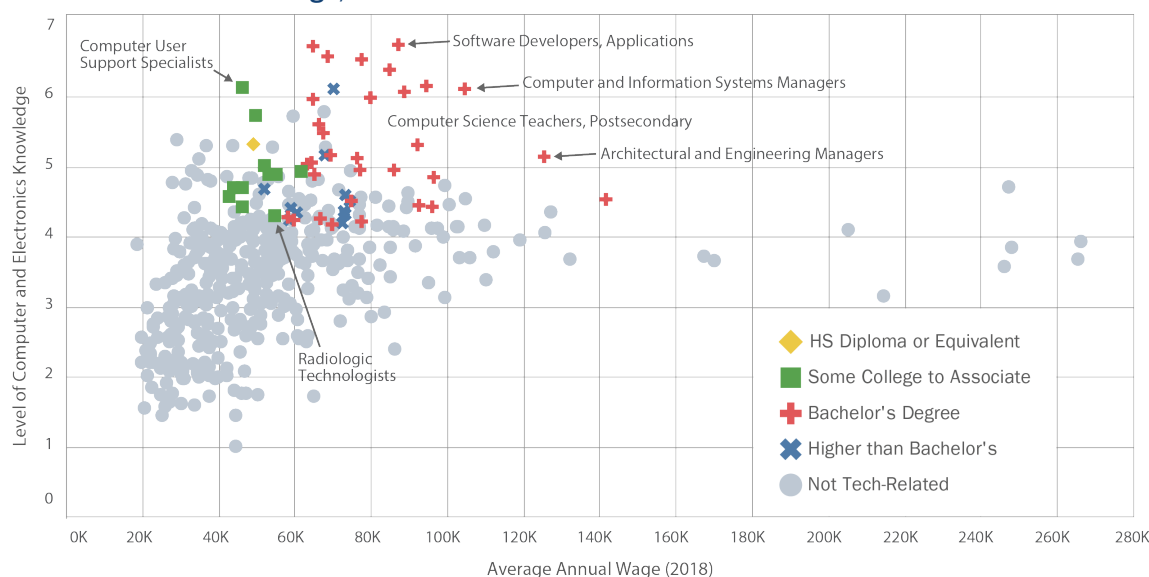
Share of Tech-Related Jobs by Region

Source: Number of jobs using 2018 MT DLI Employment Projections data. Tech-Related are STEM jobs requiring a level of computer and electronics knowledge of 4.18 and higher. Level of knowledge from ONET Online.

The High Wages of Tech-Related Jobs

Jobs requiring high levels of computer and electronics knowledge pay higher wages than the average job in Montana. **Figure 4** shows the wages and level of computer and electronics knowledge for all jobs. Non tech-related jobs are colored gray. Tech-related jobs are nongray colors based on the occupation's minimum education required.[7] In general, tech-related jobs pay an average annual wage of $71,600, which is well above the statewide average annual wage of $43,410. Wages vary only slightly across the low, medium, and high

FIGURE 4:
Montana's Occupations by Average Wage, Level of Computer and Electronics Knowledge, and Minimum Education

Source: Average annual wages from 2018 OES. Level of computer and electronics knowledge from ONET Online. Education level reflects minimum education estimates from the BLS.

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7 *Minimum education is the minimum generally required to enter the profession as determined by the U.S. Department of Labor, Bureau of Labor Statistics.*

tech-related categories: average wages are about $70,900 for low tech-related jobs; $72,055 for the medium tech-related jobs; and $72,220 for the high tech-related jobs.
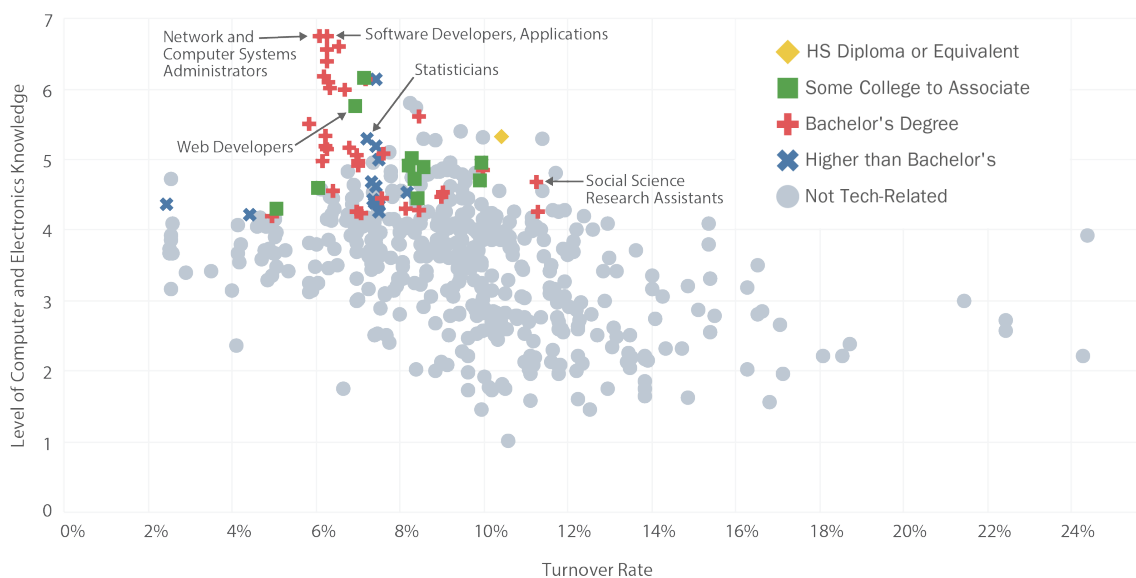
Tech-related wages vary based on the occupation's minimum education level typically required, which is true across all jobs. In general, wages across all jobs rise with increased education. However, tech-related occupations requiring a bachelor's degree tend to pay higher wages than tech-related occupations requiring a master's degree or higher. Occupations requiring a bachelor's degree pay an average annual wage of $81,550 compared with $69,110 for occupations requiring a master's degree or higher. Tech-related occupations requiring some college to an associate degree pay about $49,200 on average, which is higher than the statewide average across all jobs.

Tech-Related Jobs have Low Turnover

Tech-related jobs tend to have lower turnover than average, which is expected, since high wages are generally correlated with low turnover. **Figure 5** shows job turnover and level of computer and electronics knowledge for all jobs. Non tech-related jobs are shaded gray. Tech-related jobs are nongray colors based on the occupation's minimum education required. Each year, 1,140 workers are estimated to leave their tech-related job for work in a different occupational group. Another 530 tech-related workers are estimated to leave the labor force possibly to retire, return to school, or take care of family. This means 1,670 tech-related workers leave their job each year, a turnover rate of 6.9%. This turnover rate is lower than the all-occupation average of 11.1%.[8]

FIGURE 5:
Montana's Occupations by Turnover Rate, Level of Computer and Electronics Knowledge, and Minimum Education

Source: Job turnover is calculated using data from 2018 MT DLI Employment Projections. Turnover rates equal the sum of projected annual exits and projected annual transfers divided by the average number of jobs in 2018 (actual) and 2028 (projected). Level of computer and electronics knowledge from O*NET Online. Education level reflects minimum education estimates from the BLS.

[8] *Job turnover is calculated using data from the 2018-2028 MT DLI Occupational Projections. Turnover equals the sum of projected annual exits and projected annual transfers divided by the average number of jobs in 2018 (actual) and 2028 (projected).*

Tech-Related Jobs are Projected to Grow Fast

Jobs requiring high levels of computer and electronics knowledge are projected to grow faster than average over the next ten years, at an average annual rate of 1.2% compared with 0.7% across all jobs. This projected growth suggests that despite low turnover rates, Montana needs to be prepared to fill many open positions. **Figure 6** shows the tech-related occupations with the most projected openings over the next ten years. As shown, these jobs typically require postsecondary education, which requires time and planning to educate workers. One supply and demand analysis identified computer science and IT programs as expansion candidates at Montana colleges due to the high-demand from Montana's employers. Montana graduates who complete these computer and IT programs have a relatively easy time finding work post-graduation – 67% worked in Montana one year after graduation.[9]

FIGURE 6:

Top Ten STEM Occupations Requiring High Levels of Computer and Electronics Knowledge
2018-2028

Occupation	Knowledge Level (0-7)	Minimum Education/ Work Experience	Annual New Jobs	Annual Total Openings	2018 MT Annual Average Wage
1 Computer User Support Specialists[1]	6.1	SC ND	37	226	$46,060
2 Software Developers, Applications[2]	6.8	Bachelor's	36	145	$87,120
3 Civil Engineers	4.2	Bachelor's	22	139	$77,480
4 Medical and Health Services Managers[1]	4.4	Bach./<5yrs	23	133	$96,180
5 Computer Programmers[1]	6.2	Bachelor's	1	79	$94,480
6 Radiologic Technologists[2]	4.3	Associate's	13	60	$54,700
7 Computer and Information Systems Managers[1]	6.1	Bach./+5yrs	10	55	$104,630
8 Architects, Except Landscape and Naval	4.3	Bach./Internship	5	55	Not Releasable
9 Software Developers, Systems Software	6.6	Bachelor's	14	54	$77,560
10 Computer Occupations, All Other[2]	6.6	Bachelor's	8	52	$68,430

Source: MT DLI Employment Projections. 2018-2028. Level of computer and electronics knowledge from ONET Online. High levels at 4.18 and above.
Notes: [1] Apprenticeable in Montana; [2] Apprenticeable by US DOL standards; SC ND = Some college no degree, Bach. = Bachelor's Degree

Conclusion

Because most jobs require some tech skills, distinguishing tech from nontech jobs is not always clear. However, jobs requiring high levels of computer and electronics knowledge provide an idea of Montana's most tech-related occupations. These jobs exist across industry and region, and they will continue to be in strong demand over the next ten years. Individuals who want to work in a tech-related occupation generally must attend longer-term training through postsecondary education. Although this workforce development takes time, gaining high levels of computer and electronics knowledge may lead to relatively high wages and low turnover. And workers with this knowledge are not limited to work in a traditional information technology occupation. These workers can choose a career path towards a traditional tech occupation or an occupation requiring relatively advanced use of technology. For more information on career planning across all jobs including these tech-related jobs, visit the Montana Career Lab at careers.mt.gov.

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9 Watson, Amy. "Meeting State Worker Demand." Available at http://lmi.mt.gov/Portals/193/Publications/LMI-Pubs/Special%20Reports%20and%20Studies/StateCollegeReport.pdf.