STEM: Occupations and Employment

Oklahoma Employment Security Commission
Economic and Research Division

STEM Occupations and Employment: A Brief Review for Oklahoma

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Economic Research and Analysis Division

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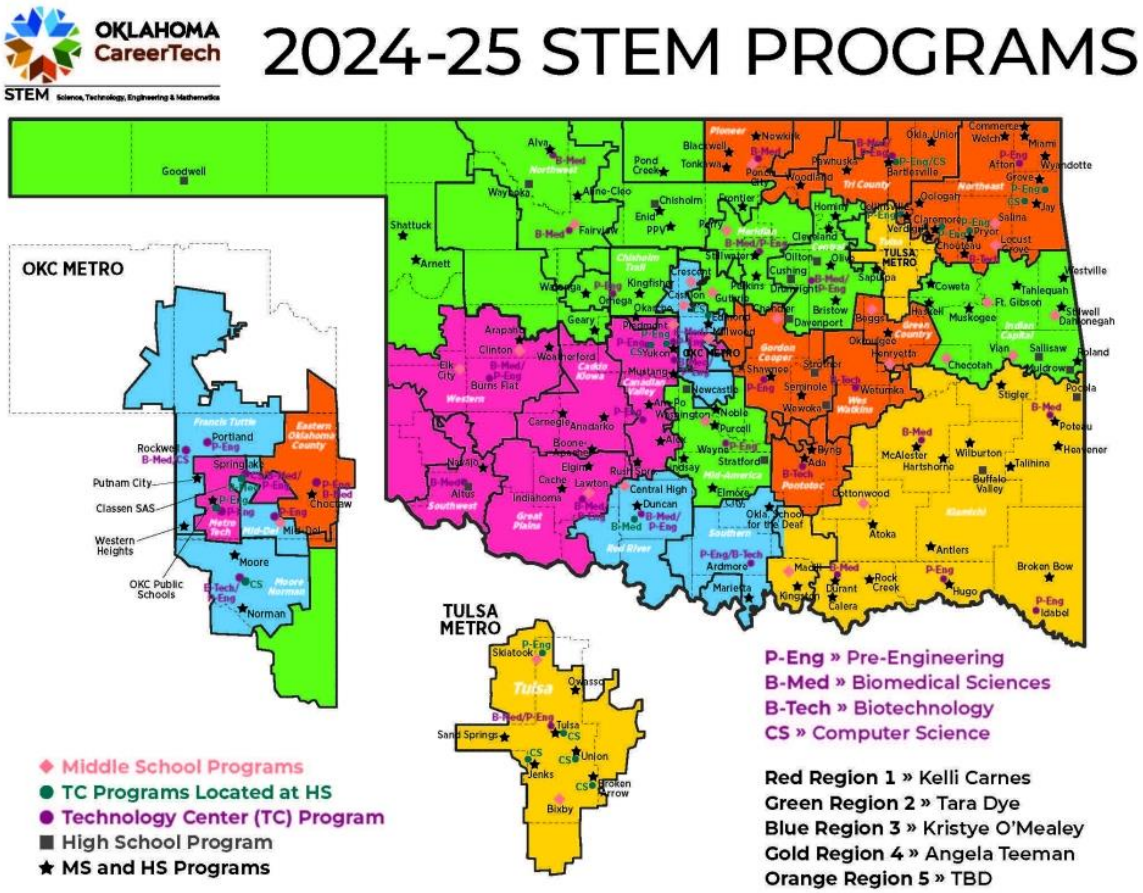
STEM Occupations and Employment: A Brief Review for Oklahoma

"Do the research. Ask questions. Find someone doing what you are interested in! Be curious!" –Katherine Johnson, mathematician whose calculations were critical to the success of the first and subsequent U.S. crewed spaceflights.

Because there are a lot of science, technology, engineering, and mathematics (STEM) occupations have become one of the most essential occupations needed to innovative ideals. The STEM occupations are significant and important part of any growing economy. The educational requirement for entry to any STEM employment can range from a high school diploma to a doctoral degree. Some occupations require additional educational requirements consisting of on-the-job training. Because there is a high demand for STEM occupations, the pay for these occupations is relatively higher than most occupations.

Figure 1: 2024-2025 STEM Programs

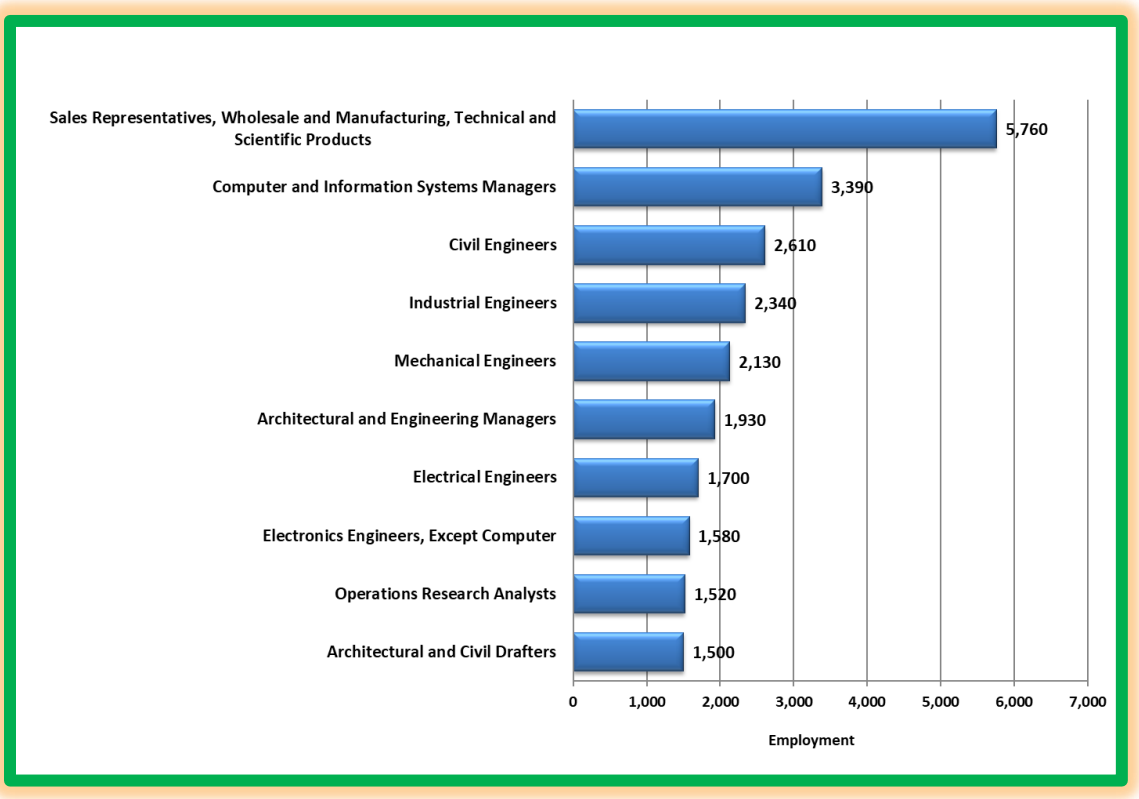


Source: *Contact us* (no date) *CareerTech*. Available at: https://oklahoma.gov/careertech/educators/stem/about/contact.html (Accessed: 29 August 2024).

Figure 1 represents the map of Oklahoma STEM programs. The map is broken into multiple different regions, including a red, pink, green, blue and gold region. For more information on STEM occupations within your region, see: https://oklahoma.gov/careertech/educators/stem/about/contact.html. Also, for more information on the BLS STEM occupations, see: https://www.bls.gov/oes/topics.htm#stem and check out O'NET STEM occupations at: https://www.onetonline.org/find/stem?t=0.

In this report, the data comes from the Occupational Employment and Wage Statistics (OEWS) program, a partnership between the U.S. Bureau of Labor Statistics (BLS) and the Oklahoma Employment Security Commission (OESC) and the Employment Projections Program produced by the Economic Research and Analysis Division of the Oklahoma Employment Security Commission (see Endnote 1, page 12). For more information on the BLS's OEWS website, see http://www.bls.gov/oes/. More than 100 STEM Occupations were chosen within this study, including occupational groups from: Chemistry, Computer Science, Engineering, Environmental Science, Life Sciences, Mathematics and Physics/Astronomy. With some of the STEM occupations needing additional experience and education, this study includes managerial and postsecondary occupations. Within this study, healthcare occupations were not included.

Figure 2: Employment by occupation for the largest STEM occupations



Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2023 (published April 2024).

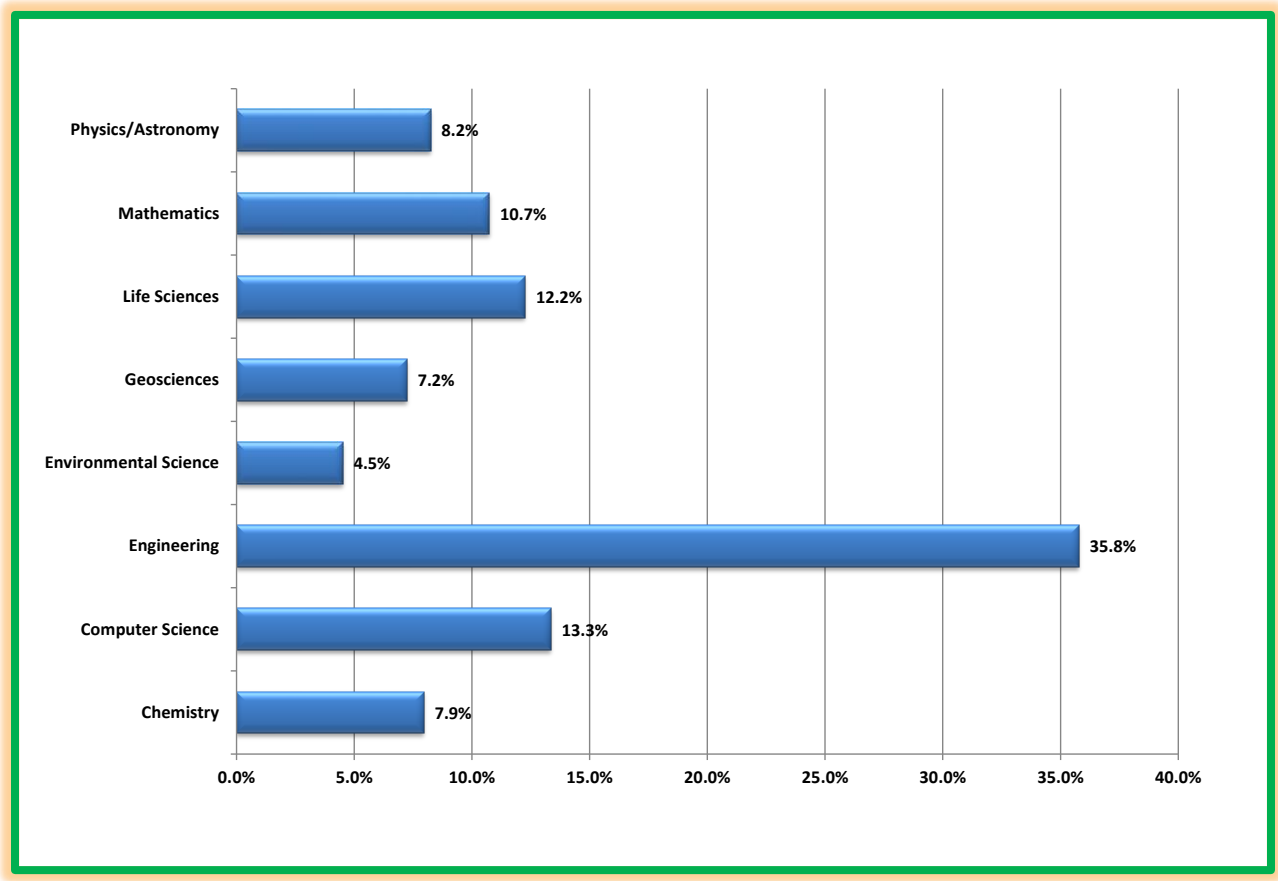
- Figure 2 displays the top ten of Oklahoma's largest STEM occupations.

- Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products are at the top of the list with approximately 5,760 jobs.

- The other top five occupations include Computer and Information Systems Managers, Civil Engineers, Industrial Engineers, and Mechanical Engineers.

- There is a 4,260 job difference between the largest occupation (Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products) and the smallest occupation (Architectural and Civil Drafters).

Figure 3: Employment share of STEM occupational groups



Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2023 (published April 2024).

Note: The sum of disciplines shares are more than 100% due to the occupations being in multiple disciplines.

Oklahoma had a total of approximately 79,040 STEM jobs in 2023, accounting for nearly 4.7 percent of state total employment.

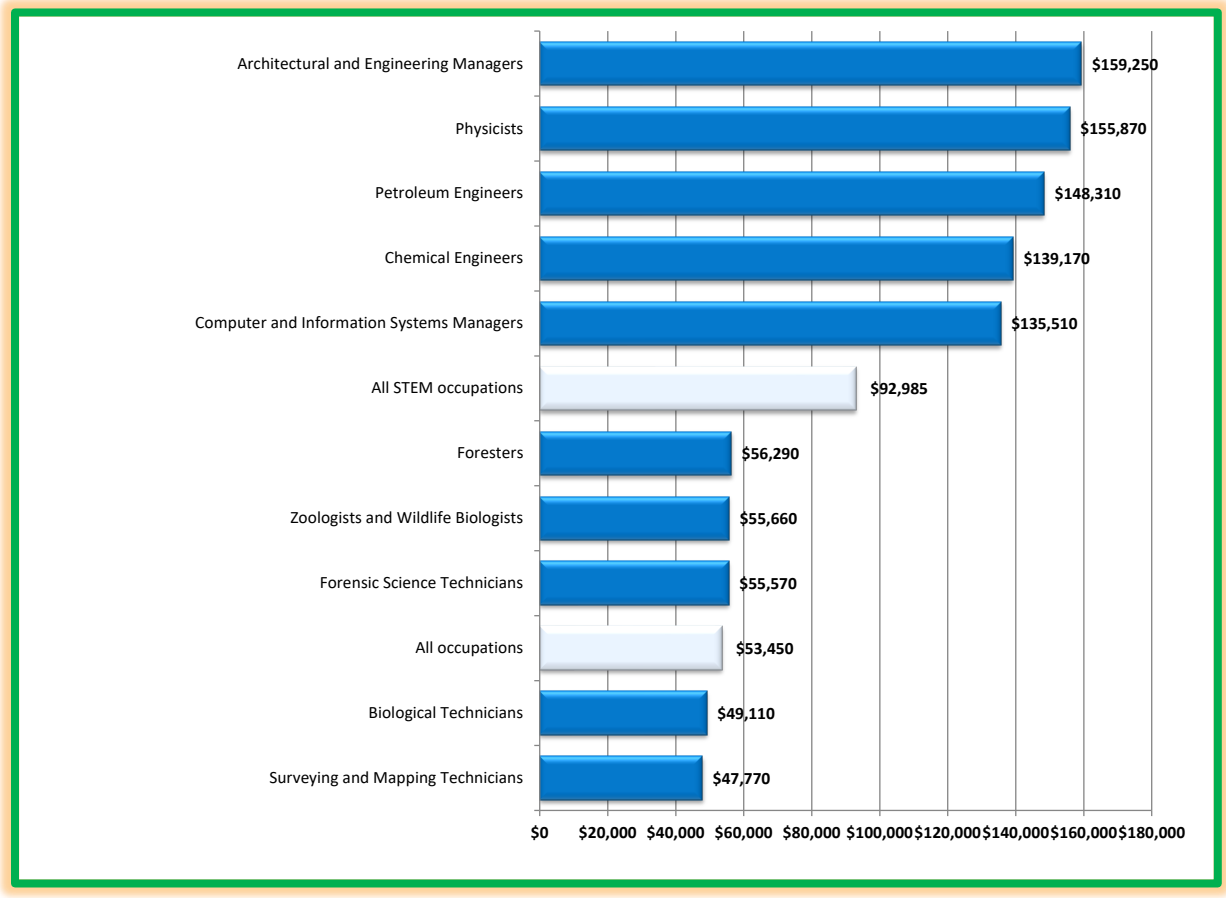
- The largest share of STEM occupations was Engineering with 28,270 jobs, and 35.8 percent of the total STEM employment.

- Computer Science had the second-largest STEM occupation share with 13.3 percent of the STEM occupations and 10,550 jobs.

- Life Sciences was the third-largest STEM occupation share with 12.2 percent and 9,680 jobs.

- Other STEM employment shares include: Mathematics with 8,480, Physics/Astronomy with 6,510, Chemistry with 6,280, Geoscience with 5,710 jobs, and Environmental Science with 3,560.

Figure 4: Highest- and lowest-paying STEM occupations



Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2023 (published April 2024).

- The STEM jobs' average annual wage was $92,985; however, Oklahoma's average annual wages for all occupations was $53,450.

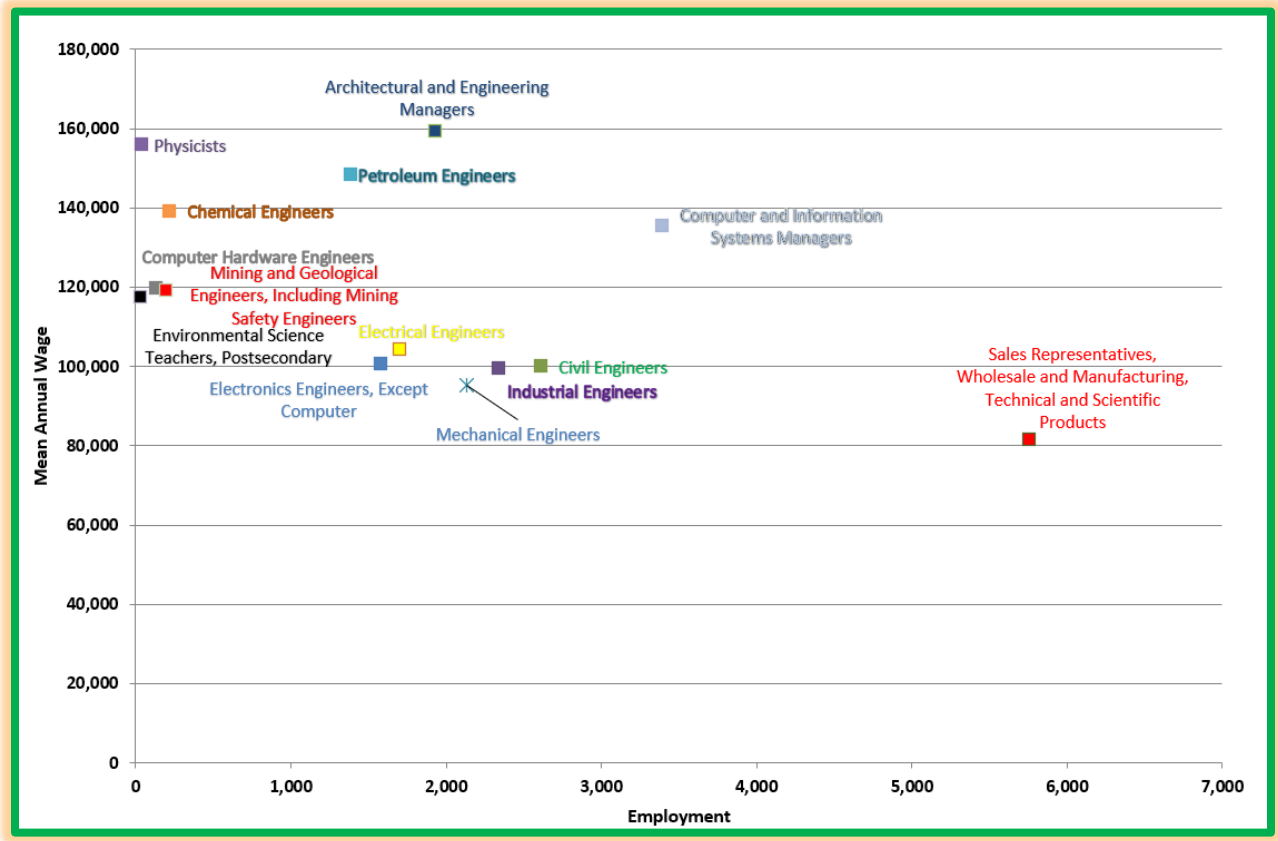
- Architectural and Engineering Managers were the highest-paying STEM occupation with an annual mean of $159,250.

- Surveying and Mapping Technicians was the lowest STEM occupation with an annual mean of $47,770.

- Other highest annual mean wages for STEM occupations include: Physicists, Petroleum Engineers, Chemical Engineers, and Computer and Information Systems Managers.

- Other lowest annual mean wages for STEM occupations include: Foresters, Zoologists and Wildlife Biologists, Forensic Science Technicians, and Biological Technicians.

Figure 5: Selected STEM occupations, employment and mean annual wage



Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2023 (published April 2024).

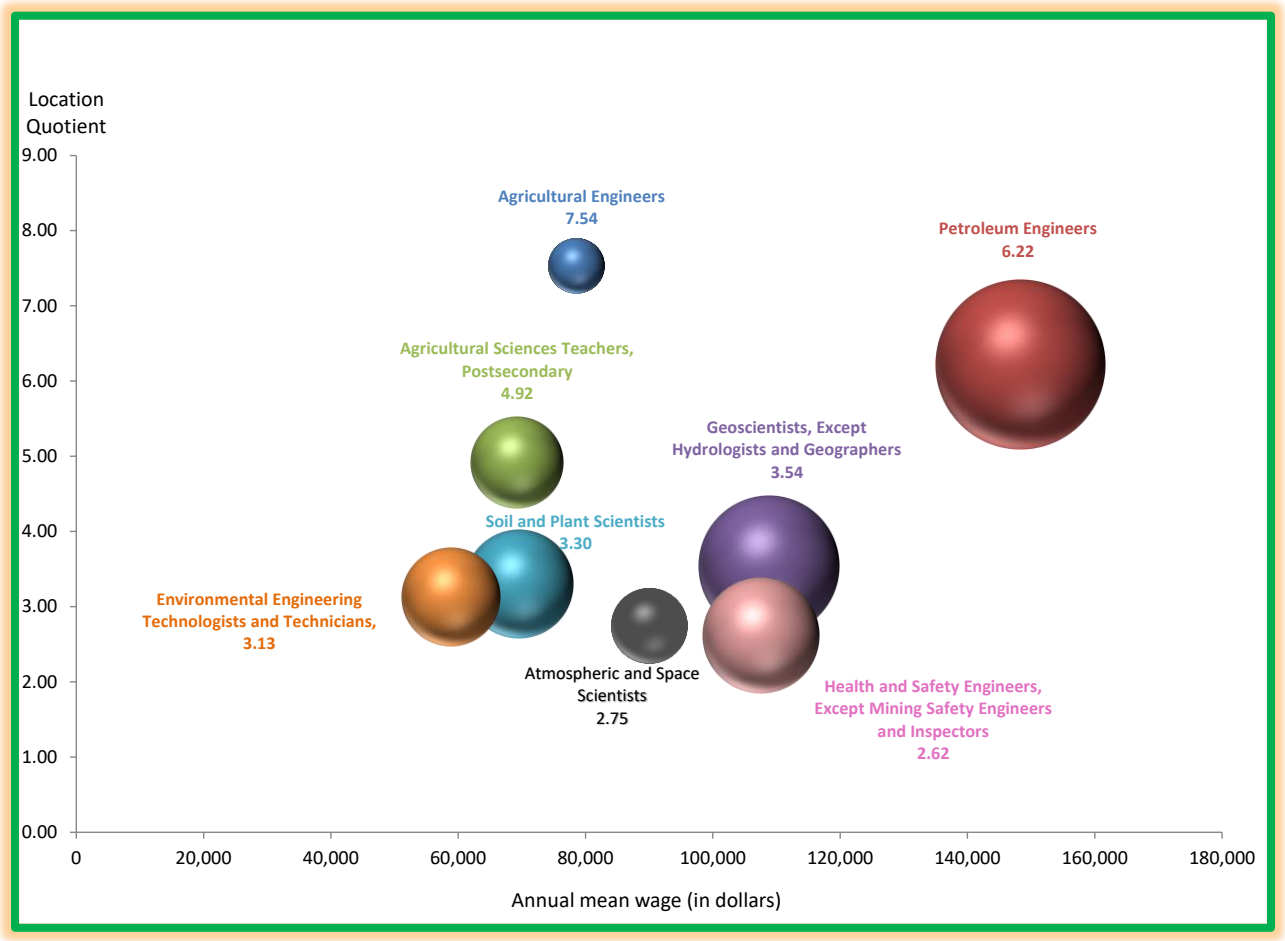
- Figure 5 displays the eight STEM occupations with the largest employment and highest annual mean wage.

- Computer and Information Systems Managers and Architectural and Engineering Managers was included in the top eight for both the largest occupations and the highest mean annual wages.

- The top eight highest paid STEM occupations had a weighted average annual mean wage of $143,606 while the largest employment STEM occupations had an average annual mean wage of $105,779.

- The top eight largest STEM occupations had an average employment of 2,680, while the top 8 highest paid STEM occupations had an average employment of 916.

Figure 6: The highest location quotients for STEM occupations by employment level



Note: Bubble size represents employment level

Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2023 (published April 2024).

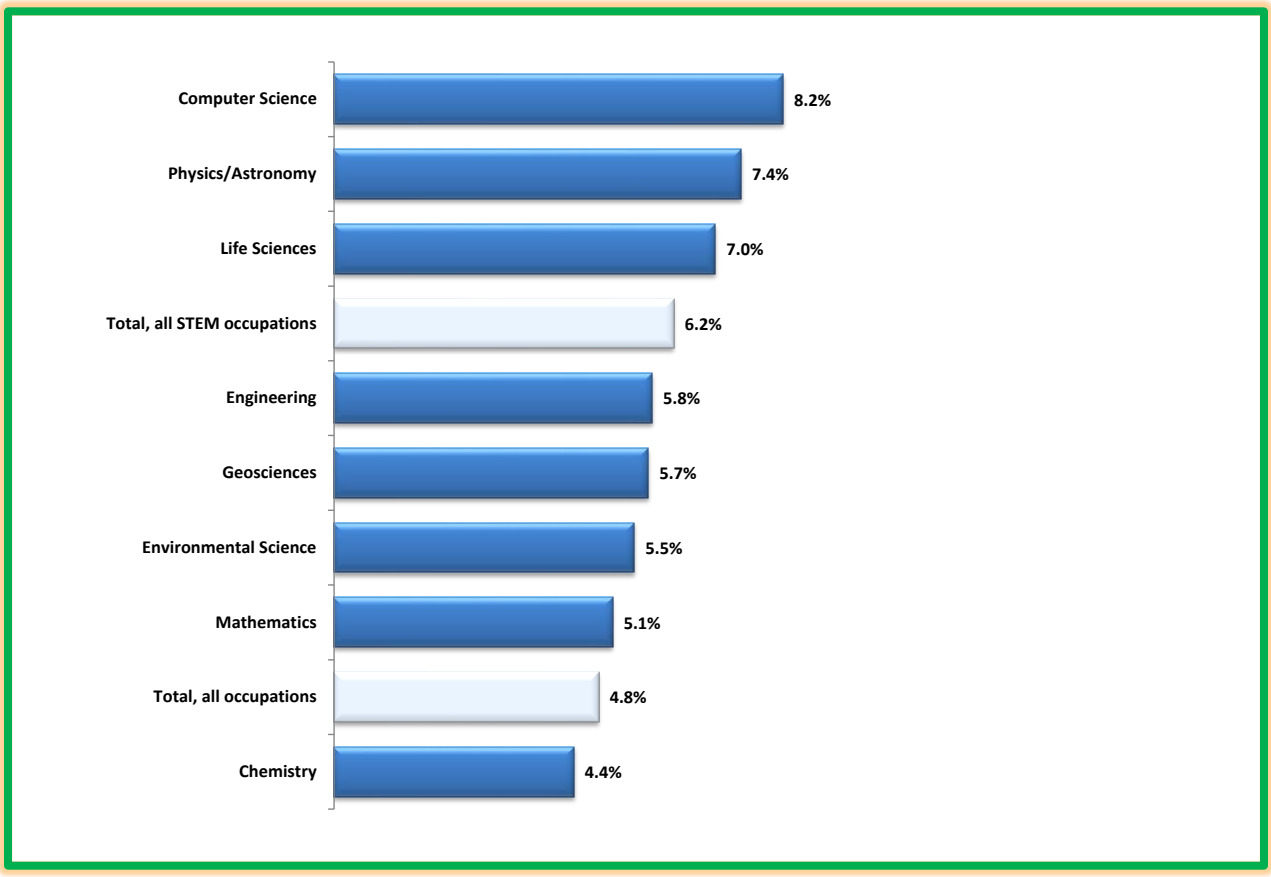
- The STEM occupations' location quotients are calculated as a ratio comparing the STEM occupation employment concentration in Oklahoma to the U.S. (see Endnote 2, page 12-13).

- A location quotient less than 1.0 suggests that the STEM occupational employment is less concentrated in Oklahoma compared to the U.S., while location quotients larger than 1.0

suggests that STEM occupational employment is more concentrated in Oklahoma compared to the U.S.

- Figure 6 displays the highest eight STEM occupations location quotients in Oklahoma. Most of the occupations with the highest location quotients are technicians, scientists, or engineers.

Figure 7: Projected job growth by STEM occupational groups, 2022-32



Note: Each STEM occupational group only includes STEM occupations.

Source: Employment Projections Program, Oklahoma Employment Security Commission, Economic Research & Analysis Division, July 2024.

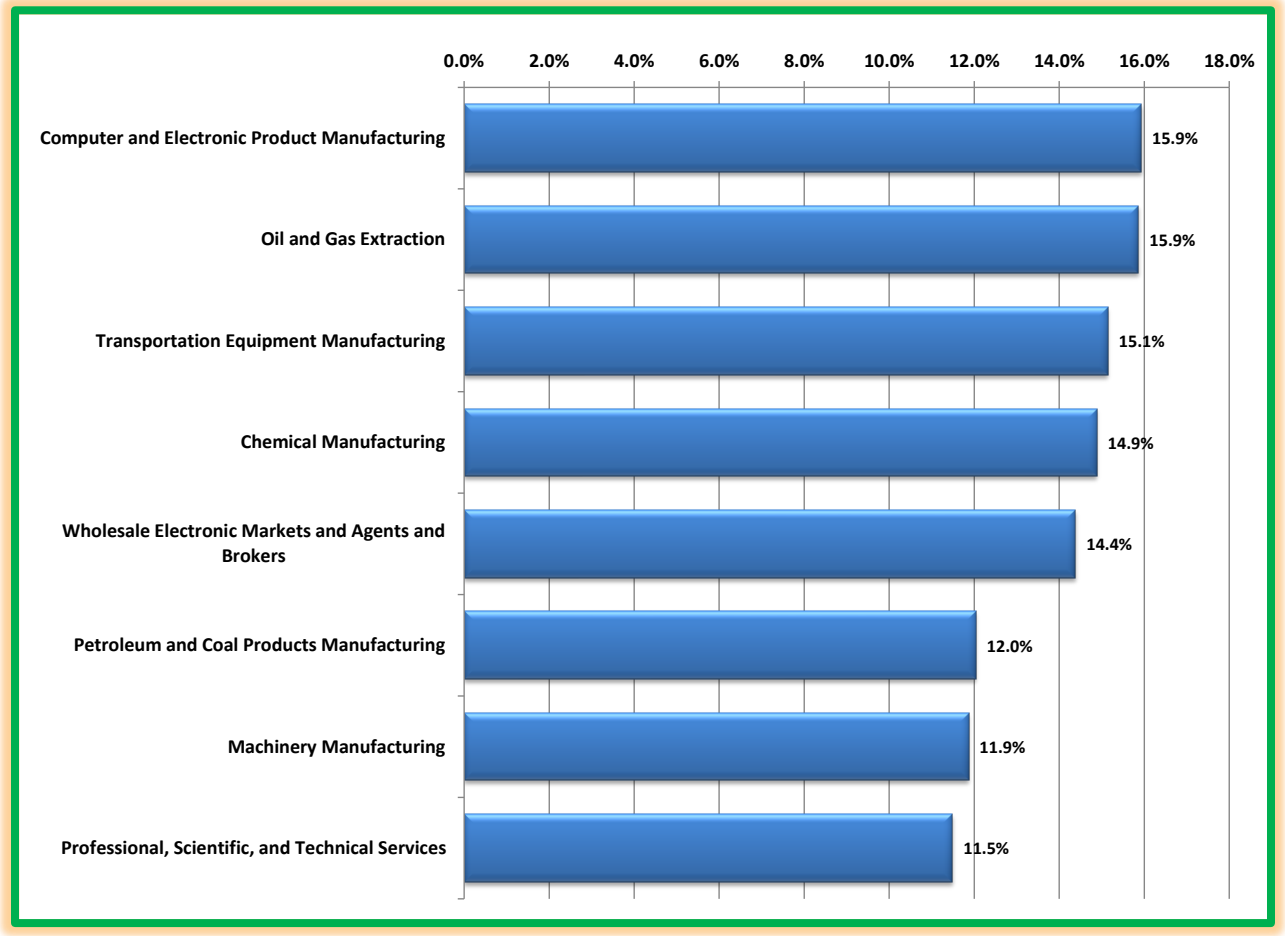
- Figure 7 displays the projected job growth by major STEM occupational groups from 2022 to 2032. Total Occupations at 4.8 percent are projected to grow slower than the STEM Occupations at 6.2 percent.

- Computer Science is predicted to be the fastest growing occupational group with an 8.2 percent growth rate from 2022 to 2032, while the slowest group is Chemistry with a projected 4.4 percent growth rate.

- Physics/Astronomy is the second-highest growing occupational group with a projected 7.4 percent growth rate between 2022 and 2032.

- Life Sciences, Engineering, and Geosciences round out the top five for projected growth between 2022 and 2032.

Figure 8: Industries with the highest employment share of STEM occupations, 2022



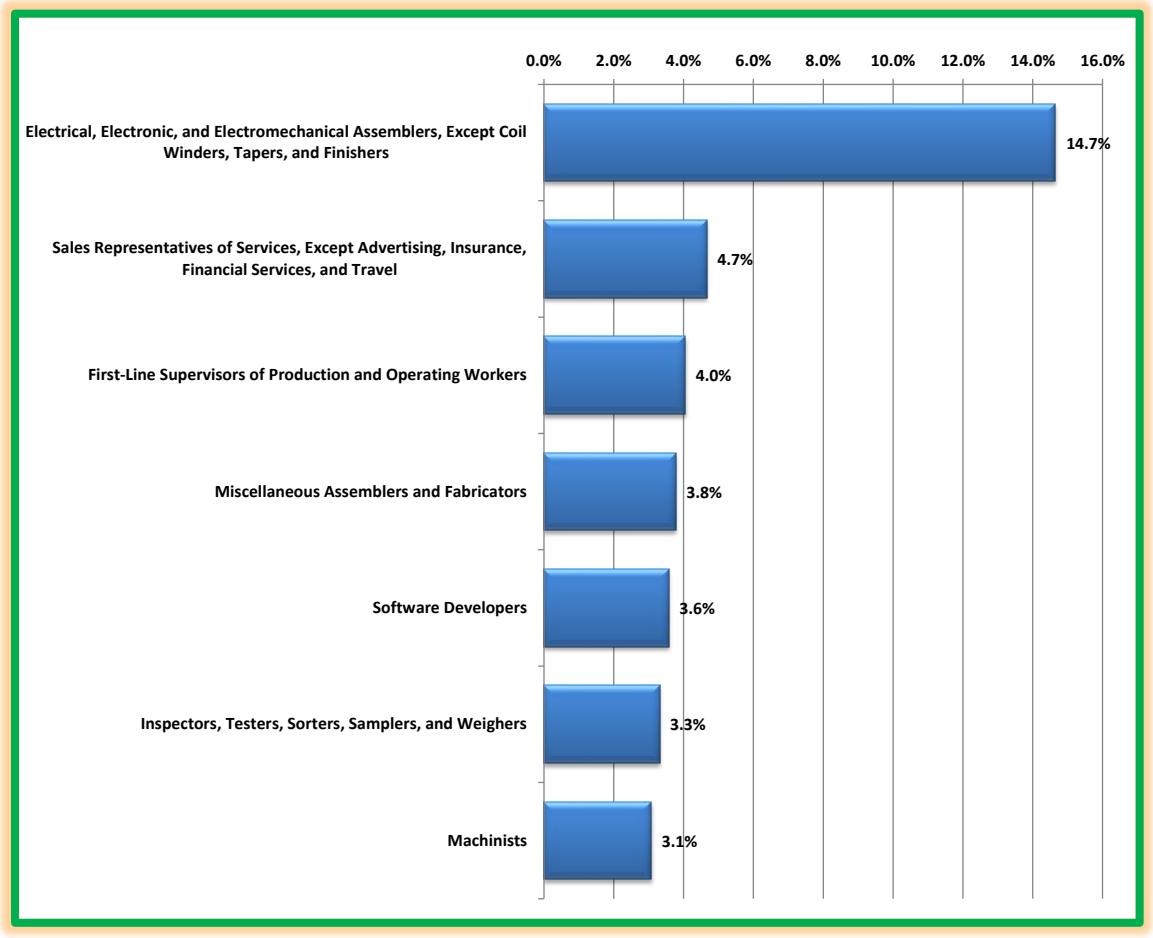
Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2024.

- Figure 8 displays the top eight industries with the highest employment share of STEM occupations for Oklahoma with the employment share of STEM occupations for all industries being 2.9 percent in 2022 (see Endnote 3, page 13).

- Computer and Electronic Product Manufacturing topped the chart with 15.9 percent of the industry's employment being a STEM job.

- Among the other top five industries with the highest employment share include: Oil and Gas Extraction, Transportation Equipment Manufacturing, Chemical Manufacturing, and Wholesale Electronic Markets and Agents and Brokers.

Figure 9: The largest occupations in the Computer and Electronic Product Manufacturing services subsector



Note: Lighter bars indicate STEM occupations. There were no STEM occupations within the top 7 for Computer and Electronic Products.

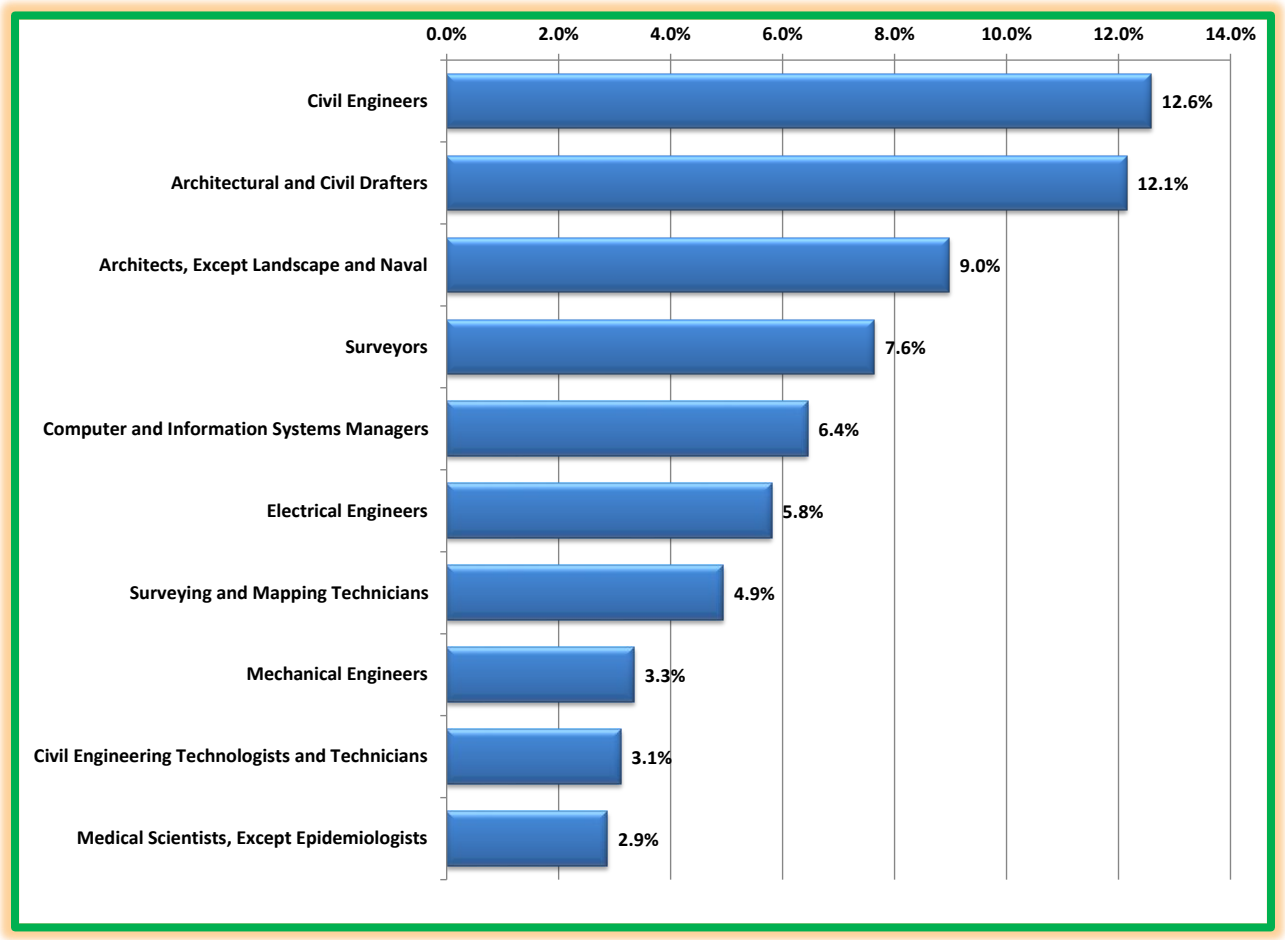
Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2024.

- Figure 9 shows the top seven occupations in the Computer and Electronic Product Manufacturing.

- Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers was the top largest occupations in the Computer and Electronic Product Manufacturing subsector with 14.7 percent of the occupations in 2022.

- The second largest occupations within the Computer and Electronic Product Manufacturing were Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel with 4.7 percent of the occupations.

Figure 10: The largest STEM occupations in the Professional, Scientific, and Technical Services



Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2024.

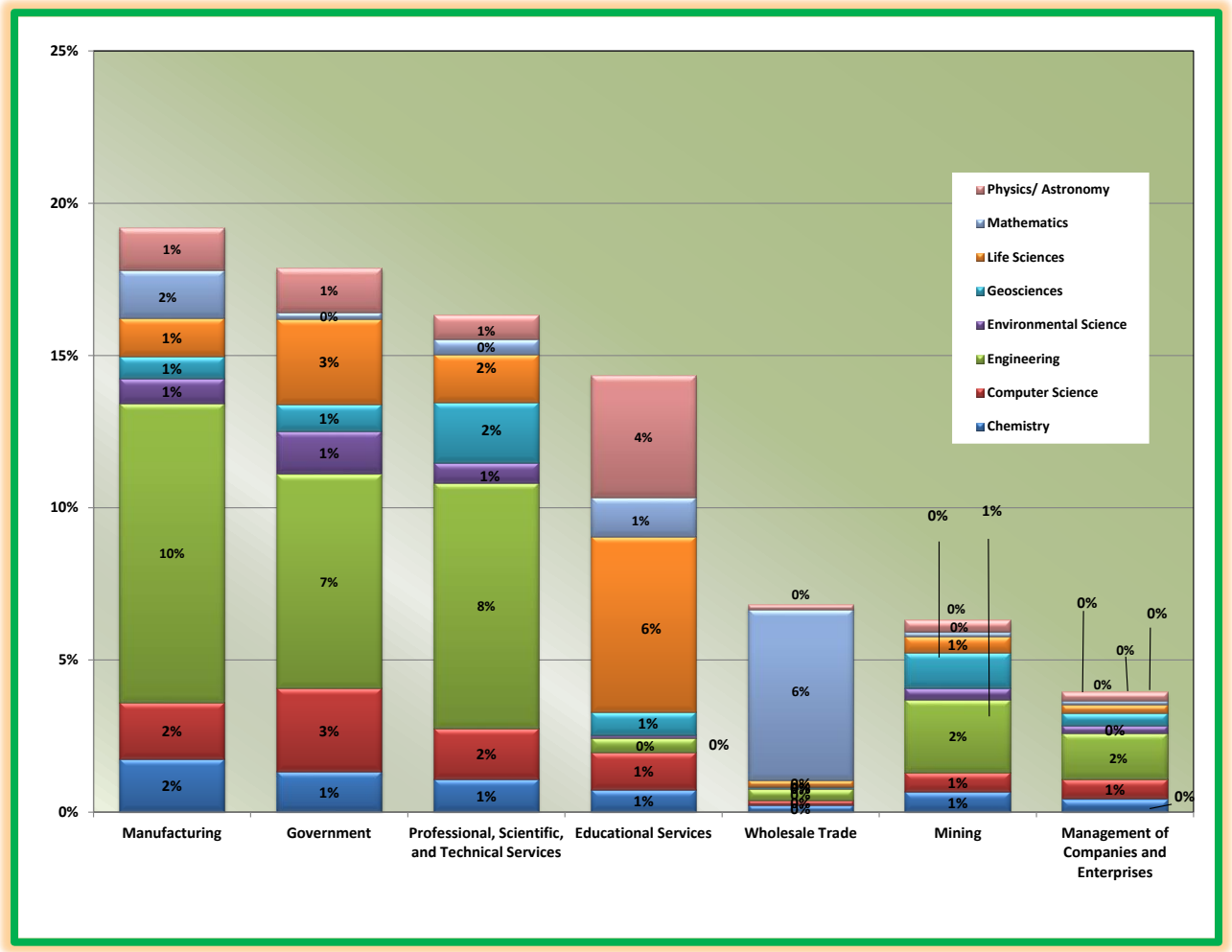
- Professional, Scientific, and Technical Services had the largest STEM employment with 0.5 percent of the total industry.

- In Figure 10 above, the top 10 largest STEM occupations are shown for the Professional, Scientific, and Technical Services subsector.

- Within the Professional, Scientific, and Technical Services subsector, Civil Engineers had the largest STEM employment share with 12.6 percent in 2022.

- Architectural and Civil Drafters, Architects, Except Landscape and Naval, Surveyors, and Computer and Information Systems Managers rounded out the other top five occupations.

Figure 11: Sectors with the largest employment of science, technology, engineering, and mathematics (STEM) occupations



Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2024.

- Figure 11 displays the largest STEM occupational employment within the industry sectors in Oklahoma.

- Manufacturing had the most STEM jobs, about 19 percent of total STEM employment.

- For the Manufacturing industry, the largest shares included Engineering and Computer Science occupations.

- Government was the second-highest industry sector with nearly 18 percent STEM employment.

- The highest share for Government was Engineering and Computer Science.

Summary

- The Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products occupations had the highest employment with about 5,760 jobs.

- The Oklahoma's STEM jobs' average annual wage was $92,985; however, Oklahoma's average annual wages for all occupations was $53,450.

- Architectural and Engineering Managers was the highest paying STEM occupation with an annual mean wage of $159,250 in 2023.

- Engineering topped the chart with 35.8 percent of the industry's employment being a STEM job.

- The largest industry sector for the most STEM employment in Oklahoma in 2022 was the Manufacturing sector with 24 percent of STEM jobs.

- The largest shares of STEM occupations in Oklahoma within for the Manufacturing industry, the largest shares included Engineering and Computer Science occupations in 2022.

Endnotes

1) The Occupational Employment and Wage Statistics (OEWS) program estimates employment and wages for over 800 occupations based on semi-annual mail surveys. The survey is a cooperative program between the Bureau of Labor Statistics (BLS) and State Workforce agencies (for Oklahoma, it is the Oklahoma Employment Security Commission), covering all full-time and part-time wage and salary workers in nonfarm industries.

2) Location quotient shows the occupations share of an area's employment relative to the national average. In the analysis, we compare the employment in Oklahoma to the U.S. average for each occupation. If an occupation in Oklahoma has a higher employment share

than expected, compared to this occupational employment share at the U.S. average, there is evidence suggesting this occupational employment is more concentrated in Oklahoma relative to the national average, or the occupation has a comparatively competitive skills advantage in Oklahoma.

Take mechanical drafters for example, we compute the location quotient for mechanical drafters in Oklahoma by comparing it to national figures, based on the following statistics:

Table 1: Total and occupation employment, Oklahoma and the U.S., 2009

	Employment in mechanical drafters	Total Employment
Oklahoma	1,170	1,525,330
U.S.	71,890	130,647,610

Table 2: Computation of the location quotient for Oklahoma for mechanical drafters

LQ part 1 = region occupation/ region total = 1,170/ 1,525,330 = 0.00076705
LQ part 2 = State occupation / state total = 71,890 / 130,647,610 = 0.00055026
LQ part 3 = region ratio / state ratio = 0.00076705 / 0.00055026 = 1.394

Therefore, the location quotient in Oklahoma for mechanical drafters is 1.394, which is greater than 1.0 (the employment share for mechanical drafters in Oklahoma is greater than the U.S. average) suggesting that the employment of mechanical drafters was more concentrated in Oklahoma, compared with the U.S. average in 2009.

3) Sector, subsector and industry group: The North American Industry Classification System (NAICS) is a two- through six-digit hierarchical classification system, offering five levels of detail. Each digit in the code is part of a series of progressively narrower categories, and the more digits in the code signify greater classification detail.

Sector: Two-digit codes designate *economic sectors*, the highest level of aggregation.

Subsector: Three-digit codes designate *subsectors*, a more detailed level of aggregation.

Note: The STEM disciplines now include O'Net occupations, which is used throughout the paper. Occupations are divided into eight different disciplines. We have excluded the STEM occupations that require no formal educational credential. For more information on O'Net STEM occupations, see http://www.onetonline.org/find/stem/?t=0.