



STEM: Occupations and Employment

Oklahoma Employment Security Commission
Economic Research and Analysis Division

STEM Occupations and Employment: A Brief Review for Oklahoma

a publication from

Oklahoma Employment Security Commission

Economic Research and Analysis Division

P.O. Box 52003

Oklahoma City, OK 73152-2003

Trae Rahill, Chief Executive Officer

Lynn Gray, Director of Economic Research and Analysis

Updated by

Kristie Brown, Statistical Research Specialist

This publication is issued and is part of the activities of the Oklahoma Employment Security Commission as authorized by the Oklahoma Employment Security Act. An electronic copy has been deposited with the Publishing Clearinghouse of the Oklahoma Department of Libraries.

January 2023

Equal Opportunity Employer/Program

Auxiliary aids and services are available upon request to individuals with disabilities.

STEM Occupations and Employment: A Brief Review for Oklahoma

“Creativity is the secret sauce to science, technology, engineering and math (STEM). It is a STEM virtue.” ~Ainissa G. Ramirez, PhD, former engineering professor at Yale University.

Having an ample supply of science, technology, engineering and mathematics (STEM) occupations has become one of the most important pre-conditions necessary to secure inspired and groundbreaking innovations. The STEM occupations are an important and essential part of any growing economy. The educational requirement for entry to employment can range from a high school diploma to a doctoral degree. Some educational additional requirements consist of on-the-job training. Since the demand for STEM occupations has increased, many are now relatively high paying occupations.

Figure 1: 2022-2023 STEM Programs

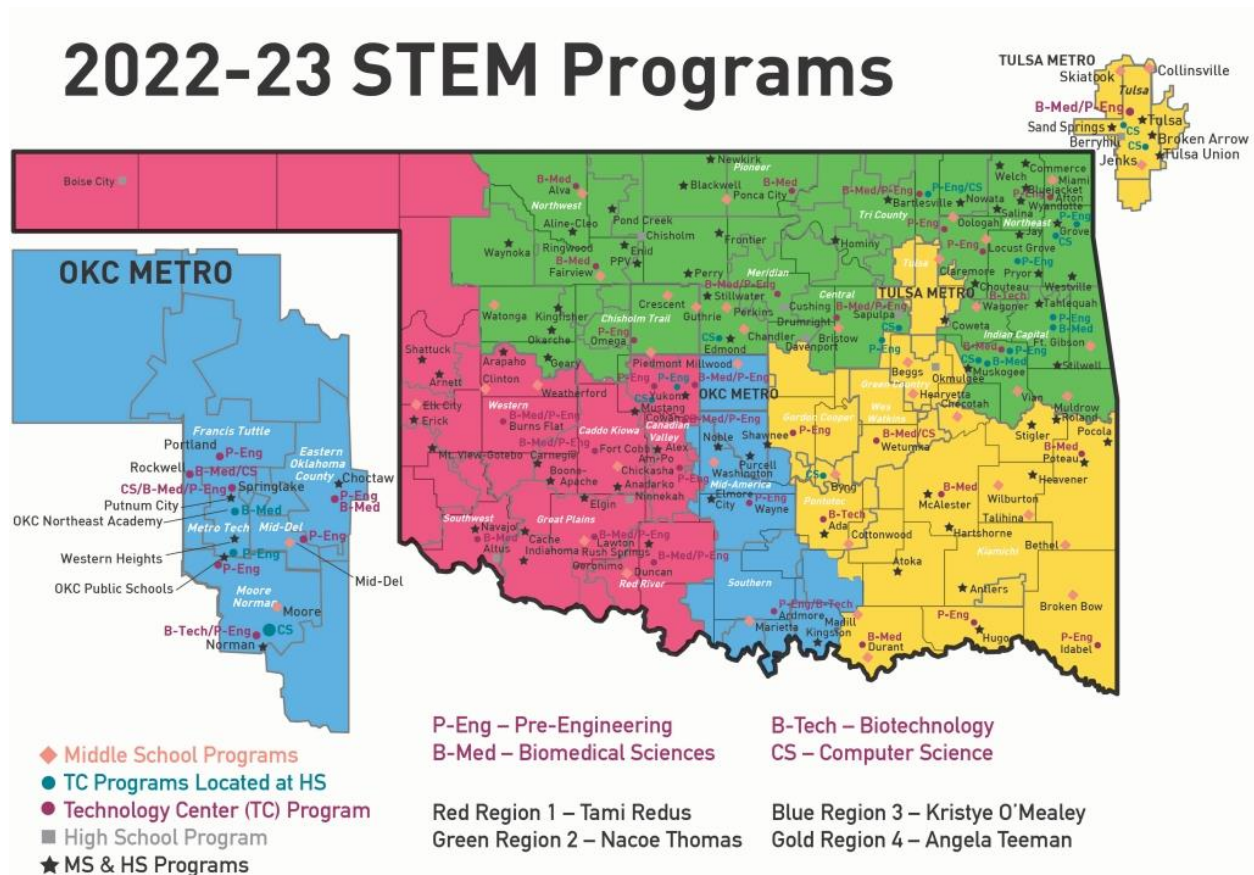


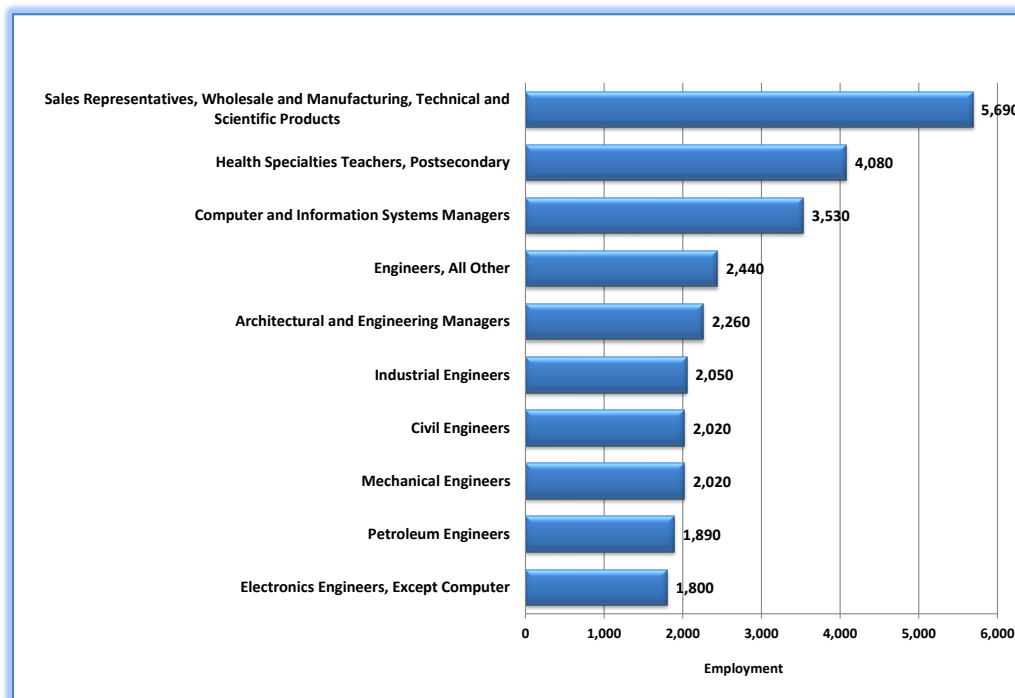
Figure 1 represents the map of Oklahoma STEM programs. The map is broken into four different regions, including a red, green, blue and gold region.

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

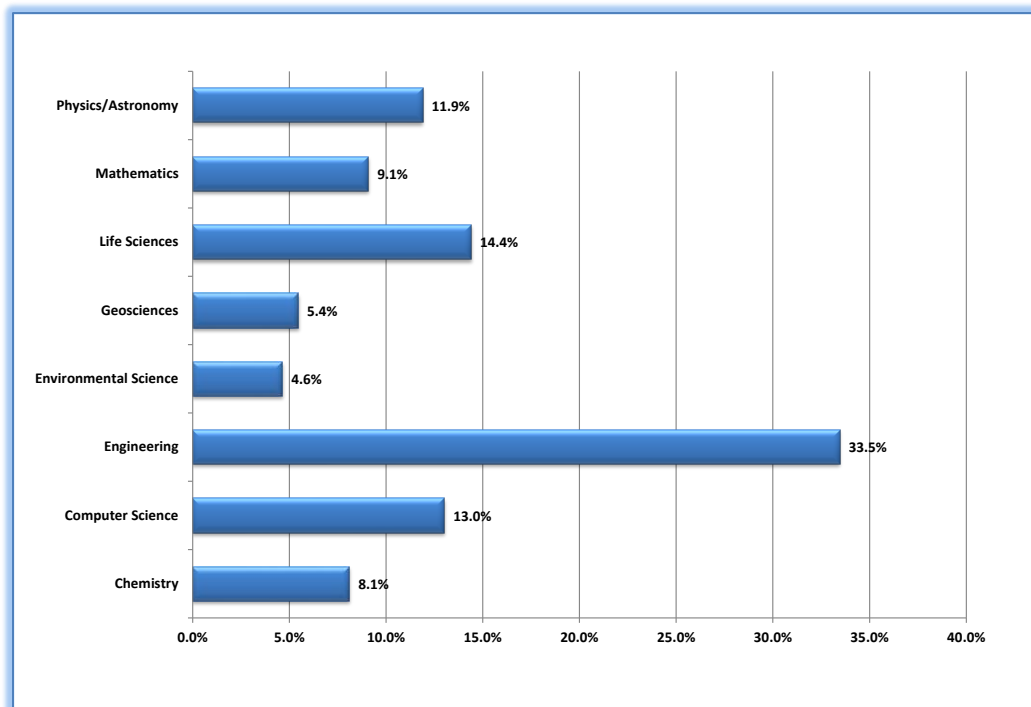


Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2020 (published April 2021).

- 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 5,690 jobs.

- The other top five occupations include Health Specialties Teachers, Postsecondary, Computer and Information Systems Managers, Engineers, All Other, and Architectural and Engineering Managers.
- There is a 3,890 job difference between the largest occupation (Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products) and the smallest occupation (Electronics Engineers, Except Computer).

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 2020 (published April 2021).

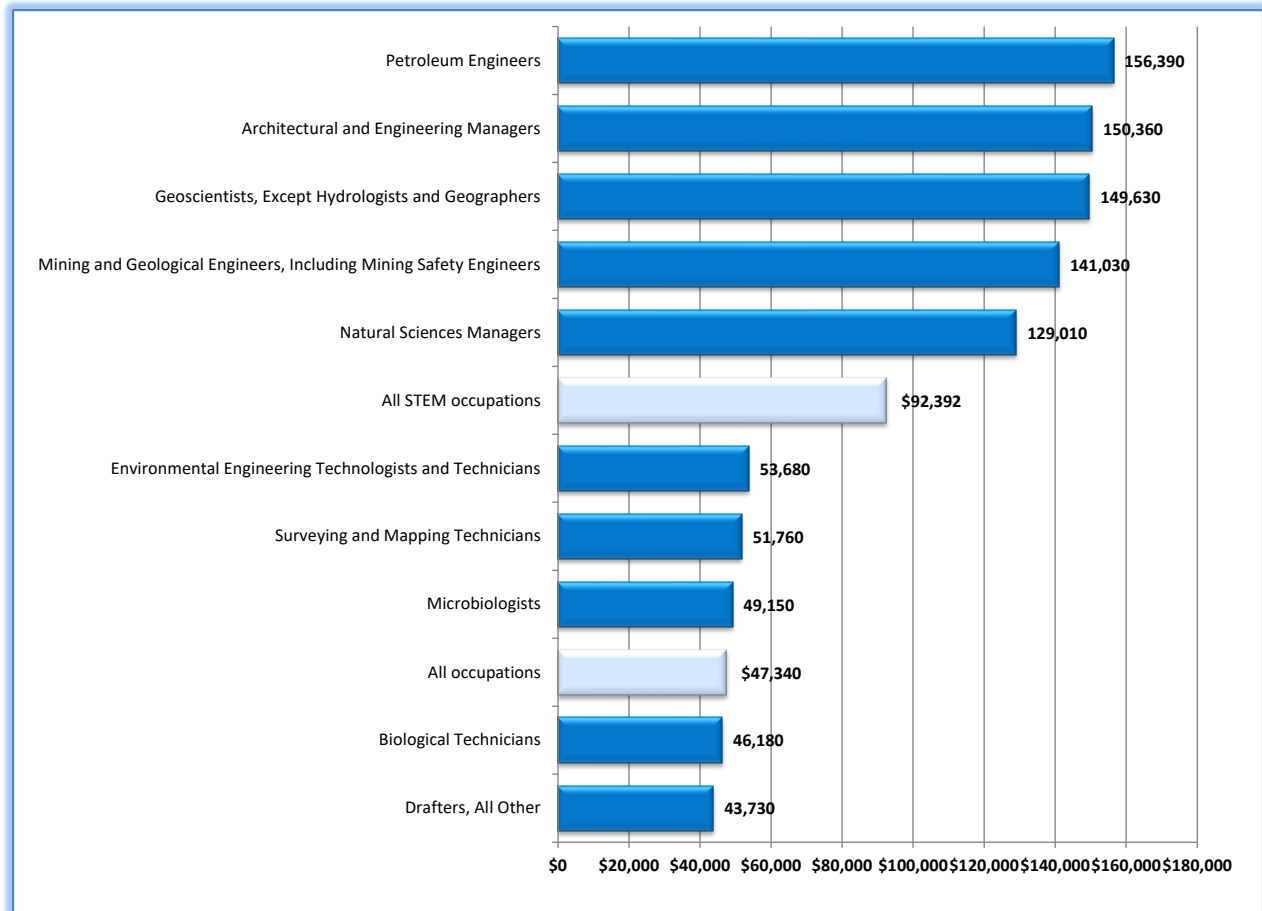
Note: The sum of disciplines shares are more than 100% due to the occupations being in multiple disciplines.

Oklahoma had a total of approximately 84,620 STEM jobs in 2020, accounting for nearly 5.4 percent of state total employment.

- The largest share of STEM occupations was Engineering with 28,310 jobs, and 33.5 percent of the total STEM employment.
- Life Sciences had the second-largest STEM occupation share with 14.4 percent of the STEM occupations and 12,170 jobs.
- Computer Science was the third-largest STEM occupation share with 11.9 percent and 11,010 jobs.

- Other STEM employment shares include: Physics/Astronomy with 10,060, Mathematics with 7,680, Chemistry with 6,860, Geoscience with 4,600 jobs, and Environmental Science with 3,920.

Figure 4: Highest- and lowest-paying STEM occupations

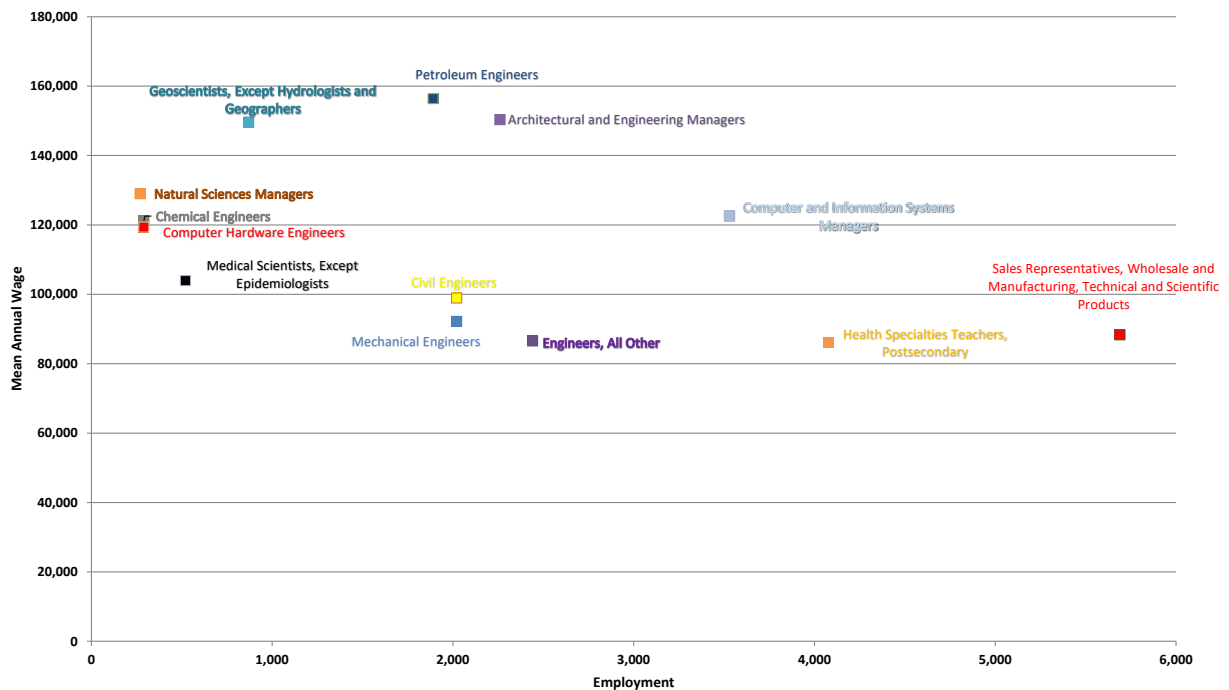


Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2020 (published April 2021).

- The STEM jobs' average annual wage was \$92,392; however, Oklahoma's average annual wages for all occupations was \$47,340.
- Petroleum Engineers were the highest paying STEM occupation with an annual mean of \$156,390.
- Drafters, All Other was the lowest STEM occupation with an annual mean of \$43,730.
- Other highest annual mean wages for STEM occupations include: Architectural and Engineering Managers, Geoscientists, Except Hydrologists and Geographers, Mining and Geological Engineers, Including Mining Safety Engineers and Natural Sciences Mangers.

- Other lowest annual mean wages for STEM occupations include: Biological Technicians, Microbiologists, Surveying and Mapping Technicians and Environmental Engineering Technologists and Technicians.

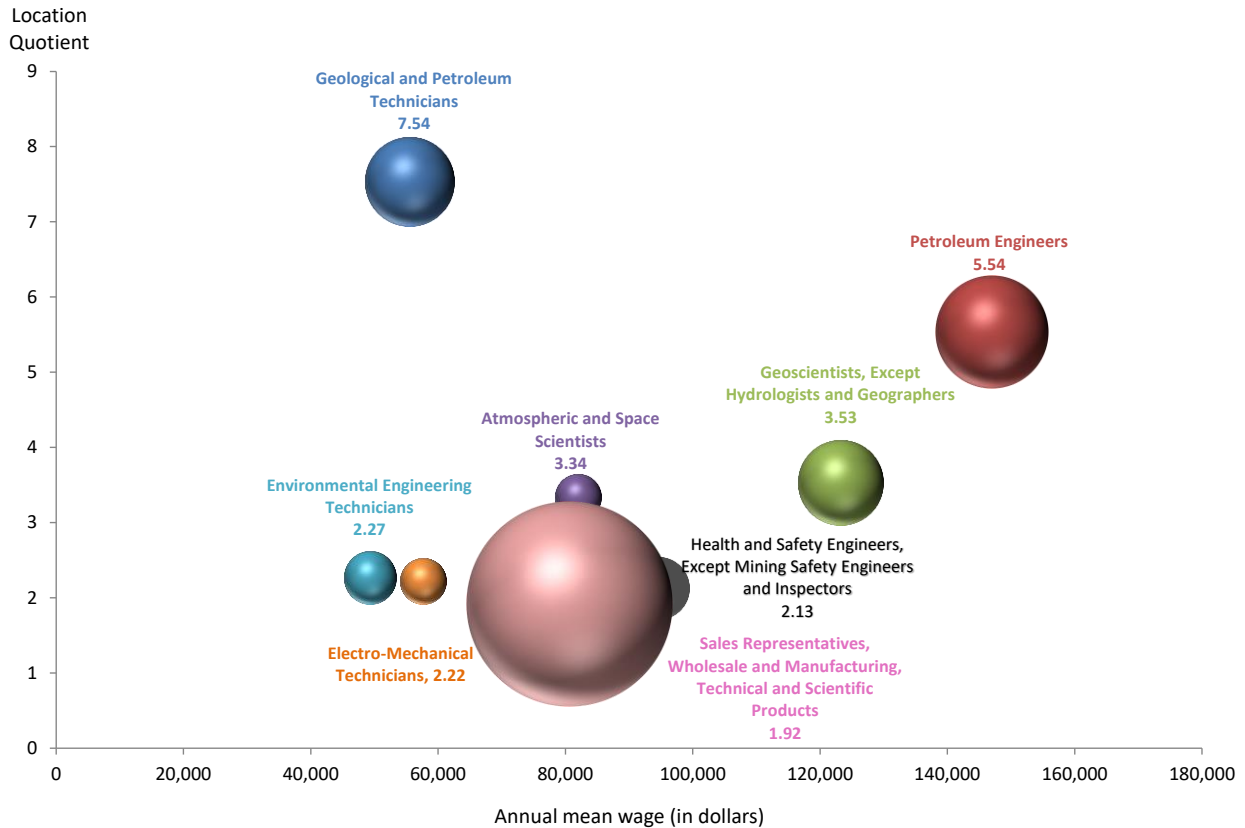
Figure 5: Selected STEM occupations, employment and mean annual wage



Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2020 (published April 2021).

- 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 \$138,613, while the largest employment STEM occupations had an average annual mean wage of \$99,973.
- The top eight largest STEM occupations had an average employment of 3,011, while the top 8 highest paid STEM occupations had an average employment of 1,240.

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

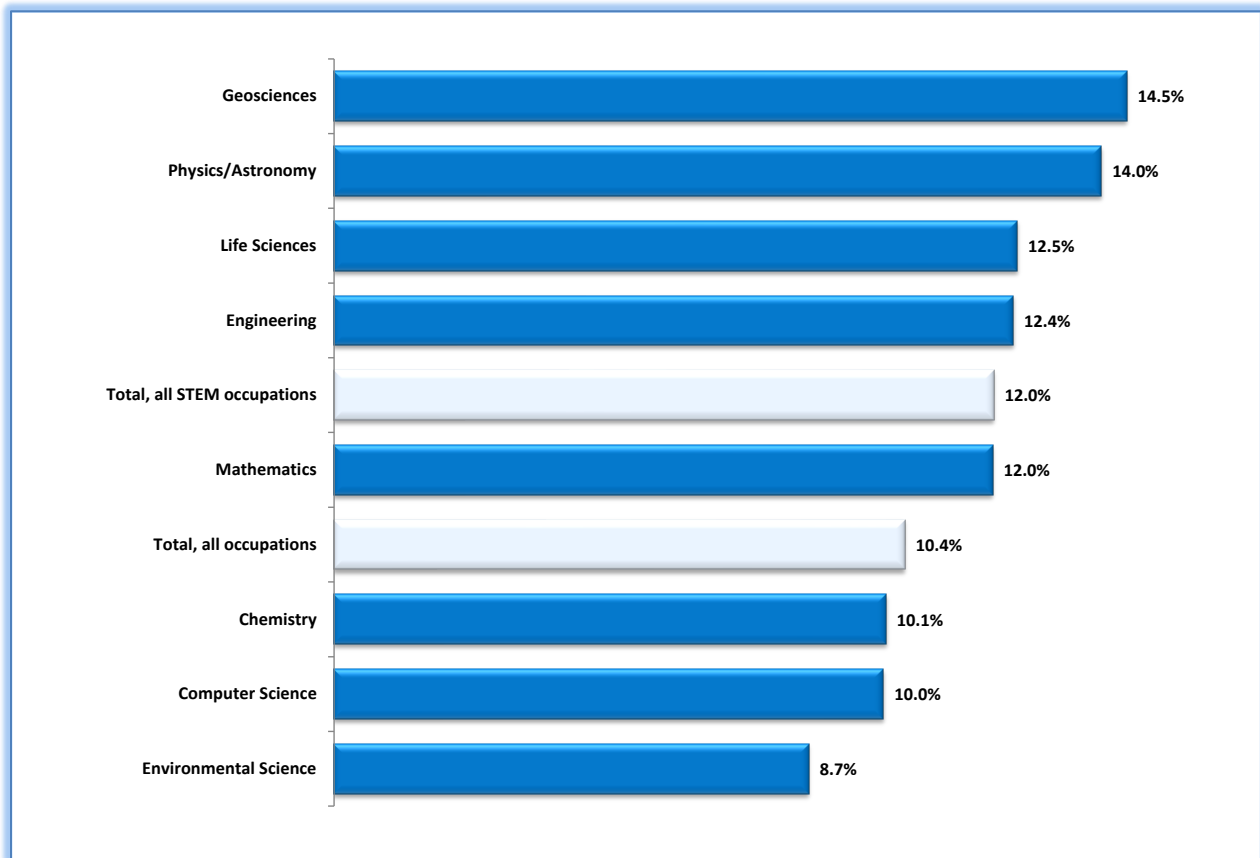


Note: Bubble size represents employment level

Source: Occupational Employment and Wage Statistics (OEWS), U.S. Bureau of Labor Statistics and Oklahoma Employment Security Commission, May 2020 (published April 2021).

- 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, 2020-30

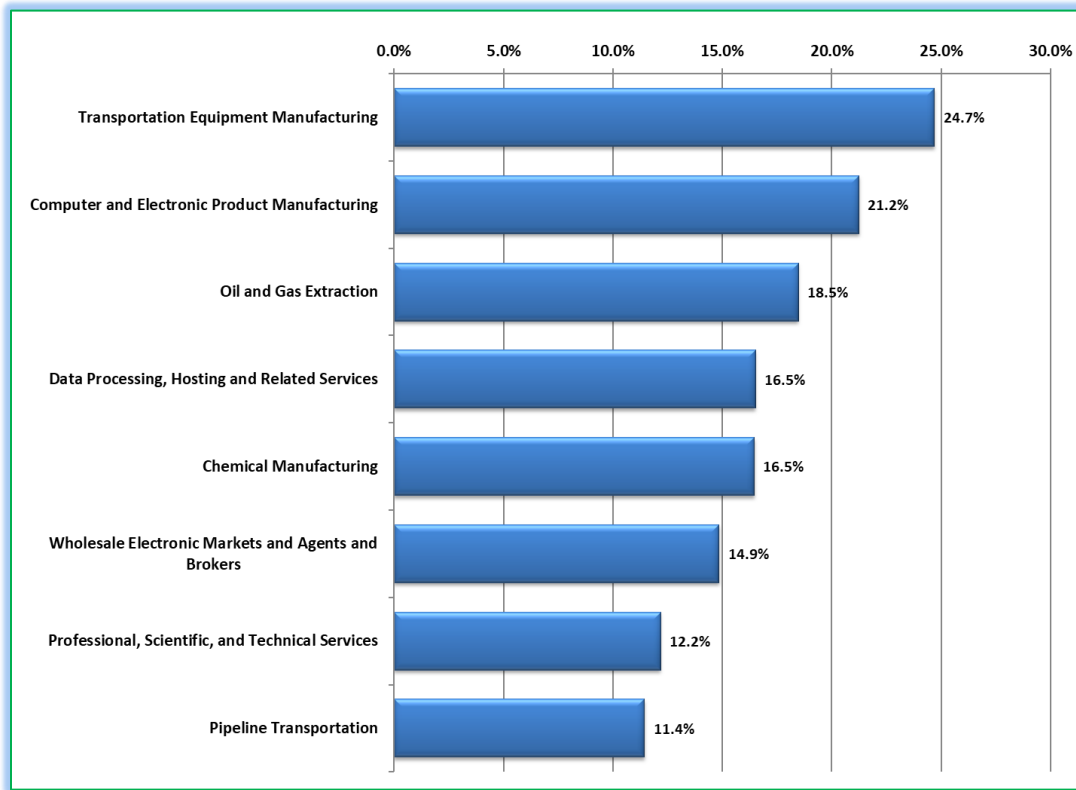


Note: Each STEM occupational group only includes STEM occupations.

Source: Employment Projections Program, Oklahoma Employment Security Commission, Economic Research & Analysis Division, July 2022.

- Figure 7 displays the projected job growth by major STEM occupational groups from 2020 to 2030. Total Occupations at 10.4 percent are projected to grow slower than the STEM Occupations at 12.0 percent.
- Geosciences is predicted to be the fastest growing occupational group with a 14.5 percent growth rate from 2020 to 2030, while the slowest group is Environmental Science with a projected 8.7 percent growth rate.
- Physics/Astronomy is the second-highest growing occupational group with a projected 14.0 percent growth rate between 2020 and 2030.
- Life Sciences, Engineering, and Mathematics round out the top five for projected growth between 2020 and 2030.

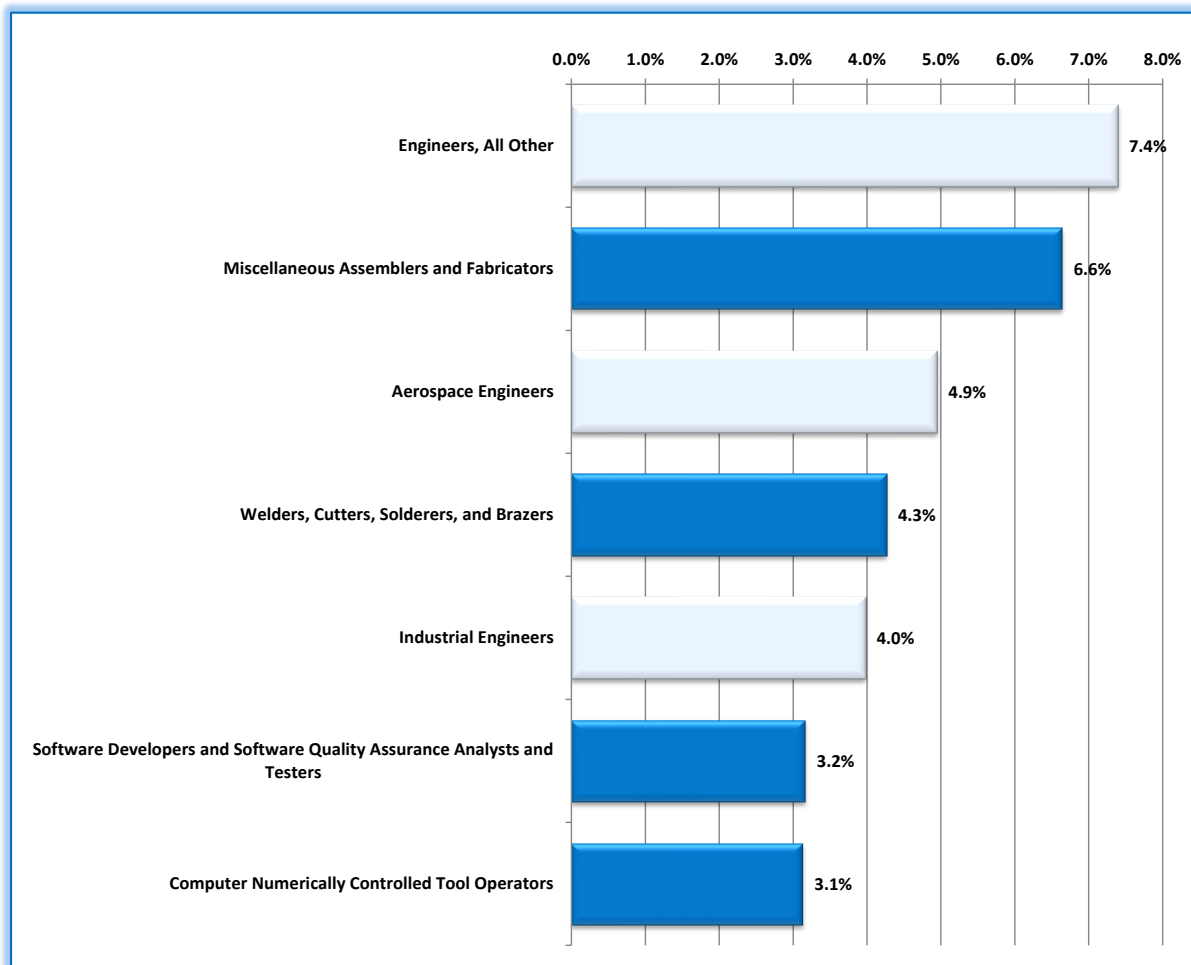
Figure 8: Industries with the highest employment share of STEM occupations, 2020



Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2022.

- 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 3.2 percent in 2020 (see Endnote 3, page 13).
- Transportation Equipment Manufacturing topped the chart with 24.7 percent of the industry's employment being a STEM job.
- Among the other top five industries with the highest employment share include: Computer and Electronic Product Manufacturing, Oil and Gas Extraction, Data Processing, Hosting and Related Services and Chemical Manufacturing.

Figure 9: The largest occupations in the Transportation Equipment Manufacturing services subsector

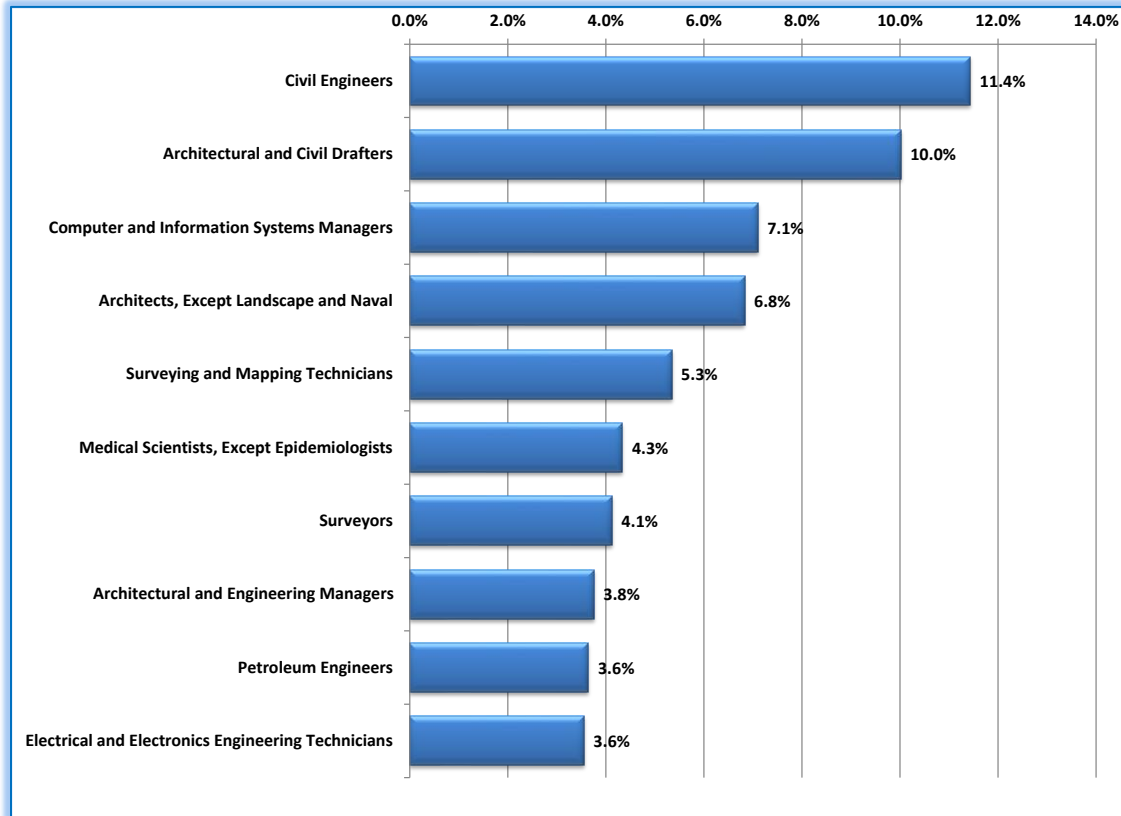


Note: Lighter bars indicate STEM occupations

Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2022.

- Figure 9 shows the top five occupations in the Transportation Equipment Manufacturing.
- Engineering, All was the top largest occupations in the Transportation Equipment Manufacturing subsector with 7.4 percent of the occupations in 2020.
- The second largest occupations within the Transportation Equipment Manufacturing were Miscellaneous Assemblers and Fabricators with 6.6 percent of the occupations.

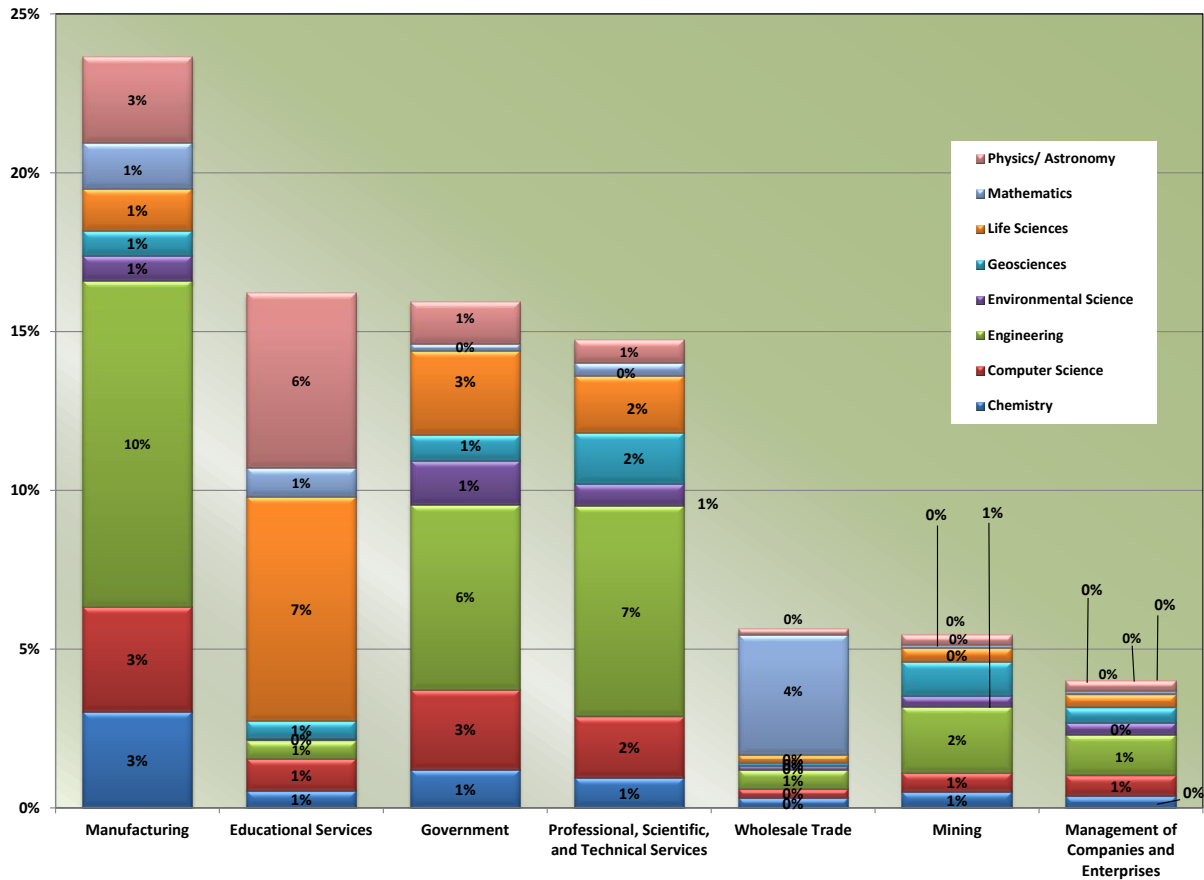
Figure 10: The largest STEM occupations in the Professional, Scientific, and Technical Services



Source: Employment Projections Program, Oklahoma Employment Security Commission, Research & Analysis Division, July 2022.

- 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 11.4 percent in 2020.
- Out of the 10 occupations, three of the occupations had around 4.0 percent of the STEM occupational share include: Architectural and Engineering Managers, Petroleum Engineers and Electrical and Electronics Engineering Technicians.

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 2022.

- Figure 11 displays the largest STEM occupational employment within the industry sectors in Oklahoma.
- Manufacturing had the most STEM jobs, about 24 percent of total STEM employment.
- For the Manufacturing industry, the largest shares included Engineering and Computer Science occupations.
- Education Services and Government was the second-highest industry sector with nearly 16 percent STEM employment.

- The highest share for Educational Services was Life Sciences, while the highest share for Government was Engineering.

Summary

- The Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products sector had the highest employment with about 5,690 jobs.
- The Oklahoma's STEM jobs' average annual wage was \$92,392; however, Oklahoma's average annual wages for all occupations was \$47,340.
- Petroleum Engineers were the highest paying STEM occupation with an annual mean of \$156,390 in 2020.
- Engineering topped the chart with 55.4 percent of the industry's employment being a STEM job.
- The largest industry sector for the most STEM employment in Oklahoma in 2020 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 2020.

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>.

This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. This product was created by the recipient and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it. Internal use by an organization and/or personal use by an individual for non-commercial purposes is permissible. All other uses require the prior authorization of the copyright owner.