



# Exploring the High-Tech Industry

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## High Tech Industries in the U.S. Economy

The high technology sector is being targeted by economic developers and local leaders for growth and workforce planning. But with no official industrial definition in the North American Industrial Classification System, developing a standardized, research-based approach definition for high-tech is an important tool for analysts and decision makers across the country. Often high-tech definitions are restricted to occupational analyses. An industrial classification definition lends itself to commonly used economic development and job creation metrics such as economic multipliers and associated analytical tools. While such a definition is not an official NAICS classification, it provides a way to compare high-tech to the official sectors in terms of the relative importance of this growing sector and its influence on the rest of the economy.



The most influential research and analysis on developing a high technology industrial taxonomy was published in the July 2005 *Monthly Labor Review* by Daniel Hecker of the U.S. Bureau of Labor Statistics, titled “High-technology employment: a NAICS-based update.”

Hecker’s approach to calculating concentrations of high-tech occupations among four-digit NAICS industry sectors was adopted to an extent. But rather than using the National Science Foundation’s occupational scheme, this effort endorsed the Science, Technology, Engineering and Math (STEM) official occupations. The effort focused on the first subdomain of the Standard Occupation Classification Policy Committee STEM occupation list – life and physical science, engineering, mathematics and information technology – and the fourth subdomain of health occupations. These two subdomains are the strongest, most comprehensive list available that best represent high-tech occupations. This list of occupations was the basis of the concentration of occupations within the NAICS categories.

After reviewing the national average concentrations of STEM jobs across all industry sectors, a concentration level of 2.5 times the national average was identified as producing a robust list of industries without being overly cumbersome. Two industry categories were removed based on further research. The *9991-Federal Executive Branch* was removed as the designation is primarily used as an Occupational Employment Statistics designation, and further state research on the *5511-Management of Companies and Enterprises* industry suggests this industry would not be collectively reflective of the high-tech sector across all 50 states. A total of 46 four digit industries comprise the final list (see graphic on next page).





# STEM-Driven High-Tech Industry Taxonomy

## TWO-DIGIT SECTOR

**21** Mining, Quarrying and Oil and Gas Extraction

**22** Utilities

**31-33** Manufacturing

**42** Wholesale Trade

**48-49** Transportation and Warehousing

**51** Information

**52** Finance and Insurance

**54** Professional, Scientific and Technical Services

2111 Oil and Gas Extraction

2211 Electric Power Generation Transmission and Distribution

3241 Petroleum and Coal Products Manufacturing

3251 Basic Chemical Manufacturing

3252 Resin, Synthetic Rubber and Artificial Synthetic Fibers and Filaments Manufacturing

3254 Pharmaceutical and Medicine Manufacturing

3332 Industrial Machinery Manufacturing

3333 Commercial and Service Industry Machinery Manufacturing

3336 Engine, Turbine and Power Transmission Equipment Manufacturing

3341 Computer and Peripheral Equipment Manufacturing

3342 Communications Equipment Manufacturing

3343 Audio and Video Equipment Manufacturing

3344 Semiconductor and Other Electronic Component Manufacturing

3345 Navigational, Measuring, Electromedical and Control Instruments Manufacturing

3346 Manufacturing and Reproducing Magnetic and Optical Media

3353 Electrical Equipment Manufacturing

3364 Aerospace Product and Parts Manufacturing

4234 Professional and Commercial Equipment and Supplies Merchant Wholesalers

4236 Household Appliances and Electrical and Electronic Goods Merchant Wholesalers

4242 Drugs and Druggists' Sundries Merchant Wholesalers

4861 Pipeline Transportation of Crude Oil

5112 Software Publishers

5171 Wired Telecommunications Carriers

5172 Wireless Telecommunications Carriers (except Satellite)

5174 Satellite Telecommunications

5179 Other Telecommunications

5182 Data Processing, Hosting, and Related Services

5191 Other Information Services

5211 Monetary Authorities-Central Bank

5413 Architectural, Engineering, and Related Services

5415 Computer Systems Design and Related Services

5416 Management, Scientific and Technical Consulting Services

5417 Scientific Research and Development Services

## HEALTHCARE COMPONENT

**44-45** Retail Trade

**54** Professional, Scientific and Technical Services

**62** Health Care and Social Assistance

4461 Health and Personal Care Stores

5419 Other Professional, Scientific, and Technical Services

6211 Offices of Physicians

6212 Offices of Dentists

6213 Offices of Other Health Practitioners

6214 Outpatient Care Centers

6215 Medical and Diagnostic Laboratories

6216 Home Health Care Services

6219 Other Ambulatory Health Care Services

6221 General Medical and Surgical Hospitals

6222 Psychiatric and Substance Abuse Hospitals

6223 Specialty (except Psychiatric and Substance Abuse) Hospitals

6231 Nursing Care Facilities (Skilled Nursing Facilities)

Further research will compare the new taxonomy to the taxonomy developed by Hecker, develop an instructional guide for analyzing high-tech taxonomies of smaller geographies which may have structural differences than the national averages and support a white paper comparing the high-tech industries of all 50 states. Other research projects are planned subject to available funding.

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# **The High-Tech Industrial and Occupational Cluster**

*National and State Comparisons*



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## EXECUTIVE SUMMARY

High technology generates over one fifth of all covered jobs nationally, but those paychecks account for more than 28 percent of earnings. As significant as this economic component already is, its impact will only increase. By 2022 high-tech occupations will increase more than 63 percent faster than all occupations. Only 10 of these 161 occupations have median annual wages below the national median for all occupations. Two categories were established. STEM Core focused on life and physical science, engineering, mathematics and information technology, and STEM Health Care focused on health occupations. The health occupations make up a slightly larger portion of the high-tech picture than the others. They also account for the largest portion of projected growth, both nominally and rate of growth, most likely because of the aging population's increasing demand on health care. But what occupations in life and physical science, engineering, math and information technology lack in employment and growth is certainly made up in wages. National average earnings per worker in these occupations were just under \$93,000 in 2012.

State rankings vary based on the statistic being compared, but well known high-tech states like California and Washington perform well in most comparisons.

## INTRODUCTION TO RESEARCH METHODOLOGY

Creating a unified high-tech taxonomy that allows comparisons at the national and state levels was the foremost goal of this research. Using the first and four sub domains of the Standard Occupation Classification Policy Committee's recommendation to the Office of Management and Budget for defining science, technology, engineer and mathematics, or STEM, occupations<sup>1</sup> – with a similar methodology to Daniel Hecker's approach to measure high-tech employment in 2005 – resulted in a revised high-tech industry taxonomy. This taxonomy lists all industries that have at least 2.5 times the average concentration in either STEM Core or STEM Health Care occupations.

While all the highlighted occupations and industries are high-tech by this definition, this research determined the data would be better analyzed separately in the STEM Core and STEM Health Care categories, which are based on the two chosen subdomains of occupations on the STEM occupation list. There were enough differences in earnings and employment to make this comparison valuable.

A further discussion on the methodology used in this paper including a comparison to Hecker's work is in Appendix 1.

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<sup>1</sup> [http://www.bls.gov/soc/Attachment\\_A\\_STEM.pdf](http://www.bls.gov/soc/Attachment_A_STEM.pdf)





## NATIONAL

Covered high-tech industry employment made up over 20 percent of all industry employment in 2012. In terms of the nation's total payroll though, high-tech industries pay out more than their share – totaling 28 percent of the country's earnings. This translates to an earning's per worker of \$68,429 – 39 percent higher than the national average of \$49,289.

When looking only at occupations though, high-tech employment is only 11.7 percent of the total. This underscores the number of support occupations within some of the high-tech industries.

Using the Bureau of Labor Statistics Employment Projections program as the data source for occupations data has the added benefit of being able to look at projected growth. High-tech employment in the U.S. is projected to increase 17.5 percent – 63 percent faster than all occupations, by 2022.

High-tech wages tend to be higher than the wages found elsewhere with only 10 of the 161 making less than the national median of \$34,750. With higher wages though come higher education requirements. Over 93 percent of all high-tech occupations require a post-secondary degree or certificate. The ratio for all occupations is a little over 32 percent.



## INDUSTRY

STEM Core industries make up a little over 8 percent of the U.S. total covered employment in 2012. In terms of total earnings however, STEM Core industries make up a much larger portion of the national picture with almost 16 percent – just about double their percentage of the total covered employment.

STEM Health Care industries make up a larger portion of national covered employment at 12 percent of the total. Unlike STEM Core industries though, their earnings per worker average is only 4.2 percent higher than the national average. So while STEM Core industry's percent of the nation's total earnings is more than double its percentage of covered employment, STEM Health Care industries are roughly the same at 12.5 percent.

### STEM Core Industries

STEM Core industries employed almost 11 million workers in 2012 with computer systems design and related services accounting for the largest share at 1.6 million jobs. Two other industries had over a million jobs, and together the three made up almost 38 percent all STEM Core industry employment. Pipeline transportation of crude oil had the lowest employment at fewer than 9,300.



STEM Core - National Covered High-Tech Employment		
Industry	Employment	Rank
Computer Systems Design and Related Services	1,630,641	1
Architectural and Engineering Services	1,382,720	2
Management and Technical Consulting Services	1,130,143	3
Scientific Research and Development Services	654,755	4
Commercial Equip. Merchant Wholesalers	620,217	5
Magnetic Media Manufacturing and Reproducing	20,335	30
Audio and Video Equipment Manufacturing	20,316	31
Monetary Authorities - Central Bank	17,286	32
Satellite Telecommunications	10,266	33
Pipeline Transportation of Crude Oil	9,348	34

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

It was no surprise that the industries with the most employment also had the most total wages. However, there was some shuffling at the bottom of the list as pipeline transportation of crude oil moved above satellite telecommunications. The latter was the only industry to have less than a billion dollars in total earnings in 2012.

STEM Core - National Covered High-Tech Earnings		
Industry	Total Earnings	Rank
Computer Systems Design and Related Services	\$167,336,349,782	1
Architectural and Engineering Services	\$111,962,736,382	2
Management and Technical Consulting Services	\$96,910,683,800	3
Scientific Research and Development Services	\$70,316,976,643	4
Commercial Equip. Merchant Wholesalers	\$56,063,537,983	5
Magnetic Media Manufacturing and Reproducing	\$2,059,310,259	30
Monetary Authorities - Central Bank	\$1,739,345,054	31
Audio and Video Equipment Manufacturing	\$1,606,171,375	32
Pipeline Transportation of Crude Oil	\$1,124,491,494	33
Satellite Telecommunications	\$992,503,259	34

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

While total earnings are important, earnings per worker underscore the value of these industries. Pipeline transportation of crude oil moved from the bottom in the previous rankings to fourth earnings per worker at over \$120,000 a year. Two other industries involved in energy production ranked in the top five as well, and oil and gas extraction was highest at \$155,061 per worker. Electrical equipment manufacturing ranked at the bottom. But its \$65,098 average wage was more than 32 percent higher than the national average covered wage.



STEM Core - National Covered High-Tech Earnings		
Industry	EPW	Rank
Oil and Gas Extraction	\$155,061	1
Computer and Peripheral Equipment Mfg.	\$152,884	2
Software Publishers	\$131,335	3
Pipeline Transportation of Crude Oil	\$120,292	4
Petroleum and Coal Products Manufacturing	\$109,358	5
Turbine and Power Transmission Equipment Mfg.	\$74,167	30
Industrial Machinery Manufacturing	\$72,341	31
Wireless Telecommunications Carriers	\$70,547	32
Commercial and Service Industry Machinery	\$66,681	33
Electrical Equipment Manufacturing	\$65,098	34

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wage

For full tables of all industries, see Appendix 2.

### STEM Health Care Industries

STEM Health Care industries had over 40 percent more jobs at 15.8 million with four industries having over a million covered jobs each. General medical and surgical hospitals claimed the most employment at over 5.5 million. By itself, general medical and surgical hospitals made up over a third of the total STEM Health Care industry covered employment. Medical and diagnostic laboratories and psychiatric and substance abuse hospitals have the least employment nationwide at around 236,000 a piece.

STEM Health Care - National Covered High-Tech Employment			
NAICS	Industry	Employment	Rank
6221	General Medical and Surgical Hospitals	5,541,129	1
6211	Offices of Physicians	2,428,436	2
6231	Nursing Care Facilities	1,737,570	3
6216	Home Health Care Services	1,193,169	4
4461	Health and Personal Care Stores	998,409	5
6212	Offices of Dentists	852,002	6
6213	Offices of Other Health Practitioners	726,483	7
6214	Outpatient Care Centers	704,876	8
5419	Other Professional and Technical Services	614,903	9
6219	Other Ambulatory Health Care Services	281,466	10
6223	Other Hospitals	254,629	11
6215	Medical and Diagnostic Laboratories	236,892	12
6222	Psychiatric and Substance Abuse Hospitals	235,453	13

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Total earnings follow total employment. General medical and surgical hospitals top the list with over \$312 billion in covered wages and psychiatric and substance abuse hospitals are at the bottom with \$10 billion.



### STEM Health Care - National Covered High-Tech Earnings

NAICS	Industry	Total Earnings	Rank
6221	General Medical and Surgical Hospitals	\$312,219,582,023	1
6211	Offices of Physicians	\$194,422,993,956	2
6231	Nursing Care Facilities	\$51,949,963,141	3
6212	Offices of Dentists	\$39,871,186,561	4
6214	Outpatient Care Centers	\$39,146,216,668	5
4461	Health and Personal Care Stores	\$35,686,977,801	6
6216	Home Health Care Services	\$32,922,994,299	7
6213	Offices of Other Health Practitioners	\$27,968,647,462	8
5419	Other Professional and Technical Services	\$27,602,150,511	9
6223	Other Hospitals	\$14,948,542,027	10
6215	Medical and Diagnostic Laboratories	\$13,638,925,008	11
6219	Other Ambulatory Health Care Services	\$11,060,883,607	12
6222	Psychiatric and Substance Abuse Hospitals	\$10,892,556,932	13

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

But the rankings change considerably for earnings per worker. Physician offices top the list by a wide margin at \$80,000 per worker. The next industry, a residual category for hospitals not categorized elsewhere, was under \$59,000 per worker, over \$20,000 less. At the bottom were nursing care facilities and home health care services. They were notably below health and personal care stores. Overall, six STEM Health Care industries had per worker earnings below the national average.

### STEM Health Care - National Covered High-Tech Earnings

NAICS	Industry	EPW	Rank
6211	Offices of Physicians	\$80,061	1
6223	Other Hospitals	\$58,707	2
6215	Medical and Diagnostic Laboratories	\$57,574	3
6221	General Medical and Surgical Hospitals	\$56,346	4
6214	Outpatient Care Centers	\$55,536	5
6212	Offices of Dentists	\$46,797	6
6222	Psychiatric and Substance Abuse Hospitals	\$46,262	7
5419	Other Professional and Technical Services	\$44,889	8
6219	Other Ambulatory Health Care Services	\$39,297	9
6213	Offices of Other Health Practitioners	\$38,499	10
4461	Health and Personal Care Stores	\$35,744	11
6231	Nursing Care Facilities	\$29,898	12
6216	Home Health Care Services	\$27,593	13

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages





## OCCUPATION

Nationally STEM Core high-tech occupations included 8.4 million jobs, about 2.6 million fewer than the STEM Core industries employed. STEM Core high-tech occupations are projected to add a little over 1 million jobs by 2022, a 13 percent increase compared to the 11 percent increase, or 15.6 million jobs, for all occupations.

STEM Health Care occupations covered 8.6 million jobs in the United States, just over half the number employed by STEM Health Care industries. The difference between the occupation and industry totals is greater for in the STEM Health Care category because of the much larger number of supporting occupations that are not high-tech. Projected growth for STEM Health Care high-tech occupations, though, is much higher. By 2022 the Bureau of Labor Statistics estimates an additional 1.9 million STEM Health Care occupation jobs, a 22 percent increase that is double the all-occupation growth rate.

### STEM Core Occupations

The top four STEM Core occupations by employment involve computers, the stereotype of high-tech. Application software developers are the most prevalent at 613,000 jobs in 2012. Mathematical technicians and a residual math sciences occupational category were at the bottom with 1,900 jobs apiece.

STEM Core - National High-Tech Employment		
Occupation	Employment	Rank
Software Developers, Applications	613,000	1
Computer User Support Specialists	547,700	2
Computer Systems Analysts	520,600	3
Software Developers, Systems Software	405,000	4
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	382,300	5
Astronomers	2,700	93
Animal Scientists	2,700	94
Agricultural Engineers	2,600	95
Mathematical Science Occupations, All Other	1,900	96
Mathematical Technicians	1,900	97

Source: Bureau of Labor Statistics, Employment Projections

The same four computer occupations are projected to add the most jobs by 2022 – just over 460,000 jobs between them. Not all STEM Core occupations are projecting growth, though. Four occupations are expected to decline, and two more should remain flat.

Mechanical drafters, industrial engineering technicians, forest and conservation technicians and a residual biological science category should all decline by around 6,900 total.



### STEM Core - Projected National High-Tech Employment Growth, 2012-2022

Occupation	Projected Change	Rank
Software Developers, Applications	139,900	1
Computer Systems Analysts	127,800	2
Computer User Support Specialists	110,800	3
Software Developers, Systems Software	82,800	4
Civil Engineers	53,700	5
Electrical and Electronics Engineering Technicians	0	92
Aerospace Engineering and Operations Technicians	0	92
Biological Scientists, All Other	-200	94
Forest and Conservation Technicians	-1,200	95
Industrial Engineering Technicians	-2,200	96
Mechanical Drafters	-3,300	97

Source: Bureau of Labor Statistics, Employment Projections

Forty-three STEM Core occupations are projected to have a higher growth rate than all occupations, and information security analyst stands above the rest with a projected growth of 36.5 percent over the decade – almost 10 percentage points above the next fastest occupation, biomedical engineers at 26.8 percent.

### STEM Core - Projected National High-Tech Employment Growth, 2012-2022

Occupation	Percent Change	Rank
Information Security Analysts	36.5%	1
Biomedical Engineers	26.8%	2
Operations Research Analysts	26.6%	3
Statisticians	26.4%	4
Actuaries	25.9%	5
Electrical and Electronics Engineering Technicians	0.0%	92
Aerospace Engineering and Operations Technicians	0.0%	92
Biological Scientists, All Other	-0.6%	94
Industrial Engineering Technicians	-3.2%	95
Forest and Conservation Technicians	-3.5%	96
Mechanical Drafters	-4.9%	97

Source: Bureau of Labor Statistics, Employment Projections



The majority of STEM Core occupations have wages that significantly exceed the national average. Only two – agriculture and food science technicians and forest and conservation technicians – had annual median wages lower than the national median of \$34,750 for all occupations. Ten occupations led by petroleum engineers had annual median wages above \$100,000. Engineering occupations made up five of the top 10 STEM Core occupations by median wage.

STEM Core - National High-Tech Employment Median Wage		
Occupation	Median	Rank
Petroleum Engineers	\$130,280	1
Architectural and Engineering Managers	\$124,870	2
Computer and Information Systems Managers	\$120,950	3
Natural Sciences Managers	\$115,730	4
Physicists	\$106,840	5
Environmental Science and Protection Technicians, Including Health	\$41,240	92
Biological Technicians	\$39,750	92
Surveying and Mapping Technicians	\$39,670	94
Agricultural and Food Science Technicians	\$34,070	95
Forest and Conservation Technicians	\$33,920	96

Source: Bureau of Labor Statistics, Occupational Employment Statistics

It is no surprise that the majority of high-tech occupations require a bachelor’s degree or higher. An estimated 6.6 million STEM Core occupational jobs – 78 percent – have a typical entry-level education requirement of no less than a bachelor’s degree. Only 22 percent of all occupations have that requirement. These same occupations are also making up the lion’s share of projected growth – 83 percent or just over 1 million new jobs by 2022.

STEM Core - National Covered High-Tech Employment by Education Level				
	2012	2022	Total Growth	Percent Growth
Bachelor's Degree	6,077,500	6,897,500	820,000	13.5%
Associate Degree	1,208,900	1,278,800	69,900	5.8%
Some College, No Degree	547,700	658,500	110,800	20.2%
Doctoral or Professional Degree	472,000	537,000	65,000	13.8%
High School Diploma or Equivalent	54,000	61,300	7,300	13.5%
Master's Degree	43,600	53,000	9,400	21.6%

Source: Bureau of Labor Statistics, Employment Projections

*For a look at all occupations in STEM Core, see Appendix 3.*





## STEM Health Care Occupations

Registered nurses are by far the most prevalent STEM Health Care occupation. At 2.7 million jobs in 2012, they accounted for 31.4 percent of all STEM Health Care occupational employment. Licensed practical and vocational nurses were the second most common occupation, pushing the proportion of all nurses to almost 40 percent of the STEM Health Care total. Prosthodontists were the fewest in number at 400 in 2012.

STEM Health Care - National High-Tech Employment		
Occupation	Employment	Rank
Registered Nurses	2,711,500	1
Licensed Practical and Licensed Vocational Nurses	738,400	2
Pharmacy Technicians	355,300	3
Physicians and Surgeons, All Other	348,900	4
Medical and Health Services Managers	315,500	5
Nurse Midwives	6,000	60
Exercise Physiologists	6,000	60
Hearing Aid Specialists	5,300	62
Genetic Counselors	2,100	63
Prosthodontists	400	64

Source: Bureau of Labor Statistics, Employment Projections

Unlike STEM Core occupations, which had a few professions projecting declines or flat growth into 2022, all STEM Health Care occupations will increase. Registered and license practical nurses had the highest growth rate at 710,000 jobs, or 28 percent of all STEM Health Care occupational growth. Four occupations are projected to grow by less than a thousand jobs with prosthodontists the smallest at 100.

STEM Health Care - Projected National High-Tech Employment Growth, 2012-2022		
Occupation	Projected Change	Rank
Registered Nurses	526,900	1
Licensed Practical and Licensed Vocational Nurses	182,900	2
Physical Therapists	73,500	3
Medical and Health Services	73,300	4
Pharmacy Technicians	70,800	5
Oral and Maxillofacial Surgeons	1,100	60
Genetic Counselors	900	61
Exercise Physiologists	500	62
Dentists, All Other Specialists	400	63
Prosthodontists	100	64

Source: Bureau of Labor Statistics, Employment Projections



While nurses are certainly growing by the largest numbers, they are not growing at the fastest rate. Two occupations, diagnostic medical sonographers and genetic counselors, are estimated to grow over 40 percent by 2022. Fifty-eight of the 64 occupations included in STEM Health Care are projected to grow faster than the all-occupation rate of 11 percent.

STEM Health Care - Projected National High-Tech Employment Growth, 2012-2022		
Occupation	Percent Change	Rank
Diagnostic Medical Sonographers	46.1%	1
Genetic Counselors	42.9%	2
Physician Assistants	38.4%	3
Health Specialties Teachers, Postsecondary	36.1%	4
Physical Therapists	36.0%	5
Exercise Physiologists	8.3%	60
Health Diagnosing and Treating Practitioners, All Other	7.8%	61
Occupational Health and Safety Specialists	6.7%	62
Dentists, All Other Specialists	6.3%	63
Psychiatric Technicians	3.9%	64

Source: Bureau of Labor Statistics, Employment Projections

Wages for STEM Health Care occupations were a mixed bag. Seven professions had median wages of over \$187,999 – the highest number the Bureau of Labor Statistics publishes. No STEM Core occupation had a median wage at that level. There were nine more STEM Health Care occupations with median wages over \$100,000. At the same time, eight STEM Health Care occupations had median wages below the all occupation median of \$34,750 while only two STEM Core occupations fell into that category. The five occupations with the lowest wages were all technicians for a variety of disciplines.

STEM Health Care - National High-Tech Employment Median Wage		
Occupation	Median	Rank
Anesthesiologists	>\$187,199	1
Surgeons	>\$187,199	1
Physicians and Surgeons, All Other	>\$187,199	1
Oral and Maxillofacial Surgeons	>\$187,199	1
Orthodontists	>\$187,199	1
Obstetricians and Gynecologists	>\$187,199	1
Internists, General	>\$187,199	1
Emergency Medical Technicians and Paramedics	\$31,020	60
Veterinary Technologists and Technicians	\$30,290	61
Psychiatric Technicians	\$30,050	62
Pharmacy Technicians	\$29,320	63
Dietetic Technicians	\$26,260	64

Source: Bureau of Labor Statistics, Occupational Employment Statistics



While education is still an important requirement for STEM Health Care occupations – 94 percent require a degree or postsecondary award – 43 percent of the jobs required an associate degree while 27 percent typically required a master’s degree or higher. About 8 percent required a bachelor’s degree. Only about 4 percent of all occupations require a master’s degree or higher.

STEM Health Care occupations that typically require an associate’s degree are estimated to have the most total growth by 2022, but those requiring master’s degrees are increasing at the fastest rate of 28 percent.

<b>STEM Health Care - National Covered High-Tech Employment by Education Level</b>				
	<b>2012</b>	<b>2022</b>	<b>Total Growth</b>	<b>Percent Growth</b>
Associate Degree	3,688,300	4,482,000	793,700	21.5%
Doctoral or Professional Degree	1,690,400	2,050,200	359,800	21.3%
Postsecondary Non-Degree Award	1,362,900	1,683,200	320,300	23.5%
Bachelor's Degree	739,200	879,700	140,500	19.0%
Master's Degree	611,000	782,300	171,300	28.0%
High School Diploma or Equivalent	531,200	644,700	113,500	21.4%

Source: Bureau of Labor Statistics, Employment Projections

*For a look at all occupations in STEM Health Care, see Appendix 4.*



## STATE COMPARISON

Comparing statewide differences in high-tech employment demonstrates the effect of geography and population. Data from the U.S. Census Bureau’s Quarterly Workforce Indicators were used for the comparison, which has some limitations that are explained in Appendix 1.

### STEM Core

Share of total STEM Core employment generally follows total population. California had the lion’s share of STEM Core employment at almost 15 percent<sup>2</sup>. Texas followed at 10 percent. New York, which falls next on the list, only had 5.7 percent of the total STEM Core employment. At the bottom were predominantly rural states like Wyoming and the Dakotas, which had the proportion of STEM Core employment at 0.2 percent.

<sup>2</sup> Three states (California, Louisiana and New Mexico) did not have fourth quarter data available – fourth quarter 2012 was substituted in the calculation of annual averages.



STEM Core - Percent of Total** High-Tech Employment		
Area	Percent	Rank
California*	14.9%	1
Texas	10.0%	2
New York	5.7%	3
Florida	4.9%	4
Illinois	4.2%	5
Alaska	0.2%	46
Montana	0.2%	47
North Dakota	0.2%	48
South Dakota	0.2%	49
Wyoming	0.2%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

As a percentage of a state's total employment, the District of Columbia had the highest concentration at 14.1 percent in STEM Core industries. Washington and Virginia ranked next, with almost 13 percent apiece. Sixteen states had more than the average concentration of STEM Core employment of 8.4 percent. Nevada ranked at the bottom with 4 percent.

STEM Core - Relative High-Tech Employment		
Area	Percent	Rank
<b>Average**</b>	<b>8.4%</b>	<b>-</b>
Washington, D.C.	14.1%	1
Washington	12.8%	2
Virginia	12.7%	3
Colorado	11.9%	4
Maryland	11.7%	5
Hawaii	5.0%	46
Maine	4.9%	47
Mississippi	4.8%	48
South Dakota	4.8%	49
Nevada	4.0%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*\* Only states with available data



The past decade has been tough on employment in most areas of the country and in most industries. This period includes a robust expansion followed by one of the worst recessions since the Great Depression. STEM Core industries employment on average dropped 0.3 percent between 2002 and 2012<sup>3</sup>. North Dakota with its well-known growth surrounding natural resources development ranked at the top with over 40 percent growth. Alaska and Utah followed at almost 30 percent growth.

Many areas of the country have not fully recovered from the effects of the Great Recession, and 24 states' STEM Core industries recorded employment declines over the decade. Delaware had by far the steepest decline at 21.1 percent. This was over 6 percentage points greater than Connecticut's 14.9 percent decline. Maine, New Jersey, Michigan and Kansas also had losses greater than 10 percent.

STEM Core - Change in High-Tech Employment, 2002 - 2012		
Area	Percent	Rank
<b>Average**</b>	<b>-0.3%</b>	<b>-</b>
North Dakota	40.3%	1
Alaska	30.5%	2
Utah	29.0%	3
Wyoming	18.8%	4
Washington	17.9%	5
New Jersey	-11.9%	41
Michigan	-12.9%	42
Kansas	-13.6%	43
Connecticut	-14.9%	44
Delaware	-21.1%	45

Source: U.S. Census Bureau, Quarterly Workforce Indicators  
 \*\* Only states with available data

The overall composition of state employment also changed during this decade. On average, STEM Core industries made up 2.6 percent less of the states' total employment in 2012 than they did in 2002. Seventeen states bucked the trend, though, with increases in STEM Core employment concentration. Alaska, South Carolina, and Utah had their relative employment in STEM Core industries grow by more than 10 percent. Seven states led by Delaware saw their relative STEM Core employment decrease by more than 10 percent.

<sup>3</sup> Four states (Arizona, Arkansas, Mississippi and New Hampshire) and the District of Columbia do not have 2002 data available within the Quarterly Workforce Indicators.



### STEM Core - Change in Relative High-Tech Employment, 2002 - 2012

Area	Percent	Rank
<b>Average**</b>	<b>-2.6%</b>	<b>-</b>
Alaska	13.4%	1
South Carolina	12.7%	2
Utah	12.0%	3
Virginia	8.8%	4
Washington	7.9%	5
Nevada	-12.5%	41
Idaho	-13.0%	42
Connecticut	-13.7%	43
Kansas	-14.2%	44
Delaware	-22.9%	45

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*\* Only states with available data

The average earnings per worker in STEM Core industries in 2012 were over \$92,000. Eight states did even better, coming in at more than \$100,000 per worker. California topped this list at \$114,500 per worker. South Dakota was at the bottom with \$57,400 in earnings per worker – almost \$5,000 per worker less the next state, Arkansas.

### STEM Core - Earnings in High-Tech Employment

Area	EPW	Rank
<b>Average**</b>	<b>\$92,233</b>	<b>-</b>
California*	\$114,542	1
Washington, D.C.	\$111,212	2
Washington	\$107,202	3
New Jersey	\$106,612	4
Virginia	\$103,069	5
Maine	\$65,228	46
Kentucky	\$64,657	47
Mississippi	\$63,780	48
Arkansas	\$62,155	49
South Dakota	\$57,368	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



There was a range in earnings per worker depending on region, but one thing was common – STEM Core industry averages were always higher than the all-industry average. Overall, earnings per worker were 88 percent higher than the all-industry averages. Washington, California and Alaska came out on top – their averages were double the all-industry average. It is important that these states also had quite high all-industry earnings ranging from \$55,800 in California to \$51,700 in Texas. This ranked all three in the top 10 in terms of the all-industry averages. The two areas with the highest all-industry earnings per worker, the District of Columbia and New York, ranked at the bottom in relative earnings per worker. But even then, the STEM Core industry averages were still between 40.5 and 52.3 percent higher.

STEM Core - Relative Earnings in High-Tech Employment		
Area	EPW	Rank
<b>Average**</b>	<b>188.0%</b>	<b>-</b>
Washington	205.4%	1
California*	205.4%	2
Alaska	201.2%	3
Texas	199.0%	4
Oregon	198.4%	5
North Dakota	160.7%	46
South Dakota	157.5%	47
Kentucky	157.5%	48
New York	152.3%	49
Washington, D.C.	140.5%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

The majority of workers in STEM Core industries were male, averaging 65.8 percent. Wyoming had the highest concentration at 75 percent. No state has a majority of female workers, but the District of Columbia was the closest at 43.4 percent.



STEM Core - Gender of High-Tech Employment		
Area	Male	Female
<b>Average**</b>	<b>65.8%</b>	<b>34.2%</b>
Wyoming	75.1%	24.9%
Louisiana*	73.1%	26.9%
West Virginia	71.9%	28.1%
Utah	71.3%	28.7%
North Dakota	70.0%	30.0%
North Carolina	63.1%	36.9%
New Jersey	62.9%	37.1%
Rhode Island	62.7%	37.3%
Delaware	62.7%	37.3%
Washington, D.C.	56.6%	43.4%

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

Workers in STEM Core industries were slightly more concentrated in the middle age groups than for all industries. STEM Core industries only had 5.5 percent of their employment under 25 while all industries had over 13 percent. This was likely because of the large percentage of jobs requiring at least a four-year degree. The majority of workers for STEM Core industries, almost 48 percent, were 25 to 44.

STEM Core - Average** Age of High-Tech Employment				
	14-24	25-44	45-64	65-99
STEM Core	5.5%	47.7%	43.4%	3.4%
All Industry	13.4%	43.1%	38.7%	4.7%

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*\*Only states with available data

The District of Columbia had the youngest STEM Core employment with 64 percent under 45. Utah was close behind at 63 percent, and North Dakota was at 60 percent. The Northeast had the oldest STEM Core workforce. Delaware, New Hampshire, Connecticut, Vermont and Maine all had 56 percent of their STEM Core workforces 45 or older.

A listing of employment by age groups for all available states and complete tables on all statistics researched are at Appendix 5.



### STEM Health Care

The populous states of California, Texas, New York, Florida and Pennsylvania made up the largest portion of STEM Health Care employment. Wyoming and Alaska had the least employment at 0.2 percent.

STEM Health Care - Percent of Total** High-Tech Employment		
Area	Percent	Rank
California*	9.8%	1
Texas	8.3%	2
New York	7.4%	3
Florida	6.3%	4
Pennsylvania	4.8%	5
North Dakota	0.3%	46
Washington, D.C.	0.3%	47
Vermont	0.2%	48
Alaska	0.2%	49
Wyoming	0.2%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

The range among the states in employment concentration of STEM Health Care industries was not as great, running from Nevada at 8.3 percent to West Virginia at 15.5 percent. The average for all areas was 12 percent. Only five states were under 10 percent in 2012.



## STEM Health Care - Relative High-Tech Employment

Area	Percent	Rank
<b>Average**</b>	<b>12.0%</b>	<b>-</b>
West Virginia	15.5%	1
Rhode Island	15.3%	2
Michigan	14.0%	3
Maine	13.9%	4
Ohio	13.5%	5
Utah	9.8%	46
Colorado	9.8%	47
Wyoming	9.3%	48
Washington, D.C.	8.6%	49
Nevada	8.3%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*\*Only states with available data

STEM Health Care industries had a much stronger decade than STEM Core industries. Their average growth was almost 25 percent compared to the overall decline in STEM Core industries. This is the result of growth in health care as the nation ages. Every state recorded increases in STEM Health Care employment.

Delaware saw the biggest change between the two high-tech categories – a nation-worst 23 percent decline in STEM Core employment to STEM Health Care employment more than doubling over the decade to lead all states. Five other states – Idaho, Utah, Texas, New Mexico and Alaska – had more than 30 percent increases in their STEM Health Care industry employment. Vermont saw the least growth at 7 percent.



## STEM Health Care - Change in High-Tech Employment 2002 - 2012

Area	Percent	Rank
<b>Average**</b>	<b>24.8%</b>	<b>-</b>
Alaska	43.9%	1
New Mexico*	37.5%	2
Texas	35.9%	3
Utah	35.5%	4
Idaho	33.4%	5
Louisiana*	8.8%	41
Kansas	8.8%	42
Connecticut	8.8%	43
Rhode Island	8.1%	44
Vermont	7.2%	45

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

STEM Health Care employment concentration also grew faster than all other industries in every area but one. The STEM Health Care concentration increased an average of 14 percent between 2002 and 2012. Delaware, where STEM Health Care employment more than doubled, saw its concentration jump 54 percent. Three more states – New Mexico, Michigan and Alaska – had changes in excess of 20 percent. The only state where STEM Health Care industry employment concentration declined was North Dakota.



## STEM Health Care - Change in Relative High-Tech Employment, 2002 - 2012

Area	Percent	Rank
<b>Average**</b>	<b>14.3%</b>	<b>-</b>
New Mexico*	23.5%	1
Michigan	21.3%	2
Alaska	20.0%	3
Idaho	19.4%	4
Tennessee	19.0%	5
Louisiana*	7.3%	41
Vermont	6.8%	42
Hawaii	6.0%	43
Iowa	4.5%	44
North Dakota	-9.0%	45

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

STEM Health Care industry earnings were not as strong as STEM Core, although in the majority of states they were higher than the all-industry average. The average earnings per worker in STEM Health Care industries was \$51,300 in 2012, slightly more than half of what it was for STEM Core industries. The District of Columbia and California topped the list, but D.C. was almost \$13,000 higher than California. Alabama and Idaho were last at around \$42,000.

## STEM Health Care - Earnings in High-Tech Employment

Area	EPW	Rank
<b>Average**</b>	<b>\$51,305</b>	<b>-</b>
Washington, D.C.	\$73,413	1
California*	\$60,616	2
Nevada	\$57,358	3
Minnesota	\$56,119	4
New York	\$55,766	5
Utah	\$44,173	46
West Virginia	\$43,738	47
Kansas	\$43,722	48
Alabama	\$42,406	49
Idaho	\$42,241	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



South Dakota’s average earnings per STEM Health Care industry workers were 133.3 percent above the all-industry average. Hawaii and Nevada were the only other states with STEM Health Care earnings at least 30 percent higher than the all-industry averages. Six states had STEM Health Care earnings below their average for all industries. Those state all were in the top 10 for highest average earnings per worker for all industries.

<b>STEM Health Care - Relative Earnings in High-Tech Employment</b>		
<b>Area</b>	<b>EPW</b>	<b>Rank</b>
<b>Average**</b>	<b>104.6%</b>	<b>-</b>
South Dakota	133.3%	1
Hawaii	132.5%	2
Nevada	130.5%	3
Mississippi	127.6%	4
South Carolina	124.9%	5
Texas	93.3%	46
Washington, D.C.	92.7%	47
New Jersey	92.2%	48
Connecticut	88.3%	49
New York	87.2%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators  
 \*\*Only states with available data

The gender of workers in STEM Health Care industries was greatly skewed toward women, who held more than 77 percent of the jobs. Sixteen states led by Iowa had more than 80 percent of their STEM Health Care industry jobs held by women. Utah and the District of Columbia employed the most men, but only at 29 percent of their STEM Health Care totals.



## STEM Health Care - Gender of High-Tech Employment

Area	Male	Female
<b>Average**</b>	<b>22.6%</b>	<b>77.4%</b>
Utah	29.2%	70.8%
Washington, D.C.	29.1%	70.9%
California*	27.5%	72.5%
New York	26.5%	73.5%
Hawaii	26.1%	73.9%
South Dakota	18.4%	81.6%
Wisconsin	18.4%	81.6%
Indiana	18.3%	81.7%
North Dakota	17.6%	82.4%
Iowa	17.6%	82.4%

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data

The age of employees in STEM Health Care industries more closely mirrors the all-industry averages than the STEM Core industries, but the STEM Health Care industries had noticeably lower employment under 25 at 9.2 percent, over four percentage points below the all-industry percentage. That underscored the requirements for postsecondary education. Utah again has the youngest workforce at just over 66 percent under 45. No other state had more than 60 percent of its STEM Health Care workforce in that age group. The Northeast again had the oldest workers. Maine, Vermont and New Hampshire recorded more than 50 percent of their STEM Health Care workers 45 or older. Montana, which had a rather young STEM Core labor force, had 49 percent of its STEM Health Care workers 45 or older.

## STEM Health Care - Average\*\* Age of High-Tech Employment

	14-24	25-44	45-64	65-99
STEM Health Care	9.2%	45.9%	40.6%	4.3%
All Industry	13.4%	43.1%	38.7%	4.7%

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*\*Only states with available data

*A full listing of employment by age groups for all available states and complete tables on all statistics researched are at Appendix 6.*



## APPENDIX 1



### METHODOLOGY

In the July 2005 Bureau of Labor Statistics Monthly Labor Review, Daniel Hecker<sup>4</sup> studied different methods used to define the high-tech industry. In his paper, he advocated using the concentration of high-tech occupations within industries. This approach was adopted as the basic framework for the taxonomy in this paper.

Hecker's approach to calculating concentrations of high-tech occupations among NAICS industry sectors used the National Science Foundation's occupational scheme to define high-tech. Since the publication in 2005, this occupation list has changed little. In light of this, this research looked into other definitions of high-tech occupations. After further review and discussion, two of the four subdomains in the Standard Occupation Classification Policy Committee list of occupations in Science, Technology, Engineering and Mathematics (STEM) fit best. The first subdomain focused on life and physical science, engineering, mathematics and information technology. The fourth subdomain focused on health occupations. These two subdomains provide the strongest, most comprehensive description of high-tech occupations and were the basis of the occupation concentrations within the NAICS categories.

Dalton Terrell with the Bureau of Labor Statistics used the most current industry staffing patterns to calculate concentrations of high-tech occupations among four-digit NAICS industry sectors. After reviewing the national average concentrations of STEM jobs across all industry sectors, a concentration level of 2.5 times the national average for either subdomain was identified as producing a robust list of industries without being overly cumbersome. Three industry categories were removed based on further research. In keeping with the tradition of a nonfarm approach to looking at employment, industries in NAICS 11 -Agriculture, Forestry, Fishing and Hunting were excluded. The NAICS 9991 - Federal Executive Branch was also excluded since it is primarily used as an Occupational Employment Statistics designation. Further state research indicated NAICS 5511- Management of Companies and Enterprises would not reflect the high-tech sector across all 50 states. A total of 46 four-digit industries comprise the final list.



### COMPARISON TO HECKER'S LIST

Using a different occupation list as the basis for analysis, differences were expected between the industry taxonomy developed by this research and the one developed by Daniel Hecker in 2005. Surprisingly, with the exception of two, all of the STEM Core industries appeared on Hecker's list. Likewise, all of Hecker's Level I and all but two Level II industries, which represent the industries with the highest concentrations of high-tech employment, appear on the updated taxonomy. The two Level II industries that do not appear on the new list are in 11 -Agriculture, Forestry, Fishing and Hunting.

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<sup>4</sup> "High-technology employment: a NAICS-based update."  
[www.bls.gov/opub/mlr/2005/07/art6full.pdf](http://www.bls.gov/opub/mlr/2005/07/art6full.pdf)



The major difference occurs with the STEM Health Care industries. Hecker's occupation list did not include health care occupations so none of the industries identified in this research appeared on the previous list.

High-Tech Taxonomy Comparison					
Hecker's 2005 Taxonomy			2014 National High-Tech Taxonomy		
Level	NAICS	Title	NAICS	Industry	
II	1131	Timber Tract Operations	2111	Oil and Gas Extraction	
II	1132	Forest Nurseries and Gathering of Forest Products	2211	Power Generation and Supply	
II	2111	Oil and Gas Extraction	3241	Petroleum and Coal Products Manufacturing	
II	2211	Electric Power Generation, Transmission and Distribution	3251	Basic Chemical Manufacturing	
III	3241	Petroleum and Coal Products Manufacturing	3252	Resin, Rubber, and Artificial Fibers Mfg.	
II	3251	Basic Chemical Manufacturing	3254	Pharmaceutical and Medicine Manufacturing	
II	3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing	3332	Industrial Machinery Manufacturing	
III	3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3333	Commercial and Service Industry Machinery	
I	3254	Pharmaceutical and Medicine Manufacturing	3336	Turbine and Power Transmission Equipment Mfg.	
III	3255	Paint, Coating, and Adhesive Manufacturing	3341	Computer and Peripheral Equipment Mfg.	
III	3259	Other Chemical Product and Preparation Manufacturing	3342	Communications Equipment Manufacturing	
II	3332	Industrial Machinery Manufacturing	3343	Audio and Video Equipment Manufacturing	
II	3333	Commercial and Service Industry Machinery Manufacturing	3344	Semiconductor and Electronic Component Mfg.	
III	3336	Engine, Turbine, and Power Transmission Equipment Manufacturing	3345	Electronic Instrument Manufacturing	
III	3339	Other General Purpose Machinery Manufacturing	3346	Magnetic Media Manufacturing and Reproducing	
I	3341	Computer and Peripheral Equipment Manufacturing	3353	Electrical Equipment Manufacturing	
I	3342	Communications Equipment Manufacturing	3364	Aerospace Product and Parts Manufacturing	
II	3343	Audio and Video Equipment Manufacturing	4234	Commercial Equip. Merchant Wholesalers	
I	3344	Semiconductor and Other Electronic Component Manufacturing	4236	Electric Goods Merchant Wholesalers	
I	3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	4242	Druggists' Goods Merchant Wholesalers	
II	3346	Manufacturing and Reproducing Magnetic and Optical Media	4861	Pipeline Transportation of Crude Oil	
III	3353	Electrical Equipment Manufacturing	5112	Software Publishers	
I	3364	Aerospace Product and Parts Manufacturing	5171	Wired Telecommunications Carriers	
III	3369	Other Transportation Equipment Manufacturing	5172	Wireless Telecommunications Carriers	
II	4234	Professional and Commercial Equipment and Supplies Merchant Wholesalers	5174	Satellite Telecommunications	
III	4861	Pipeline Transportation of Crude Oil	5179	Other Telecommunications	
III	4862	Pipeline Transportation of Natural Gas	5182	Data Processing, Hosting and Related Services	
III	4869	Other Pipeline Transportation	5191	Other Information Services	
I	5112	Software Publishers	5211	Monetary Authorities - Central Bank	
I	5161	Internet Publishing and Broadcasting*	5413	Architectural and Engineering Services	
III	5171	Wired Telecommunications Carriers	5415	Computer Systems Design and Related Services	
III	5172	Wireless Telecommunications Carriers (except Satellite)	5416	Management and Technical Consulting Services	
III	5173	Telecommunications Resellers***	5417	Scientific Research and Development Services	
III	5174	Satellite Telecommunications	4461	Health and Personal Care Stores	
I	5179	Other Telecommunications	5419	Other Professional and Technical Services	
I	5181	ISP's and Web Search Portals**	6211	Offices of Physicians	
I	5182	Data Processing, Hosting, and Related Services	6212	Offices of Dentists	
I	5191	Other Information Services	6213	Offices of Other Health Practitioners	
III	5211	Monetary Authorities-Central Bank	6214	Outpatient Care Centers	
III	5232	Securities and Commodity Exchanges	6215	Medical and Diagnostic Laboratories	
I	5413	Architectural, Engineering, and Related Services	6216	Home Health Care Services	
I	5415	Computer Systems Design and Related Services	6219	Other Ambulatory Health Care Services	
II	5416	Management, Scientific, and Technical Consulting Services	6221	General Medical and Surgical Hospitals	
I	5417	Scientific Research and Development Services	6222	Psychiatric and Substance Abuse Hospitals	
III	5511	Management of Companies and Enterprises	6223	Other Hospitals	
III	5612	Facilities Support Services	6231	Nursing Care Facilities	
III	8112	Electronic and Precision Equipment Repair and Maintenance			
			Appears in Both Taxonomies		
			STEM Health Care		

\* 5161 rolled into 51913 after 2007 NAICS Update  
 \*\* 5181 rolled into 5191 after 2007 NAICS Update  
 \*\*\* 5173 rolled into 5179 after 2007 NAICS Update





## INDUSTRY EMPLOYMENT DATA

This paper uses two main sources of data for industry employment: the Bureau of Labor Statistics Quarterly Census of Employment and Wages and the U.S. Census Bureau's Quarterly Workforce Indicators.

Quarterly Census of Employment and Wages data were used to look at national high-tech employment and wages. Coming from each state's unemployment tax files, these data are the most accurate available although they are not without issues. Industry miscoding of specific companies can lead to errors in the data. This data source is also not a time series so growth over time cannot be analyzed.

To identify state-specific differences in high-tech employment, the U.S. Census Bureau's Quarterly Workforce Indicators were used. This data set uses some of the same base data – state unemployment tax files – but adds demographic data. The program also converts the data into a time series so comparisons over time can be analyzed. The dataset however uses synthetic data to keep respondent level data confidential.

While more comparisons between the states and the nation could be developed using the same dataset, issues within each program make that impossible. In the case of the Quarterly Census of Employment and Wages, confidentiality requirements at the state level bar many states from publishing industry data at the four-digit level. In fact, for 2012 no state's data include all of the STEM Core industries. Similarly, the Quarterly Workforce Indicators dataset is provided only at the state level. There is no national rollup. In addition, not all states participate in the Census program, and some that do participate do not have data reaching back a decade.





SIZE			EARNINGS			EARNINGS		
Covered High-Tech Employment			Covered High-Tech Earnings			Earnings per Worker		
NAICS	Industry	Employment Rank	NAICS	Industry	Total Earnings	NAICS	Industry	EPW
5415	Computer Systems Design and Related Services	1,630,641	5415	Computer Systems Design and Related Services	\$167,336,349,782	2111	Oil and Gas Extraction	\$155,061
5413	Architectural and Engineering Services	1,382,720	5413	Architectural and Engineering Services	\$111,962,736,382	3341	Computer and Peripheral Equipment Mfg.	\$152,884
5416	Management and Technical Consulting Services	1,130,143	5416	Management and Technical Consulting Services	\$96,910,683,800	5112	Software Publishers	\$131,335
5417	Scientific Research and Development Services	654,755	5417	Scientific Research and Development Services	\$70,316,976,643	4861	Pipeline Transportation of Crude Oil	\$120,292
4234	Commercial Equip. Merchant Wholesalers	620,217	4234	Commercial Equip. Merchant Wholesalers	\$56,063,537,983	3241	Petroleum and Coal Products Manufacturing	\$109,358
5171	Wired Telecommunications Carriers	581,246	2211	Power Generation and Supply	\$46,034,526,708	3254	Pharmaceutical and Medicine Manufacturing	\$108,717
3364	Aerospace Product and Parts Manufacturing	499,086	5171	Wired Telecommunications Carriers	\$45,615,374,176	5417	Computer Research and Development Services	\$107,394
2211	Power Generation and Supply	485,794	3364	Aerospace Product and Parts Manufacturing	\$44,264,097,355	4242	Druggists' Goods Merchant Wholesalers	\$102,891
3345	Electronic Instrument Manufacturing	400,066	5112	Software Publishers	\$37,324,599,520	5415	Computer Systems Design and Related Services	\$102,620
3344	Semiconductor and Electronic Component Mfg.	382,700	3344	Semiconductor and Electronic Component Mfg.	\$33,973,838,950	5211	Monetary Authorities - Central Bank	\$100,622
4236	Electric Goods Merchant Wholesalers	314,578	3344	Semiconductor and Electronic Component Mfg.	\$29,316,520,976	3342	Communications Equipment Manufacturing	\$98,554
5191	Other Information Services	308,060	2111	Oil and Gas Extraction	\$29,151,956,237	5174	Satellite Telecommunications	\$96,679
3254	Pharmaceutical and Medicine Manufacturing	269,660	5191	Other Information Services	\$24,833,337,980	2211	Power Generation and Supply	\$94,761
2111	Oil and Gas Extraction	188,003	4236	Electric Goods Merchant Wholesalers	\$24,683,355,143	3251	Basic Chemical Manufacturing	\$90,511
4242	Druggists' Goods Merchant Wholesalers	187,689	3341	Computer and Peripheral Equipment Mfg.	\$24,110,315,021	3345	Electronic Instrument Manufacturing	\$90,405
5172	Wireless Telecommunications Carriers	157,703	5182	Data Processing, Hosting and Related Services	\$21,854,835,720	4234	Commercial Equip. Merchant Wholesalers	\$90,393
3353	Electrical Equipment Manufacturing	156,112	4242	Druggists' Goods Merchant Wholesalers	\$19,311,500,891	3364	Semiconductor and Electronic Component Mfg.	\$88,774
3251	Basic Chemical Manufacturing	143,108	3251	Basic Chemical Manufacturing	\$12,952,444,531	5416	Management and Technical Consulting Services	\$88,680
3241	Petroleum and Coal Products Manufacturing	143,104	3241	Petroleum and Coal Products Manufacturing	\$12,186,403,364	5182	Data Processing, Hosting and Related Services	\$84,485
3342	Communications Equipment Manufacturing	111,436	5172	Wireless Telecommunications Carriers	\$11,013,271,059	5413	Architectural and Engineering Services	\$80,973
5179	Other Telecommunications	109,671	3342	Communications Equipment Manufacturing	\$10,808,555,712	5191	Other Information Services	\$80,612
3332	Industrial Machinery Manufacturing	108,446	5179	Other Telecommunications	\$9,316,057,048	3252	Resin, Rubber, and Artificial Fibers Mfg.	\$80,382
3336	Turbine and Power Transmission Equipment Mfg.	104,607	3332	Industrial Machinery Manufacturing	\$8,609,335,946	5179	Other Telecommunications	\$79,388
3252	Resin, Rubber, and Artificial Fibers Mfg.	91,560	3336	Turbine and Power Transmission Equipment Mfg.	\$7,567,380,999	5171	Wired Telecommunications Carriers	\$78,479
3333	Commercial and Service Industry Machinery	89,371	3252	Resin, Rubber, and Artificial Fibers Mfg.	\$7,533,841,184	4236	Electric Goods Merchant Wholesalers	\$78,465
3346	Magnetic Media Manufacturing and Reproducing	20,335	3333	Commercial and Service Industry Machinery	\$5,959,314,271	3336	Turbine and Power Transmission Equipment Mfg.	\$74,167
3343	Audio and Video Equipment Manufacturing	20,316	3346	Magnetic Media Manufacturing and Reproducing	\$2,059,310,259	3332	Industrial Machinery Manufacturing	\$72,341
5211	Monetary Authorities - Central Bank	17,286	5211	Monetary Authorities - Central Bank	\$1,739,345,054	5172	Wireless Telecommunications Carriers	\$70,547
5174	Satellite Telecommunications	10,266	3343	Audio and Video Equipment Manufacturing	\$1,606,171,375	3333	Commercial and Service Industry Machinery	\$66,681
4861	Pipeline Transportation of Crude Oil	9,348	4861	Pipeline Transportation of Crude Oil	\$1,124,491,494	3353	Electrical Equipment Manufacturing	\$65,088
					\$992,503,259			

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

APPENDIX 3 - NATIONAL STEM CORE OCCUPATIONS (1)

2012 Estimated Employment		
SOC	Occupation	Total Rank
15-1132	Software Developers, Applications	613,000 1
15-1151	Computer User Support Specialists	547,700 2
15-1121	Computer Systems Analysts	520,600 3
15-1133	Software Developers, Systems Software	405,000 4
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	382,300 5
15-1142	Network and Computer Systems Administrators	366,400 6
15-1131	Computer Programmers	343,700 7
11-3021	Computer and Information Systems Managers	332,700 8
17-2051	Civil Engineers	272,900 9
17-2141	Mechanical Engineers	258,100 10
17-2112	Industrial Engineers	223,300 11
15-1199	Computer Occupations, All Other	205,800 12
11-9041	Architectural and Engineering Managers	193,800 13
15-1152	Computer Network Support Specialists	174,600 14
17-2071	Electrical Engineers	166,100 15
17-3023	Electrical and Electronics Engineering Technicians	146,500 16
15-1143	Computer Network Architects	143,400 17
15-1134	Web Developers	141,400 18
17-2072	Electronics Engineers, Except Computer	140,000 19
17-2199	Engineers, All Other	133,000 20
15-1141	Database Administrators	118,700 21
19-1042	Medical Scientists, Except Epidemiologists	103,100 22
19-2041	Environmental Scientists and Specialists, Including Health	90,000 23
17-3011	Architectural and Civil Drafters	87,900 24
19-2031	Chemists	87,900 24
17-2061	Computer Hardware Engineers	83,300 26
17-2011	Aerospace Engineers	83,000 27
19-4021	Biological Technicians	80,200 28
15-1122	Information Security Analysts	75,100 29
15-2031	Operations Research Analysts	73,200 30
17-3022	Civil Engineering Technicians	73,100 31
17-3026	Industrial Engineering Technicians	68,000 32
17-3029	Engineering Technicians, Except Drafters, All Other	67,700 33
17-3013	Mechanical Drafters	66,700 34
41-9031	Sales Engineers	66,000 35
19-4099	Life, Physical, and Social Science Technicians, All Other	63,900 36
19-4031	Chemical Technicians	63,600 37
25-1022	Mathematical Science Teachers, Postsecondary	63,300 38
25-1042	Biological Science Teachers, Postsecondary	61,400 39
17-3031	Surveying and Mapping Technicians	54,000 40
17-2081	Environmental Engineers	53,200 41
11-9121	Natural Sciences Managers	51,600 42
17-3027	Mechanical Engineering Technicians	47,500 43
25-1032	Engineering Teachers, Postsecondary	42,500 44
17-1022	Surveyors	42,400 45
25-1021	Computer Science Teachers, Postsecondary	41,700 46
17-2171	Petroleum Engineers	38,500 47
19-2042	Geoscientists, Except Hydrologists and Geographers	38,200 48
19-1029	Biological Scientists, All Other	34,300 49
19-4093	Forest and Conservation Technicians	34,000 50
17-2041	Chemical Engineers	33,300 51
19-4091	Environmental Science and Protection Technicians, Including Health	32,800 52
19-2099	Physical Scientists, All Other	31,200 53
17-3012	Electrical and Electronics Drafters	29,600 54
19-1021	Biochemists and Biophysicists	29,200 55
15-2041	Statisticians	27,600 56
15-1111	Computer and Information Research Scientists	26,700 57
19-4011	Agricultural and Food Science Technicians	25,900 58
25-1052	Chemistry Teachers, Postsecondary	25,300 59
15-2011	Actuaries	24,300 60
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	24,100 61
17-2131	Materials Engineers	23,200 62
19-1031	Conservation Scientists	22,100 63
19-2012	Physicists	20,600 64
17-2161	Nuclear Engineers	20,400 65
19-1022	Microbiologists	20,100 66
19-1023	Zoologists and Wildlife Biologists	20,100 66
17-2031	Biomedical Engineers	19,400 68
19-1012	Food Scientists and Technologists	19,400 68
17-3025	Environmental Engineering Technicians	19,000 70
25-1054	Physics Teachers, Postsecondary	17,400 71
17-3024	Electro-Mechanical Technicians	17,300 72
19-1013	Soil and Plant Scientists	16,300 73
19-4041	Geological and Petroleum Technicians	15,800 74
17-3019	Drafters, All Other	15,600 75
25-1051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	13,200 76
19-4092	Forensic Science Technicians	12,900 77
25-1041	Agricultural Sciences Teachers, Postsecondary	12,800 78
17-1021	Cartographers and Photogrammetrists	12,100 79
19-1032	Foresters	12,000 80
19-2021	Atmospheric and Space Scientists	11,100 81
17-3021	Aerospace Engineering and Operations Technicians	9,900 82
19-1099	Life Scientists, All Other	9,900 82
19-2032	Materials Scientists	8,300 84
19-4051	Nuclear Technicians	8,100 85
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	7,900 86
19-2043	Hydrologists	7,400 87
17-2121	Marine Engineers and Naval Architects	7,300 88
25-1053	Environmental Science Teachers, Postsecondary	6,300 89
19-1041	Epidemiologists	5,100 90
15-2021	Mathematicians	3,500 91
25-1043	Forestry and Conservation Science Teachers, Postsecondary	3,100 92
19-1011	Animal Scientists	2,700 93
19-2011	Astronomers	2,700 93
17-2021	Agricultural Engineers	2,600 95
15-2091	Mathematical Technicians	1,900 96
15-2099	Mathematical Science Occupations, All Other	1,900 96

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



## APPENDIX 3 - NATIONAL STEM CORE OCCUPATIONS (2)

2012-2022 Estimated Employment Growth			
SOC	Occupation	Total	Rank
15-1132	Software Developers, Applications	139,900	1
15-1121	Computer Systems Analysts	127,800	2
15-1151	Computer User Support Specialists	110,800	3
15-1133	Software Developers, Systems Software	82,800	4
17-2051	Civil Engineers	53,700	5
11-3021	Computer and Information Systems Managers	50,900	6
15-1142	Network and Computer Systems Administrators	43,000	7
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	37,200	8
15-1134	Web Developers	28,500	9
15-1131	Computer Programmers	28,400	10
15-1122	Information Security Analysts	27,400	11
15-1143	Computer Network Architects	20,900	12
15-2031	Operations Research Analysts	19,500	13
15-1141	Database Administrators	17,900	14
19-1042	Medical Scientists, Except Epidemiologists	13,700	15
19-2041	Environmental Scientists and Specialists, Including Health	13,200	16
11-9041	Architectural and Engineering Managers	13,100	17
15-1152	Computer Network Support Specialists	12,200	18
25-1042	Biological Science Teachers, Postsecondary	12,000	19
17-2141	Mechanical Engineers	11,600	20
17-2112	Industrial Engineers	10,100	21
17-2171	Petroleum Engineers	9,900	22
17-2081	Environmental Engineers	8,200	23
19-4021	Biological Technicians	8,100	24
17-2071	Electrical Engineers	7,900	25
15-1199	Computer Occupations, All Other	7,800	26
25-1022	Mathematical Science Teachers, Postsecondary	7,300	27
17-3031	Surveying and Mapping Technicians	7,300	27
15-2041	Statisticians	7,300	27
19-4099	Life, Physical, and Social Science Technicians, All Other	6,500	30
15-2011	Actuaries	6,300	31
17-2061	Computer Hardware Engineers	6,100	32
17-2011	Aerospace Engineers	6,100	32
19-4091	Environmental Science and Protection Technicians, Including Health	6,100	32
19-2042	Geoscientists, Except Hydrologists and Geographers	6,000	35
19-4031	Chemical Technicians	5,900	36
41-9031	Sales Engineers	5,800	37
19-1021	Biochemists and Biophysicists	5,400	38
25-1021	Computer Science Teachers, Postsecondary	5,300	39
17-2031	Biomedical Engineers	5,200	40
17-2199	Engineers, All Other	5,100	41
19-2031	Chemists	5,000	42
25-1032	Engineering Teachers, Postsecondary	5,000	42
17-2072	Electronics Engineers, Except Computer	4,800	44
17-1022	Surveyors	4,400	45
15-1111	Computer and Information Research Scientists	4,100	46
25-1052	Chemistry Teachers, Postsecondary	3,500	47
17-3025	Environmental Engineering Technicians	3,500	47
11-9121	Natural Sciences Managers	2,900	49
17-3012	Electrical and Electronics Drafters	2,900	49
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	2,600	51
25-1054	Physics Teachers, Postsecondary	2,400	52
19-4041	Geological and Petroleum Technicians	2,400	52
17-1021	Cartographers and Photogrammetrists	2,400	52
17-3027	Mechanical Engineering Technicians	2,200	55
19-2012	Physicists	2,100	56
19-1012	Food Scientists and Technologists	2,100	56
17-3019	Drafters, All Other	2,000	58
19-2099	Physical Scientists, All Other	1,900	59
17-2161	Nuclear Engineers	1,900	59
17-2041	Chemical Engineers	1,500	61
19-1022	Microbiologists	1,500	61
25-1051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	1,500	61
19-1013	Soil and Plant Scientists	1,300	64
19-4051	Nuclear Technicians	1,200	65
25-1041	Agricultural Sciences Teachers, Postsecondary	1,100	66
19-2021	Atmospheric and Space Scientists	1,100	66
19-1023	Zoologists and Wildlife Biologists	1,000	68
19-1099	Life Scientists, All Other	1,000	68
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	1,000	68
19-4011	Agricultural and Food Science Technicians	800	71
19-4092	Forensic Science Technicians	800	71
19-1032	Foresters	800	71
17-2121	Marine Engineers and Naval Architects	800	71
25-1053	Environmental Science Teachers, Postsecondary	800	71
15-2021	Mathematicians	800	71
17-3024	Electro-Mechanical Technicians	700	77
19-2043	Hydrologists	700	77
17-3011	Architectural and Civil Drafters	600	79
17-3029	Engineering Technicians, Except Drafters, All Other	600	79
19-1041	Epidemiologists	600	79
17-3022	Civil Engineering Technicians	500	82
19-2032	Materials Scientists	500	82
25-1043	Forestry and Conservation Science Teachers, Postsecondary	300	84
19-1011	Animal Scientists	300	84
15-2099	Mathematical Science Occupations, All Other	300	84
17-2131	Materials Engineers	200	87
19-1031	Conservation Scientists	200	87
19-2011	Astronomers	200	87
15-2091	Mathematical Technicians	200	87
17-2021	Agricultural Engineers	100	91
17-3023	Electrical and Electronics Engineering Technicians	0	92
17-3021	Aerospace Engineering and Operations Technicians	0	92
19-1029	Biological Scientists, All Other	-200	94
19-4093	Forest and Conservation Technicians	-1,200	95
17-3026	Industrial Engineering Technicians	-2,200	96
17-3013	Mechanical Drafters	-3,300	97

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



APPENDIX 3 - NATIONAL STEM CORE OCCUPATIONS (3)

2012-2022 Estimated Employment Growth Rate			
SOC	Occupation	Total	Rank
15-1122	Information Security Analysts	36.5%	1
17-2031	Biomedical Engineers	26.8%	2
15-2031	Operations Research Analysts	26.6%	3
15-2041	Statisticians	26.4%	4
15-2011	Actuaries	25.9%	5
17-2171	Petroleum Engineers	25.7%	6
15-1121	Computer Systems Analysts	24.5%	7
15-2021	Mathematicians	22.9%	8
15-1132	Software Developers, Applications	22.8%	9
15-1133	Software Developers, Systems Software	20.4%	10
15-1151	Computer User Support Specialists	20.2%	11
15-1134	Web Developers	20.2%	12
17-1021	Cartographers and Photogrammetrists	19.8%	13
17-2051	Civil Engineers	19.7%	14
25-1042	Biological Science Teachers, Postsecondary	19.5%	15
19-4091	Environmental Science and Protection Technicians, Including Health	18.6%	16
19-1021	Biochemists and Biophysicists	18.5%	17
17-3025	Environmental Engineering Technicians	18.4%	18
15-2099	Mathematical Science Occupations, All Other	15.8%	19
19-2042	Geoscientists, Except Hydrologists and Geographers	15.7%	20
17-3081	Environmental Engineers	15.4%	21
15-1111	Computer and Information Research Scientists	15.4%	22
11-3021	Computer and Information Systems Managers	15.3%	23
19-4041	Geological and Petroleum Technicians	15.2%	24
15-1141	Database Administrators	15.1%	25
19-4051	Nuclear Technicians	14.8%	26
19-2041	Environmental Scientists and Specialists, Including Health	14.7%	27
15-1143	Computer Network Architects	14.6%	28
25-1052	Chemistry Teachers, Postsecondary	13.8%	29
25-1054	Physics Teachers, Postsecondary	13.8%	30
17-3031	Surveying and Mapping Technicians	13.5%	31
19-1042	Medical Scientists, Except Epidemiologists	13.3%	32
17-3019	Drafters, All Other	12.8%	33
25-1021	Computer Science Teachers, Postsecondary	12.7%	34
25-1053	Environmental Science Teachers, Postsecondary	12.7%	35
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	12.7%	36
25-1032	Engineering Teachers, Postsecondary	11.8%	37
19-1041	Epidemiologists	11.8%	37
15-1142	Network and Computer Systems Administrators	11.7%	39
25-1022	Mathematical Science Teachers, Postsecondary	11.5%	40
25-1051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	11.4%	41
19-1011	Animal Scientists	11.1%	42
17-2121	Marine Engineers and Naval Architects	11.0%	43
19-1012	Food Scientists and Technologists	10.8%	44
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	10.8%	45
15-2091	Mathematical Technicians	10.5%	46
17-1022	Surveyors	10.4%	47
19-2012	Physicists	10.2%	48
19-4099	Life, Physical, and Social Science Technicians, All Other	10.2%	49
19-1099	Life Scientists, All Other	10.1%	50
19-4021	Biological Technicians	10.1%	51
19-2021	Atmospheric and Space Scientists	9.9%	52
17-3012	Electrical and Electronics Drafters	9.8%	53
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	9.7%	54
25-1043	Forestry and Conservation Science Teachers, Postsecondary	9.7%	55
19-2043	Hydrologists	9.5%	56
17-2161	Nuclear Engineers	9.3%	57
19-4031	Chemical Technicians	9.3%	58
41-9031	Sales Engineers	8.8%	59
25-1041	Agricultural Sciences Teachers, Postsecondary	8.6%	60
15-1131	Computer Programmers	8.3%	61
19-1013	Soil and Plant Scientists	8.0%	62
19-1022	Microbiologists	7.5%	63
19-2011	Astronomers	7.4%	64
17-2011	Aerospace Engineers	7.3%	65
17-2061	Computer Hardware Engineers	7.3%	66
15-1152	Computer Network Support Specialists	7.0%	67
11-9041	Architectural and Engineering Managers	6.8%	68
19-1032	Foresters	6.7%	69
19-4092	Forensic Science Technicians	6.2%	70
19-2099	Physical Scientists, All Other	6.1%	71
19-2032	Materials Scientists	6.0%	72
19-2031	Chemists	5.7%	73
11-9121	Natural Sciences Managers	5.6%	74
19-1023	Zoologists and Wildlife Biologists	5.0%	75
17-2071	Electrical Engineers	4.8%	76
17-3027	Mechanical Engineering Technicians	4.6%	77
17-2112	Industrial Engineers	4.5%	78
17-2041	Chemical Engineers	4.5%	79
17-2141	Mechanical Engineers	4.5%	80
17-3024	Electro-Mechanical Technicians	4.0%	81
17-2021	Agricultural Engineers	3.8%	82
17-2199	Engineers, All Other	3.8%	83
15-1199	Computer Occupations, All Other	3.8%	84
17-2072	Electronics Engineers, Except Computer	3.4%	85
19-4011	Agricultural and Food Science Technicians	3.1%	86
19-1031	Conservation Scientists	0.9%	87
17-3029	Engineering Technicians, Except Drafters, All Other	0.9%	88
17-2131	Materials Engineers	0.9%	89
17-3022	Civil Engineering Technicians	0.7%	90
17-3011	Architectural and Civil Drafters	0.7%	91
17-3023	Electrical and Electronics Engineering Technicians	0.0%	92
17-3021	Aerospace Engineering and Operations Technicians	0.0%	92
19-1029	Biological Scientists, All Other	-0.6%	94
17-3026	Industrial Engineering Technicians	-3.2%	95
19-4093	Forest and Conservation Technicians	-3.5%	96
17-3013	Mechanical Drafters	-4.9%	97

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



APPENDIX 3 - NATIONAL STEM CORE OCCUPATIONS (4)

2012 Median Wage and Education Requirement				
SOC	Occupation	Median	Typical Education Required	Rank
17-2171	Petroleum Engineers	\$130,280	Bachelor's degree	1
11-9041	Architectural and Engineering Managers	\$124,870	Bachelor's degree	2
11-3021	Computer and Information Systems Managers	\$120,950	Bachelor's degree	3
11-9121	Natural Sciences Managers	\$115,730	Bachelor's degree	4
19-2012	Physicists	\$106,840	Doctoral or professional degree	5
17-2161	Nuclear Engineers	\$104,270	Bachelor's degree	6
17-2011	Aerospace Engineers	\$103,720	Bachelor's degree	7
15-1111	Computer and Information Research Scientists	\$102,190	Doctoral or professional degree	8
15-2021	Mathematicians	\$101,360	Master's degree	9
17-2061	Computer Hardware Engineers	\$100,920	Bachelor's degree	10
15-1133	Software Developers, Systems Software	\$99,000	Bachelor's degree	11
19-2011	Astronomers	\$96,460	Doctoral or professional degree	12
17-2041	Chemical Engineers	\$94,350	Bachelor's degree	13
15-2011	Actuaries	\$93,680	Bachelor's degree	14
25-1032	Engineering Teachers, Postsecondary	\$92,670	Doctoral or professional degree	15
17-2199	Engineers, All Other	\$92,030	Bachelor's degree	16
41-9031	Sales Engineers	\$91,830	Bachelor's degree	17
17-2072	Electronics Engineers, Except Computer	\$91,820	Bachelor's degree	18
19-2099	Physical Scientists, All Other	\$91,640	Bachelor's degree	19
15-1143	Computer Network Architects	\$91,000	Bachelor's degree	20
19-2042	Geoscientists, Except Hydrologists and Geographers	\$90,890	Bachelor's degree	21
15-1132	Software Developers, Applications	\$90,060	Bachelor's degree	22
19-2021	Atmospheric and Space Scientists	\$89,260	Bachelor's degree	23
19-2032	Materials Scientists	\$88,990	Bachelor's degree	24
17-2121	Marine Engineers and Naval Architects	\$88,100	Bachelor's degree	25
17-2071	Electrical Engineers	\$87,920	Bachelor's degree	26
17-2031	Biomedical Engineers	\$86,960	Bachelor's degree	27
15-1122	Information Security Analysts	\$86,170	Bachelor's degree	28
17-2131	Materials Engineers	\$85,150	Bachelor's degree	29
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	\$84,320	Bachelor's degree	30
25-1051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	\$82,180	Doctoral or professional degree	31
25-1043	Forestry and Conservation Science Teachers, Postsecondary	\$81,930	Doctoral or professional degree	32
19-1021	Biochemists and Biophysicists	\$81,480	Doctoral or professional degree	33
15-1199	Computer Occupations, All Other	\$81,140	Bachelor's degree	34
17-2081	Environmental Engineers	\$80,890	Bachelor's degree	35
17-2141	Mechanical Engineers	\$80,580	Bachelor's degree	36
25-1041	Agricultural Sciences Teachers, Postsecondary	\$80,490	Doctoral or professional degree	37
15-1121	Computer Systems Analysts	\$79,680	Bachelor's degree	38
17-2051	Civil Engineers	\$79,340	Bachelor's degree	39
17-2112	Industrial Engineers	\$78,860	Bachelor's degree	40
25-1054	Physics Teachers, Postsecondary	\$78,540	Doctoral or professional degree	41
25-1053	Environmental Science Teachers, Postsecondary	\$77,320	Doctoral or professional degree	42
15-1141	Database Administrators	\$77,080	Bachelor's degree	43
19-1042	Medical Scientists, Except Epidemiologists	\$76,980	Doctoral or professional degree	44
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	\$76,830	Bachelor's degree	45
15-2041	Statisticians	\$75,560	Master's degree	46
19-2043	Hydrologists	\$75,530	Master's degree	47
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	\$74,970	Bachelor's degree	48
15-1131	Computer Programmers	\$74,280	Bachelor's degree	49
25-1042	Biological Science Teachers, Postsecondary	\$74,180	Doctoral or professional degree	50
17-2021	Agricultural Engineers	\$74,000	Bachelor's degree	51
19-1029	Biological Scientists, All Other	\$72,700	Bachelor's degree	52
15-1142	Network and Computer Systems Administrators	\$72,560	Bachelor's degree	53
25-1021	Computer Science Teachers, Postsecondary	\$72,200	Doctoral or professional degree	54
15-2031	Operations Research Analysts	\$72,100	Bachelor's degree	55
19-2031	Chemists	\$71,770	Bachelor's degree	56
25-1052	Chemistry Teachers, Postsecondary	\$71,140	Doctoral or professional degree	57
19-4051	Nuclear Technicians	\$69,060	Associate's degree	58
19-1022	Microbiologists	\$66,260	Bachelor's degree	59
19-1099	Life Scientists, All Other	\$65,330	Bachelor's degree	60
19-1041	Epidemiologists	\$65,270	Master's degree	61
25-1022	Mathematical Science Teachers, Postsecondary	\$64,990	Doctoral or professional degree	62
19-2041	Environmental Scientists and Specialists, Including Health	\$63,570	Bachelor's degree	63
15-1134	Web Developers	\$62,500	Associate's degree	64
19-1011	Animal Scientists	\$61,680	Doctoral or professional degree	65
17-3021	Aerospace Engineering and Operations Technicians	\$61,530	Associate's degree	66
19-1031	Conservation Scientists	\$61,100	Bachelor's degree	67
17-3029	Engineering Technicians, Except Drafters, All Other	\$59,440	Associate's degree	68
15-1152	Computer Network Support Specialists	\$59,090	Associate's degree	69
19-1013	Soil and Plant Scientists	\$58,740	Bachelor's degree	70
19-1012	Food Scientists and Technologists	\$58,070	Bachelor's degree	71
17-3023	Electrical and Electronics Engineering Technicians	\$57,850	Associate's degree	72
19-1023	Zoologists and Wildlife Biologists	\$57,710	Bachelor's degree	73
17-1021	Cartographers and Photogrammetrists	\$57,440	Bachelor's degree	74
15-2091	Mathematical Technicians	\$56,820	Bachelor's degree	75
17-1022	Surveyors	\$56,230	Bachelor's degree	76
15-2099	Mathematical Science Occupations, All Other	\$56,120	Bachelor's degree	77
19-1032	Foresters	\$55,950	Bachelor's degree	78
17-3012	Electrical and Electronics Drafters	\$55,700	Associate's degree	79
19-4092	Forensic Science Technicians	\$52,840	Bachelor's degree	80
19-4041	Geological and Petroleum Technicians	\$52,700	Associate's degree	81
17-3027	Mechanical Engineering Technicians	\$51,980	Associate's degree	82
17-3024	Electro-Mechanical Technicians	\$51,820	Associate's degree	83
17-3026	Industrial Engineering Technicians	\$50,980	Associate's degree	84
17-3013	Mechanical Drafters	\$50,360	Associate's degree	85
17-3011	Architectural and Civil Drafters	\$47,870	Associate's degree	86
17-3022	Civil Engineering Technicians	\$47,560	Associate's degree	87
15-1151	Computer User Support Specialists	\$46,420	Some college, no degree	88
17-3019	Drafters, All Other	\$46,110	Associate's degree	89
17-3025	Environmental Engineering Technicians	\$45,350	Associate's degree	90
19-4099	Life, Physical, and Social Science Technicians, All Other	\$43,130	Associate's degree	91
19-4031	Chemical Technicians	\$42,920	Associate's degree	92
19-4091	Environmental Science and Protection Technicians, Including Health	\$41,240	Associate's degree	93
19-4021	Biological Technicians	\$39,750	Bachelor's degree	94
17-3031	Surveying and Mapping Technicians	\$39,670	High school diploma or equivalent	95
19-4011	Agricultural and Food Science Technicians	\$34,070	Associate's degree	96
19-4093	Forest and Conservation Technicians	\$33,920	Associate's degree	97

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



**APPENDIX 4 - NATIONAL STEM HEALTH CARE OCCUPATIONS (1)**

2012 Estimated Employment			
SOC	Occupation	Total	Rank
29-1141	Registered Nurses	2,711,500	1
29-2061	Licensed Practical and Licensed Vocational Nurses	738,400	2
29-2052	Pharmacy Technicians	355,300	3
29-1069	Physicians and Surgeons, All Other	348,900	4
11-1911	Medical and health services managers	315,500	5
29-1051	Pharmacists	286,400	6
29-2041	Emergency Medical Technicians and Paramedics	239,100	7
29-1123	Physical Therapists	204,200	8
29-2034	Radiologic Technologists	199,200	9
29-2021	Dental Hygienists	192,800	10
25-1071	Health Specialties Teachers, Postsecondary	190,000	11
29-2071	Medical Records and Health Information Technicians	186,300	12
29-2011	Medical and Clinical Laboratory Technologists	164,300	13
29-2012	Medical and Clinical Laboratory Technicians	161,500	14
29-1127	Speech-Language Pathologists	134,100	15
29-1021	Dentists, General	125,800	16
29-1062	Family and General Practitioners	124,000	17
29-1126	Respiratory Therapists	119,300	18
29-1122	Occupational Therapists	113,200	19
29-1171	Nurse Practitioners	110,200	20
29-2055	Surgical Technologists	98,500	21
29-2099	Health Technologists and Technicians, All Other	90,400	22
29-1071	Physician Assistants	86,700	23
29-2056	Veterinary Technologists and Technicians	84,800	24
29-2053	Psychiatric Technicians	71,000	25
29-1131	Veterinarians	70,300	26
25-1072	Nursing Instructors and Teachers, Postsecondary	67,800	27
29-2081	Opticians, Dispensing	67,600	28
29-1031	Dietitians and Nutritionists	67,400	29
29-9011	Occupational Health and Safety Specialists	62,900	30
29-2032	Diagnostic Medical Sonographers	58,800	31
29-2031	Cardiovascular Technologists and Technicians	51,600	32
29-9099	Healthcare Practitioners and Technical Workers, All Other	51,600	32
29-1063	Internists, General	51,300	34
29-1067	Surgeons	47,900	35
29-1199	Health Diagnosing and Treating Practitioners, All Other	47,200	36
29-1011	Chiropractors	44,400	37
29-1151	Nurse Anesthetists	35,200	38
29-1065	Pediatricians, General	34,700	39
29-1061	Anesthesiologists	33,900	40
29-1041	Optometrists	33,100	41
29-2035	Magnetic Resonance Imaging Technologists	30,100	42
29-2057	Ophthalmic Medical Technicians	29,600	43
29-1129	Therapists, All Other	28,800	44
29-1066	Psychiatrists	27,200	45
29-2051	Dietetic Technicians	25,100	46
29-1064	Obstetricians and Gynecologists	23,600	47
29-9091	Athletic Trainers	22,900	48
29-2033	Nuclear Medicine Technologists	20,900	49
29-1125	Recreational Therapists	19,800	50
29-1124	Radiation Therapists	19,100	51
29-2054	Respiratory Therapy Technicians	13,600	52
29-1181	Audiologists	13,000	53
29-9012	Occupational Health and Safety Technicians	12,600	54
29-1081	Podiatrists	10,700	55
29-2091	Orthotists and Prosthetists	8,500	56
29-1023	Orthodontists	7,500	57
29-1022	Oral and Maxillofacial Surgeons	6,700	58
29-1029	Dentists, All Other Specialists	6,400	59
29-1161	Nurse Midwives	6,000	60
29-1128	Exercise Physiologists	6,000	60
29-2092	Hearing Aid Specialists	5,300	62
29-9092	Genetic Counselors	2,100	63
29-1024	Prosthodontists	400	64

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



**APPENDIX 4 - NATIONAL STEM HEALTH CARE OCCUPATIONS (2)**

<b>2012-2022 Estimated Employment Growth</b>			
<b>SOC</b>	<b>Occupation</b>	<b>Total</b>	<b>Rank</b>
29-1141	Registered Nurses	526900	1
29-2061	Licensed Practical and Licensed Vocational Nurses	182900	2
29-1123	Physical Therapists	73500	3
11-1911	Medical and health services managers	73300	4
29-2052	Pharmacy Technicians	70800	5
25-1071	Health Specialties Teachers, Postsecondary	68600	6
29-1069	Physicians and Surgeons, All Other	65300	7
29-2021	Dental Hygienists	64100	8
29-2041	Emergency Medical Technicians and Paramedics	55300	9
29-2012	Medical and Clinical Laboratory Technicians	47900	10
29-2034	Radiologic Technologists	41600	11
29-1051	Pharmacists	41400	12
29-2071	Medical Records and Health Information Technicians	41200	13
29-1171	Nurse Practitioners	37100	14
29-1071	Physician Assistants	33300	15
29-1122	Occupational Therapists	32900	16
29-2055	Surgical Technologists	29300	17
29-2032	Diagnostic Medical Sonographers	27100	18
29-1127	Speech-Language Pathologists	26000	19
29-2056	Veterinary Technologists and Technicians	25000	20
29-2099	Health Technologists and Technicians, All Other	24200	21
25-1072	Nursing Instructors and Teachers, Postsecondary	24000	22
29-2011	Medical and Clinical Laboratory Technologists	22800	23
29-1126	Respiratory Therapists	22800	23
29-1021	Dentists, General	20600	25
29-1062	Family and General Practitioners	18100	26
29-2081	Opticians, Dispensing	15900	27
29-2031	Cardiovascular Technologists and Technicians	15700	28
29-1031	Dietitians and Nutritionists	14200	29
29-1067	Surgeons	11100	30
29-1129	Therapists, All Other	9100	31
29-9099	Healthcare Practitioners and Technical Workers, All Other	8800	32
29-2057	Ophthalmic Medical Technicians	8800	32
29-1151	Nurse Anesthetists	8700	34
29-1131	Veterinarians	8400	35
29-1061	Anesthesiologists	8200	36
29-1041	Optometrists	8100	37
29-1063	Internists, General	7300	38
29-2035	Magnetic Resonance Imaging Technologists	7100	39
29-1011	Chiropractors	6500	40
29-1065	Pediatricians, General	5400	41
29-9091	Athletic Trainers	4900	42
29-2051	Dietetic Technicians	4500	43
29-1124	Radiation Therapists	4500	43
29-1066	Psychiatrists	4400	45
29-1181	Audiologists	4300	46
29-9011	Occupational Health and Safety Specialists	4200	47
29-2033	Nuclear Medicine Technologists	4200	47
29-1199	Health Diagnosing and Treating Practitioners, All Other	3700	49
29-1064	Obstetricians and Gynecologists	3400	50
29-2091	Orthotists and Prosthetists	3000	51
29-2053	Psychiatric Technicians	2800	52
29-1125	Recreational Therapists	2700	53
29-1081	Podiatrists	2400	54
29-2054	Respiratory Therapy Technicians	2300	55
29-1161	Nurse Midwives	1700	56
29-9012	Occupational Health and Safety Technicians	1300	57
29-2092	Hearing Aid Specialists	1300	57
29-1023	Orthodontists	1200	59
29-1022	Oral and Maxillofacial Surgeons	1100	60
29-9092	Genetic Counselors	900	61
29-1128	Exercise Physiologists	500	62
29-1029	Dentists, All Other Specialists	400	63
29-1024	Prosthodontists	100	64

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



## APPENDIX 4 - NATIONAL STEM HEALTH CARE OCCUPATIONS (3)

2012-2022 Estimated Employment Growth Rate			
SOC	Occupation	Total	Rank
29-2032	Diagnostic Medical Sonographers	46.1%	1
29-9092	Genetic Counselors	42.9%	2
29-1071	Physician Assistants	38.4%	3
25-1071	Health Specialties Teachers, Postsecondary	36.1%	4
29-1123	Physical Therapists	36.0%	5
25-1072	Nursing Instructors and Teachers, Postsecondary	35.4%	6
29-2091	Orthotists and Prosthetists	35.3%	7
29-1171	Nurse Practitioners	33.7%	8
29-2021	Dental Hygienists	33.2%	9
29-1181	Audiologists	33.1%	10
29-1129	Therapists, All Other	31.6%	11
29-2031	Cardiovascular Technologists and Technicians	30.4%	12
29-2055	Surgical Technologists	29.7%	13
29-2057	Ophthalmic Medical Technicians	29.7%	14
29-2012	Medical and Clinical Laboratory Technicians	29.7%	15
29-2056	Veterinary Technologists and Technicians	29.5%	16
29-1122	Occupational Therapists	29.1%	17
29-1161	Nurse Midwives	28.3%	18
29-2099	Health Technologists and Technicians, All Other	26.8%	19
29-1024	Prosthodontists	25.0%	20
29-2061	Licensed Practical and Licensed Vocational Nurses	24.8%	21
29-1151	Nurse Anesthetists	24.7%	22
29-2092	Hearing Aid Specialists	24.5%	23
29-1041	Optometrists	24.5%	24
29-1061	Anesthesiologists	24.2%	25
29-2035	Magnetic Resonance Imaging Technologists	23.6%	26
29-1124	Radiation Therapists	23.6%	27
29-2081	Opticians, Dispensing	23.5%	28
11-1911	Medical and health services managers	23.2%	29
29-1067	Surgeons	23.2%	30
29-2041	Emergency Medical Technicians and Paramedics	23.1%	31
29-1081	Podiatrists	22.4%	32
29-2071	Medical Records and Health Information Technicians	22.1%	33
29-9091	Athletic Trainers	21.4%	34
29-1031	Dietitians and Nutritionists	21.1%	35
29-2034	Radiologic Technologists	20.9%	36
29-2033	Nuclear Medicine Technologists	20.1%	37
29-2052	Pharmacy Technicians	19.9%	38
29-1141	Registered Nurses	19.4%	39
29-1127	Speech-Language Pathologists	19.4%	40
29-1126	Respiratory Therapists	19.1%	41
29-1069	Physicians and Surgeons, All Other	18.7%	42
29-2051	Dietetic Technicians	17.9%	43
29-9099	Healthcare Practitioners and Technical Workers, All Other	17.1%	44
29-2054	Respiratory Therapy Technicians	16.9%	45
29-1022	Oral and Maxillofacial Surgeons	16.4%	46
29-1021	Dentists, General	16.4%	47
29-1066	Psychiatrists	16.2%	48
29-1023	Orthodontists	16.0%	49
29-1065	Pediatricians, General	15.6%	50
29-1011	Chiropractors	14.6%	51
29-1062	Family and General Practitioners	14.6%	52
29-1051	Pharmacists	14.5%	53
29-1064	Obstetricians and Gynecologists	14.4%	54
29-1063	Internists, General	14.2%	55
29-2011	Medical and Clinical Laboratory Technologists	13.9%	56
29-1125	Recreational Therapists	13.6%	57
29-1131	Veterinarians	11.9%	58
29-9012	Occupational Health and Safety Technicians	10.3%	59
29-1128	Exercise Physiologists	8.3%	60
29-1199	Health Diagnosing and Treating Practitioners, All Other	7.8%	61
29-9011	Occupational Health and Safety Specialists	6.7%	62
29-1029	Dentists, All Other Specialists	6.3%	63
29-2053	Psychiatric Technicians	3.9%	64

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



**APPENDIX 4 - NATIONAL STEM HEALTH CARE OCCUPATIONS (4)**

2012 Median Wage and Education Requirement				
SOC	Occupation	Median	Typical Education Required	Rank
29-1069	Physicians and Surgeons, All Other	>\$187,199	Doctoral or Professional Degree	1
29-1063	Internists, General	>\$187,199	Doctoral or Professional Degree	1
29-1067	Surgeons	>\$187,199	Doctoral or Professional Degree	1
29-1061	Anesthesiologists	>\$187,199	Doctoral or Professional Degree	1
29-1064	Obstetricians and Gynecologists	>\$187,199	Doctoral or Professional Degree	1
29-1023	Orthodontists	>\$187,199	Doctoral or Professional Degree	1
29-1022	Oral and Maxillofacial Surgeons	>\$187,199	Doctoral or Professional Degree	1
29-1066	Psychiatrists	173330	Doctoral or Professional Degree	8
29-1062	Family and General Practitioners	172020	Doctoral or Professional Degree	9
29-1024	Prosthodontists	169130	Doctoral or Professional Degree	10
29-1029	Dentists, All Other Specialists	154990	Doctoral or Professional Degree	11
29-1065	Pediatricians, General	154650	Doctoral or Professional Degree	12
29-1151	Nurse Anesthetists	148160	Master's Degree	13
29-1021	Dentists, General	145240	Doctoral or Professional Degree	14
29-1051	Pharmacists	116670	Doctoral or Professional Degree	15
29-1081	Podiatrists	116440	Doctoral or Professional Degree	16
29-1041	Optometrists	97820	Doctoral or Professional Degree	17
29-1071	Physician Assistants	90930	Master's Degree	18
29-1171	Nurse Practitioners	89960	Master's Degree	19
29-1161	Nurse Midwives	89600	Master's Degree	20
11-1911	Medical and health services managers	88580	Bachelor's Degree	21
29-1131	Veterinarians	84460	Doctoral or Professional Degree	22
25-1071	Health Specialties Teachers, Postsecondary	81140	Doctoral or Professional Degree	23
29-1123	Physical Therapists	79860	Doctoral or Professional Degree	24
29-1124	Radiation Therapists	77560	Associate Degree	25
29-1122	Occupational Therapists	75400	Master's Degree	26
29-1199	Health Diagnosing and Treating Practitioners, All Other	72710	Master's Degree	27
29-2021	Dental Hygienists	70210	Associate Degree	28
29-2033	Nuclear Medicine Technologists	70180	Associate Degree	29
29-1127	Speech-Language Pathologists	69870	Master's Degree	30
29-1181	Audiologists	69720	Doctoral or Professional Degree	31
29-9011	Occupational Health and Safety Specialists	66790	Bachelor's Degree	32
29-1011	Chiropractors	66160	Doctoral or Professional Degree	33
29-2032	Diagnostic Medical Sonographers	65860	Associate Degree	34
29-1141	Registered Nurses	65470	Associate Degree	35
29-2035	Magnetic Resonance Imaging Technologists	65360	Associate Degree	36
25-1072	Nursing Instructors and Teachers, Postsecondary	64850	Master's Degree	37
29-2091	Orthotists and Prosthetists	62670	Master's Degree	38
29-2011	Medical and Clinical Laboratory Technologists	57580	Bachelor's Degree	39
29-9092	Genetic Counselors	56800	Master's Degree	40
29-1126	Respiratory Therapists	55870	Associate Degree	41
29-1031	Dietitians and Nutritionists	55240	Bachelor's Degree	42
29-2034	Radiologic Technologists	54620	Associate Degree	43
29-1129	Therapists, All Other	53210	Bachelor's Degree	44
29-2031	Cardiovascular Technologists and Technicians	52070	Associate Degree	45
29-9012	Occupational Health and Safety Technicians	47440	High School Diploma or Equivalent	46
29-2054	Respiratory Therapy Technicians	46760	Associate Degree	47
29-9099	Healthcare Practitioners and Technical Workers, All Other	46180	Bachelor's Degree	48
29-1128	Exercise Physiologists	44770	Bachelor's Degree	49
29-1125	Recreational Therapists	42280	Bachelor's Degree	50
29-9091	Athletic Trainers	42090	Bachelor's Degree	51
29-2055	Surgical Technologists	41790	Postsecondary Non-Degree Award	52
29-2061	Licensed Practical and Licensed Vocational Nurses	41540	Postsecondary Non-Degree Award	53
29-2092	Hearing Aid Specialists	41430	High School Diploma or Equivalent	54
29-2099	Health Technologists and Technicians, All Other	40700	High School Diploma or Equivalent	55
29-2012	Medical and Clinical Laboratory Technicians	37240	Associate Degree	56
29-2057	Ophthalmic Medical Technicians	34240	Postsecondary Non-Degree Award	57
29-2071	Medical Records and Health Information Technicians	34160	Postsecondary Non-Degree Award	58
29-2081	Opticians, Dispensing	33330	High School Diploma or Equivalent	59
29-2041	Emergency Medical Technicians and Paramedics	31020	Postsecondary Non-Degree Award	60
29-2056	Veterinary Technologists and Technicians	30290	Associate Degree	61
29-2053	Psychiatric Technicians	30050	Postsecondary Non-Degree Award	62
29-2052	Pharmacy Technicians	29320	High School Diploma or Equivalent	63
29-2051	Dietetic Technicians	26260	Associate Degree	64

Source: Bureau of Labor Statistics, Employment Projections & Occupational Employment Statistics



**APPENDIX 5 - STEM CORE COMPARISONS BY STATE (1)**

SIZE High-Tech Employment to Total**		
Area	Percent	Rank
California*	14.9%	1
Texas	10.0%	2
New York	5.7%	3
Florida	4.9%	4
Illinois	4.2%	5
Virginia	4.1%	6
Pennsylvania	4.0%	7
New Jersey	3.4%	8
Washington	3.4%	9
Ohio	3.3%	10
Georgia	3.0%	11
North Carolina	2.9%	12
Michigan	2.7%	13
Maryland	2.6%	14
Colorado	2.5%	15
Arizona	2.0%	16
Minnesota	1.9%	17
Wisconsin	1.7%	18
Indiana	1.7%	19
Missouri	1.5%	20
Tennessee	1.5%	21
Connecticut	1.4%	22
Alabama	1.3%	23
South Carolina	1.2%	24
Kansas	1.2%	25
Oregon	1.2%	26
Louisiana*	1.1%	27
Utah	1.1%	28
Oklahoma	1.0%	29
Kentucky	0.9%	30
Iowa	0.7%	31
New Mexico*	0.7%	32
DC	0.7%	33
Arkansas	0.6%	34
Nebraska	0.5%	35
New Hampshire	0.5%	36
Mississippi	0.5%	37
Idaho	0.4%	38
Nevada	0.4%	39
West Virginia	0.4%	40
Delaware	0.3%	41
Rhode Island	0.3%	42
Maine	0.3%	43
Vermont	0.2%	44
Hawaii	0.2%	45
Alaska	0.2%	46
Montana	0.2%	47
North Dakota	0.2%	48
South Dakota	0.2%	49
Wyoming	0.2%	50

RELATIVE SIZE High-Tech Employment in State		
Area	Percent	Rank
DC	14.1%	1
Washington	12.8%	2
Virginia	12.7%	3
Colorado	11.9%	4
Maryland	11.7%	5
California	10.8%	6
Texas	10.0%	7
New Jersey	9.8%	8
New Mexico	9.7%	9
Kansas	9.7%	10
Utah	9.6%	11
Connecticut	9.4%	12
New Hampshire	9.2%	13
Arizona	9.1%	14
Vermont	8.7%	15
Georgia	8.6%	16
Average**	8.4%	-
Delaware	8.3%	17
Illinois	8.0%	18
North Carolina	7.9%	19
Minnesota	7.7%	20
Pennsylvania	7.7%	21
Alabama	7.6%	22
Oregon	7.5%	23
Alaska	7.4%	24
Idaho	7.4%	25
Michigan	7.4%	26
South Carolina	7.3%	27
Florida	7.1%	28
New York	7.0%	29
Oklahoma	7.0%	30
Ohio	7.0%	31
Wisconsin	6.8%	32
Wyoming	6.6%	33
Louisiana	6.6%	34
Rhode Island	6.5%	35
Indiana	6.5%	36
Nebraska	6.2%	37
Missouri	6.2%	38
Tennessee	5.9%	39
West Virginia	5.8%	40
Kentucky	5.6%	41
North Dakota	5.6%	42
Montana	5.5%	43
Iowa	5.4%	44
Arkansas	5.3%	45
Hawaii	5.0%	46
Maine	4.9%	47
Mississippi	4.8%	48
South Dakota	4.8%	49
Nevada	4.0%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



**APPENDIX 5 - STEM CORE COMPARISONS BY STATE (2)**

2002-2012 Change in High-Tech Employment		
Area	Percent	Rank
North Dakota	40.3%	1
Alaska	30.5%	2
Utah	29.0%	3
Wyoming	18.8%	4
Washington	17.9%	5
Montana	15.5%	6
Virginia	14.4%	7
South Carolina	14.0%	8
South Dakota	12.5%	9
Iowa	10.7%	10
Hawaii	9.9%	11
Texas	9.6%	12
Oklahoma	8.6%	13
Maryland	6.0%	14
North Carolina	4.8%	15
New Mexico*	3.7%	16
Louisiana*	2.2%	17
New York	2.1%	18
Wisconsin	1.8%	19
Oregon	1.4%	20
Kentucky	0.7%	21
Average**	-0.3%	-
Florida	-1.1%	22
Alabama	-1.3%	23
California*	-1.6%	24
Colorado	-2.0%	25
Nebraska	-2.6%	26
Minnesota	-3.5%	27
Rhode Island	-3.8%	28
Indiana	-4.4%	29
Tennessee	-5.1%	30
Pennsylvania	-5.7%	31
Nevada	-5.9%	32
Missouri	-6.2%	33
Idaho	-6.4%	34
Ohio	-7.2%	35
Vermont	-7.7%	36
Georgia	-7.8%	37
West Virginia	-7.9%	38
Illinois	-9.6%	39
Maine	-11.1%	40
New Jersey	-11.9%	41
Michigan	-12.9%	42
Kansas	-13.6%	43
Connecticut	-14.9%	44
Delaware	-21.1%	45

2002-2012 Change in Relative Size		
Area	Percent	Rank
Alaska	13.4%	1
South Carolina	12.7%	2
Utah	12.0%	3
Virginia	8.8%	4
Washington	7.9%	5
Iowa	5.6%	6
North Dakota	5.6%	7
Montana	4.6%	8
Maryland	3.3%	9
South Dakota	2.5%	10
Wyoming	2.4%	11
Wisconsin	2.1%	12
Oklahoma	1.9%	13
Rhode Island	1.5%	14
Hawaii	1.3%	15
Louisiana	1.2%	16
North Carolina	1.1%	17
New York	-0.5%	18
Alabama	-0.6%	19
New Mexico	-1.4%	20
California	-1.6%	21
Ohio	-1.7%	22
Kentucky	-1.8%	23
Oregon	-2.0%	24
Average**	-2.6%	-
Michigan	-2.7%	25
Florida	-2.7%	26
Indiana	-3.7%	27
Texas	-4.9%	28
Missouri	-5.3%	29
Pennsylvania	-6.1%	30
Minnesota	-6.4%	31
Tennessee	-6.4%	32
Colorado	-6.7%	33
Illinois	-7.4%	34
Nebraska	-7.5%	35
Vermont	-7.6%	36
Georgia	-8.3%	37
Maine	-9.7%	38
New Jersey	-10.0%	39
West Virginia	-11.3%	40
Nevada	-12.5%	41
Idaho	-13.0%	42
Connecticut	-13.7%	43
Kansas	-14.2%	44
Delaware	-22.9%	45

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



**APPENDIX 5 - STEM CORE COMPARISONS BY STATE (3)**

Earnings Earnings per Worker		
Area	EPW	Rank
California*	\$114,542	1
DC	\$111,212	2
Washington	\$107,202	3
New Jersey	\$106,612	4
Virginia	\$103,069	5
Texas	\$102,804	6
Connecticut	\$101,845	7
Alaska	\$100,265	8
Maryland	\$98,045	9
New York	\$97,397	10
Colorado	\$93,662	11
Average**	\$92,233	-
Delaware	\$92,207	12
Illinois	\$92,183	13
New Hampshire	\$88,498	14
Arizona	\$87,940	15
Oregon	\$87,865	16
Georgia	\$86,767	17
North Carolina	\$85,270	18
Minnesota	\$84,371	19
Pennsylvania	\$83,504	20
Louisiana*	\$82,945	21
Michigan	\$81,469	22
Oklahoma	\$79,773	23
Wyoming	\$78,598	24
New Mexico*	\$78,558	25
Hawaii	\$77,539	26
Florida	\$76,778	27
Nevada	\$75,933	28
Indiana	\$75,763	29
North Dakota	\$75,750	30
Missouri	\$74,811	31
Vermont	\$74,548	32
Tennessee	\$74,175	33
Rhode Island	\$74,025	34
Ohio	\$73,563	35
Alabama	\$73,099	36
Kansas	\$72,845	37
Utah	\$72,276	38
Idaho	\$71,424	39
Wisconsin	\$70,926	40
Montana	\$70,868	41
South Carolina	\$70,337	42
West Virginia	\$69,760	43
Nebraska	\$69,204	44
Iowa	\$68,348	45
Maine	\$65,228	46
Kentucky	\$64,657	47
Mississippi	\$63,780	48
Arkansas	\$62,155	49
South Dakota	\$57,368	50

Earnings Relative Earnings per Worker		
Area	EPW	Rank
Washington	205.4%	1
California*	205.4%	2
Alaska	201.2%	3
Texas	199.0%	4
Oregon	198.4%	5
Virginia	197.1%	6
Idaho	196.1%	7
New Mexico*	192.4%	8
North Carolina	191.9%	9
Montana	191.4%	10
Arizona	190.9%	11
Oklahoma	189.7%	12
Average**	188.0%	-
Delaware	187.7%	13
Maryland	187.7%	14
Colorado	187.6%	15
Georgia	185.7%	16
New Hampshire	185.6%	17
Vermont	185.5%	18
Hawaii	185.1%	19
Louisiana*	184.6%	20
Alabama	183.6%	21
Indiana	182.2%	22
New Jersey	181.2%	23
Missouri	179.6%	24
Pennsylvania	178.9%	25
Kansas	178.8%	26
South Carolina	176.8%	27
West Virginia	176.7%	28
Nebraska	176.2%	29
Florida	176.2%	30
Illinois	176.1%	31
Mississippi	175.4%	32
Wyoming	174.1%	33
Utah	173.0%	34
Nevada	172.8%	35
Michigan	172.3%	36
Maine	171.8%	37
Minnesota	168.2%	38
Iowa	167.9%	39
Wisconsin	167.7%	40
Tennessee	167.0%	41
Ohio	165.7%	42
Rhode Island	163.1%	43
Arkansas	162.0%	44
Connecticut	161.8%	45
North Dakota	160.7%	46
South Dakota	157.5%	47
Kentucky	157.5%	48
New York	152.3%	49
DC	140.5%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



**APPENDIX 5 - STEM CORE COMPARISONS BY STATE (4)**

Demographics		
Gender		
Area	Percent Male	Percent Female
<b>Average**</b>	<b>65.8%</b>	<b>34.2%</b>
Alabama	68.6%	31.4%
Alaska	69.3%	30.7%
Arizona	67.8%	32.2%
Arkansas	68.0%	32.0%
California*	65.2%	34.8%
Colorado	67.2%	32.8%
Connecticut	67.3%	32.7%
DC	56.6%	43.4%
Delaware	62.7%	37.3%
Florida	64.0%	36.0%
Georgia	64.3%	35.7%
Hawaii	65.3%	34.7%
Idaho	69.1%	30.9%
Illinois	64.1%	35.9%
Indiana	65.5%	34.5%
Iowa	65.3%	34.7%
Kansas	68.8%	31.2%
Kentucky	65.3%	34.7%
Louisiana*	73.1%	26.9%
Maine	65.0%	35.0%
Maryland	63.9%	36.1%
Michigan	66.6%	33.4%
Minnesota	64.6%	35.4%
Mississippi	67.3%	32.7%
Missouri	63.3%	36.7%
Montana	67.6%	32.4%
Nebraska	65.0%	35.0%
Nevada	66.4%	33.6%
New Hampshire	66.3%	33.7%
New Jersey	62.9%	37.1%
New Mexico*	68.0%	32.0%
New York	63.3%	36.7%
North Carolina	63.1%	36.9%
North Dakota	70.0%	30.0%
Ohio	66.7%	33.3%
Oklahoma	66.8%	33.2%
Oregon	68.5%	31.5%
Pennsylvania	65.4%	34.6%
Rhode Island	62.7%	37.3%
South Carolina	68.4%	31.6%
South Dakota	65.5%	34.5%
Tennessee	65.9%	34.1%
Texas	68.2%	31.8%
Utah	71.3%	28.7%
Vermont	68.6%	31.4%
Virginia	65.5%	34.5%
Washington	68.7%	31.3%
West Virginia	71.9%	28.1%
Wisconsin	65.6%	34.4%
Wyoming	75.1%	24.9%

Demographics				
Employment by Age Group				
Area	14-24	25-44	45-64	65-99
<b>Average**</b>	<b>5.5%</b>	<b>47.7%</b>	<b>43.4%</b>	<b>3.4%</b>
Alabama	4.6%	45.0%	46.6%	3.8%
Alaska	6.2%	45.1%	45.4%	3.1%
Arizona	4.9%	46.4%	45.3%	3.4%
Arkansas	6.3%	47.8%	42.6%	3.3%
California*	5.6%	49.8%	41.3%	3.4%
Colorado	3.6%	47.4%	46.0%	2.9%
Connecticut	5.2%	39.2%	50.9%	4.7%
DC	7.5%	56.6%	32.1%	3.8%
Delaware	4.2%	41.1%	50.8%	3.8%
Florida	5.1%	45.5%	45.2%	4.3%
Georgia	4.5%	49.2%	43.3%	3.0%
Hawaii	4.7%	46.8%	43.6%	4.8%
Idaho	5.4%	48.0%	43.9%	2.6%
Illinois	5.7%	48.7%	42.0%	3.6%
Indiana	5.5%	45.3%	46.0%	3.3%
Iowa	6.3%	46.8%	44.1%	2.9%
Kansas	5.0%	45.2%	46.6%	3.1%
Kentucky	7.3%	48.3%	41.6%	2.7%
Louisiana*	5.9%	45.7%	44.7%	3.7%
Maine	4.7%	43.0%	48.1%	4.1%
Maryland	5.2%	47.3%	43.3%	4.2%
Michigan	6.2%	46.5%	44.8%	2.5%
Minnesota	5.2%	47.5%	44.7%	2.7%
Mississippi	5.5%	46.8%	43.8%	3.8%
Missouri	6.1%	48.1%	42.6%	3.2%
Montana	6.0%	48.0%	43.1%	2.8%
Nebraska	6.1%	46.9%	43.9%	3.0%
Nevada	5.8%	45.8%	43.7%	4.6%
New Hampshire	4.6%	39.2%	52.4%	3.8%
New Jersey	5.0%	45.3%	45.6%	4.2%
New Mexico*	5.6%	42.5%	48.2%	3.6%
New York	6.5%	47.9%	41.5%	4.0%
North Carolina	4.6%	48.9%	43.6%	2.9%
North Dakota	8.5%	51.7%	37.4%	2.3%
Ohio	5.7%	44.7%	46.1%	3.6%
Oklahoma	6.2%	46.6%	43.0%	4.2%
Oregon	4.0%	50.5%	42.7%	2.8%
Pennsylvania	5.3%	45.3%	45.7%	3.8%
Rhode Island	5.6%	45.7%	44.4%	4.3%
South Carolina	4.9%	46.8%	44.9%	3.4%
South Dakota	7.1%	48.3%	41.5%	3.1%
Tennessee	5.0%	46.5%	44.9%	3.6%
Texas	5.6%	48.9%	42.2%	3.3%
Utah	9.5%	53.6%	34.4%	2.5%
Vermont	5.7%	40.1%	50.9%	3.3%
Virginia	4.7%	50.1%	41.5%	3.8%
Washington	5.1%	50.2%	42.1%	2.6%
West Virginia	4.9%	44.0%	47.8%	3.3%
Wisconsin	7.2%	46.8%	43.5%	2.5%
Wyoming	5.7%	44.0%	46.6%	3.5%

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



## APPENDIX 6 - STEM HEALTH CARE COMPARISONS BY STATE (1)

SIZE		
High-Tech Employment to Nation		
Area	Percent	Rank
California*	9.8%	1
Texas	8.3%	2
New York	7.4%	3
Florida	6.3%	4
Pennsylvania	4.8%	5
Ohio	4.4%	6
Illinois	4.4%	7
Michigan	3.6%	8
North Carolina	3.2%	9
New Jersey	3.2%	10
Georgia	2.7%	11
Indiana	2.3%	12
Virginia	2.3%	13
Missouri	2.3%	14
Tennessee	2.3%	15
Minnesota	2.1%	16
Wisconsin	2.0%	17
Washington	2.0%	18
Maryland	1.9%	19
Arizona	1.8%	20
Louisiana*	1.6%	21
Kentucky	1.5%	22
Alabama	1.5%	23
Colorado	1.4%	24
Connecticut	1.3%	25
South Carolina	1.3%	26
Oklahoma	1.2%	27
Oregon	1.1%	28
Iowa	1.1%	29
Kansas	1.0%	30
Arkansas	1.0%	31
Mississippi	0.9%	32
Utah	0.8%	33
Nebraska	0.7%	34
West Virginia	0.7%	35
New Mexico*	0.6%	36
Nevada	0.6%	37
Maine	0.5%	38
New Hampshire	0.5%	39
Idaho	0.5%	40
Rhode Island	0.4%	41
Hawaii	0.3%	42
Montana	0.3%	43
Delaware	0.3%	44
South Dakota	0.3%	45
North Dakota	0.3%	46
DC	0.3%	47
Vermont	0.2%	48
Alaska	0.2%	49
Wyoming	0.2%	50

RELATIVE SIZE		
High-Tech Employment in State		
Area	Percent	Rank
West Virginia	15.5%	1
Rhode Island	15.3%	2
Michigan	14.0%	3
Maine	13.9%	4
Ohio	13.5%	5
Missouri	13.5%	6
Pennsylvania	13.4%	7
Louisiana*	13.4%	8
Florida	13.2%	9
New York	13.1%	10
Tennessee	13.0%	11
Arkansas	12.9%	12
Kentucky	12.9%	13
New Jersey	12.8%	14
Connecticut	12.7%	15
South Dakota	12.6%	16
New Hampshire	12.6%	17
Indiana	12.5%	18
Mississippi	12.5%	19
North Carolina	12.5%	20
Delaware	12.5%	21
Alabama	12.4%	22
Oklahoma	12.4%	23
New Mexico*	12.3%	24
Minnesota	12.3%	25
Vermont	12.1%	26
Montana	12.1%	27
Nebraska	12.0%	28
Average	12.0%	-
Kansas	12.0%	29
Illinois	11.9%	30
Maryland	11.9%	31
Texas	11.9%	32
Idaho	11.6%	33
Arizona	11.6%	34
North Dakota	11.5%	35
Iowa	11.3%	36
Wisconsin	11.2%	37
South Carolina	11.2%	38
Georgia	10.9%	39
Alaska	10.5%	40
Washington	10.5%	41
Hawaii	10.3%	42
Oregon	10.3%	43
California*	10.2%	44
Virginia	10.1%	45
Utah	9.8%	46
Colorado	9.8%	47
Wyoming	9.3%	48
DC	8.6%	49
Nevada	8.3%	50

2002-2012		
Change in High-Tech Employment		
Area	Percent	Rank
Alaska	43.9%	1
New Mexico*	37.5%	2
Texas	35.9%	3
Utah	35.5%	4
Idaho	33.4%	5
Nevada	29.5%	6
Minnesota	26.1%	7
Wyoming	25.9%	8
North Carolina	25.6%	9
Tennessee	25.3%	10
Average	24.8%	-
Oregon	24.6%	11
Florida	24.4%	12
Virginia	23.2%	13
Montana	22.0%	14
North Dakota	21.9%	15
Indiana	21.8%	16
South Carolina	21.4%	17
Maryland	20.5%	18
Washington	20.4%	19
Kentucky	19.9%	20
Georgia	19.5%	21
California*	19.2%	22
South Dakota	19.1%	23
Missouri	18.0%	24
Colorado	17.6%	25
Oklahoma	16.9%	26
West Virginia	16.1%	27
Alabama	16.0%	28
Hawaii	15.4%	29
Nebraska	15.3%	30
New Jersey	14.5%	31
Illinois	14.3%	32
Maine	14.2%	33
New York	13.9%	34
Michigan	13.7%	35
Ohio	12.8%	36
Pennsylvania	10.9%	37
Wisconsin	10.2%	38
Iowa	9.8%	39
Louisiana*	8.8%	40
Kansas	8.8%	41
Connecticut	8.8%	42
Rhode Island	8.1%	43
Vermont	7.2%	44

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



## APPENDIX 6 - STEM HEALTH CARE COMPARISONS BY STATE (2)

2002-2012 Change in Relative Size		
Area	Percent	Rank
New Mexico*	23.5%	1
Michigan	21.3%	2
Alaska	20.0%	3
Idaho	19.4%	4
Tennessee	19.0%	5
Indiana	18.5%	6
Florida	18.3%	7
Minnesota	18.2%	8
North Carolina	17.4%	9
Nevada	17.0%	10
Oregon	16.9%	11
South Carolina	16.6%	12
Ohio	16.3%	13
California*	16.1%	14
Missouri	16.1%	15
Georgia	15.9%	16
Texas	15.1%	17
Utah	15.0%	18
Maryland	14.9%	19
Virginia	14.7%	20
Illinois	14.5%	21
New Jersey	14.5%	22
Kentucky	14.5%	23
Alabama	14.3%	24
Average	14.3%	-
Maine	13.8%	25
Rhode Island	12.3%	26
Colorado	10.6%	27
West Virginia	10.5%	28
New York	9.9%	29
Wisconsin	9.5%	30
Montana	9.5%	31
Pennsylvania	9.4%	32
Washington	9.3%	33
Connecticut	9.3%	34
Oklahoma	8.8%	35
Nebraska	8.6%	36
Wyoming	7.9%	37
South Dakota	7.8%	38
Kansas	7.5%	39
Louisiana*	7.3%	40
Vermont	6.8%	41
Hawaii	6.0%	42
Iowa	4.5%	43
North Dakota	-9.0%	44

Earnings Earnings per Worker		
Area	EPW	Rank
DC	\$73,413	1
California*	\$60,616	2
Nevada	\$57,358	3
Minnesota	\$56,119	4
New York	\$55,766	5
Connecticut	\$55,612	6
Hawaii	\$55,506	7
Washington	\$55,496	8
Oregon	\$54,628	9
New Jersey	\$54,222	10
Colorado	\$54,212	11
Delaware	\$54,191	12
Arizona	\$54,155	13
Virginia	\$53,763	14
Maryland	\$53,407	15
New Hampshire	\$53,353	16
Alaska	\$52,566	17
Tennessee	\$51,378	18
Average	\$51,305	-
Wyoming	\$50,791	19
Pennsylvania	\$50,560	20
Illinois	\$50,347	21
Florida	\$50,324	22
Wisconsin	\$50,176	23
Georgia	\$49,708	24
North Carolina	\$49,704	25
South Carolina	\$49,686	26
Vermont	\$49,195	27
North Dakota	\$49,165	28
Michigan	\$48,916	29
South Dakota	\$48,557	30
Texas	\$48,168	31
Kentucky	\$47,837	32
New Mexico*	\$47,501	33
Rhode Island	\$47,250	34
Maine	\$47,218	35
Missouri	\$46,911	36
Ohio	\$46,749	37
Indiana	\$46,579	38
Mississippi	\$46,392	39
Montana	\$45,979	40
Iowa	\$45,913	41
Louisiana*	\$45,612	42
Nebraska	\$44,482	43
Arkansas	\$44,378	44
Oklahoma	\$44,362	45
Utah	\$44,173	46
West Virginia	\$43,738	47
Kansas	\$43,722	48
Alabama	\$42,406	49
Idaho	\$42,241	50

Earnings Relative Earnings per Worker		
Area	EPW	Rank
South Dakota	133.3%	1
Hawaii	132.5%	2
Nevada	130.5%	3
Mississippi	127.6%	4
South Carolina	124.9%	5
Maine	124.4%	6
Montana	124.2%	7
Oregon	123.3%	8
Vermont	122.4%	9
Wisconsin	118.7%	10
Arizona	117.5%	11
Kentucky	116.5%	12
New Mexico*	116.3%	13
Idaho	116.0%	14
Tennessee	115.7%	15
Arkansas	115.6%	16
Florida	115.5%	17
Nebraska	113.2%	18
Iowa	112.8%	19
Missouri	112.6%	20
Wyoming	112.5%	21
Indiana	112.0%	22
New Hampshire	111.9%	23
Minnesota	111.9%	24
North Carolina	111.8%	25
West Virginia	110.8%	26
Delaware	110.3%	27
California*	108.7%	28
Colorado	108.6%	29
Pennsylvania	108.3%	30
Kansas	107.3%	31
Alabama	106.5%	32
Georgia	106.4%	33
Washington	106.4%	34
Utah	105.8%	35
Oklahoma	105.5%	36
Alaska	105.5%	37
Ohio	105.3%	38
Average	104.6%	-
North Dakota	104.3%	39
Rhode Island	104.1%	40
Michigan	103.4%	41
Virginia	102.8%	42
Maryland	102.2%	43
Louisiana*	101.5%	44
Illinois	96.2%	45
Texas	93.3%	46
DC	92.7%	47
New Jersey	92.2%	48
Connecticut	88.3%	49
New York	87.2%	50

Source: U.S. Census Bureau, Quarterly Workforce Indicators

\*Data for Q4 2012 was unavailable, Q4 2011 substituted

\*\*Only states with available data



## APPENDIX 6 - STEM HEALTH CARE COMPARISONS BY STATE (3)

Demographics		
Gender		
Area	Percent Male	Percent Female
Alabama	19.3%	80.7%
Alaska	23.2%	76.8%
Arizona	25.5%	74.5%
Arkansas	20.5%	79.5%
California*	27.5%	72.5%
Colorado	23.4%	76.6%
Connecticut	21.2%	78.8%
DC	29.1%	70.9%
Delaware	19.5%	80.6%
Florida	24.9%	75.1%
Georgia	19.9%	80.1%
Hawaii	26.1%	73.9%
Idaho	21.8%	78.2%
Illinois	22.2%	77.8%
Indiana	18.3%	81.7%
Iowa	17.6%	82.4%
Kansas	19.9%	80.1%
Kentucky	19.8%	80.2%
Louisiana*	19.8%	80.2%
Maine	20.9%	79.1%
Maryland	22.3%	77.7%
Michigan	21.3%	78.7%
Minnesota	20.8%	79.2%
Mississippi	19.6%	80.4%
Missouri	21.7%	78.3%
Montana	20.8%	79.2%
Average	22.6%	77.4%
Nebraska	19.0%	81.0%
Nevada	25.8%	74.2%
New Hampshire	20.7%	79.3%
New Jersey	24.6%	75.4%
New Mexico*	23.5%	76.5%
New York	26.5%	73.5%
North Carolina	20.2%	79.8%
North Dakota	17.6%	82.4%
Ohio	19.9%	80.1%
Oklahoma	21.5%	78.5%
Oregon	23.1%	76.9%
Pennsylvania	22.6%	77.4%
Rhode Island	21.4%	78.6%
South Carolina	19.2%	80.8%
South Dakota	18.4%	81.6%
Tennessee	21.1%	78.9%
Texas	22.8%	77.2%
Utah	29.2%	70.8%
Vermont	20.8%	79.2%
Virginia	20.8%	79.2%
Washington	21.9%	78.1%
West Virginia	21.5%	78.5%
Wisconsin	18.4%	81.6%
Wyoming	19.9%	80.1%

Demographics				
Employment by Age Group				
Area	14-24	25-44	45-64	65-99
Alabama	9.7%	47.9%	38.6%	3.9%
Alaska	10.8%	46.9%	39.1%	3.2%
Arizona	9.7%	48.1%	37.9%	4.3%
Arkansas	10.1%	48.3%	37.5%	4.0%
California*	8.8%	48.0%	39.0%	4.1%
Colorado	8.7%	48.9%	38.6%	3.9%
Connecticut	9.3%	42.6%	42.8%	5.3%
DC	7.8%	50.5%	36.7%	5.0%
Delaware	9.6%	45.8%	40.2%	4.4%
Florida	8.3%	45.0%	41.7%	5.0%
Georgia	7.6%	49.3%	39.5%	3.6%
Hawaii	8.5%	48.7%	38.7%	4.2%
Idaho	10.9%	48.1%	37.6%	3.5%
Illinois	9.7%	45.3%	40.2%	4.7%
Indiana	9.3%	46.4%	40.5%	3.8%
Iowa	11.3%	42.1%	42.0%	4.6%
Kansas	11.2%	44.7%	39.3%	4.8%
Kentucky	10.1%	47.7%	38.5%	3.7%
Louisiana*	9.4%	50.1%	36.9%	3.6%
Maine	8.2%	40.0%	47.1%	4.7%
Maryland	9.7%	45.0%	40.6%	4.8%
Michigan	9.3%	44.4%	42.2%	4.0%
Minnesota	9.7%	45.4%	41.2%	3.7%
Mississippi	8.6%	50.6%	37.2%	3.6%
Missouri	10.1%	45.7%	40.0%	4.2%
Montana	9.1%	42.2%	44.4%	4.3%
Average	9.2%	45.9%	40.6%	4.3%
Nebraska	11.6%	45.3%	38.7%	4.4%
Nevada	10.2%	48.8%	37.0%	4.1%
New Hampshire	8.7%	40.3%	46.5%	4.6%
New Jersey	9.4%	41.4%	43.6%	5.6%
New Mexico*	9.2%	45.8%	40.3%	4.7%
New York	8.9%	42.5%	43.6%	5.0%
North Carolina	7.9%	48.4%	40.0%	3.8%
North Dakota	14.2%	41.7%	39.7%	4.4%
Ohio	9.3%	45.2%	41.4%	4.0%
Oklahoma	10.8%	47.5%	37.0%	4.7%
Oregon	7.6%	46.1%	42.2%	4.0%
Pennsylvania	9.2%	43.3%	43.1%	4.4%
Rhode Island	9.9%	41.8%	43.7%	4.7%
South Carolina	7.9%	48.4%	39.7%	4.0%
South Dakota	11.4%	42.7%	41.0%	4.9%
Tennessee	8.3%	48.3%	39.4%	3.9%
Texas	9.3%	49.3%	37.2%	4.1%
Utah	15.3%	50.9%	30.7%	3.0%
Vermont	8.7%	40.0%	46.0%	5.4%
Virginia	9.6%	46.1%	40.0%	4.3%
Washington	7.8%	47.1%	41.2%	3.8%
West Virginia	9.5%	46.5%	40.1%	3.8%
Wisconsin	9.7%	43.5%	43.1%	3.8%
Wyoming	10.0%	45.3%	40.8%	4.0%

Source: U.S. Census Bureau, Quarterly Workforce Indicators  
 \*Data for Q4 2012 was unavailable, Q4 2011 substituted  
 \*\*Only states with available data





# Pacific Northwest High Technology Taxonomy Comparison



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In developing the new national high technology industry taxonomy, the question of possible regional difference arose. This paper explores how a state's specific employment patterns differ from the national picture and how this could lead to a different, and possibly more exact, definition of high-tech industries for a region.

Using the same methodology used for the national high-tech taxonomy, Washington, Oregon<sup>1</sup> and Idaho analyzed each of their state's specific staffing patterns and developed their own high-tech industry taxonomies. While the majority of industries for each state were on the national list, several unique industries were identified as high-tech, providing an interesting look at the specific geographic employment differences in the Pacific Northwest.

## NATIONAL COMPARISON

Of the 46 industries in the national high-tech taxonomy, three were not present or did not meet the threshold for inclusion in the Pacific Northwest analysis. These industries were 2111 Oil and Gas Extraction, 5174 Satellite Telecommunications and 5211 Monetary Authorities-Central Bank.

At the same time, 27 industries were common to all three states and the nation. NAICS 54 Professional, Scientific and Technical Services sector was the only sector where all national high-tech industries were also defined as high-tech in the Pacific Northwest.

Every STEM Health Care industry in the national taxonomy except for one was common both nationally and regionally. That exception was 6223 Specialty Hospitals (other than Psychiatric and Substance Abuse Hospitals), was not present in Washington.

In addition, 5511 Management of Companies and Enterprises and 9991 Federal Executive Branch (OES Designation) were not included in the national high-tech industry taxonomy. Both did meet the threshold requirements for all three states and the nation, but further research<sup>2</sup> led to both being dropped from the national taxonomy.

While the majority of the industries defined as high-tech in the Pacific Northwest were also defined as high-tech nationally, there were some that were unique to the region, and their calculation in state taxonomies shows that regional differences in employment do occur among industries.

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<sup>1</sup> Oregon had to modify the methodology due to an issue with staffing patterns – see the Methodology section for more details.

<sup>2</sup> See the Methodology section in *The High-Tech Industrial and Occupational Cluster: National and State Comparisons*



Pacific Northwest Compared to Official National High-Tech Taxonomy				
NAICS	Industry	Idaho	Oregon	Washington
2111	Oil and Gas Extraction			
2211	Electric Power Generation, Transmission and Distribution	X		
3241	Petroleum and Coal Products Manufacturing			X
3251	Basic Chemical Manufacturing		X	
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing		X	X
3254	Pharmaceutical and Medicine Manufacturing			X
3332	Industrial Machinery Manufacturing		X	
3333	Commercial and Service Industry Machinery Manufacturing			X
3336	Engine, Turbine, and Power Transmission Equipment Manufacturing			X
3341	Computer and Peripheral Equipment Manufacturing	X	X	X
3342	Communications Equipment Manufacturing	X	X	X
3343	Audio and Video Equipment Manufacturing		X	
3344	Semiconductor and Other Electronic Component Manufacturing	X	X	X
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	X	X	X
3346	Manufacturing and Reproducing Magnetic and Optical Media		X	
3353	Electrical Equipment Manufacturing	X	X	
3364	Aerospace Product and Parts Manufacturing			X
4234	Professional and Commercial Equipment and Supplies Merchant Wholesalers	X	X	X
4236	Household Appliances and Electrical and Electronic Goods Merchant Wholesalers	X	X	X
4242	Drugs and Druggists' Sundries Merchant Wholesalers		X	X
4461	Health and Personal Care Stores	X	X	X
4861	Pipeline Transportation of Crude Oil			
5112	Software Publishers	X	X	X
5171	Wired Telecommunications Carriers			X
5172	Wireless Telecommunications Carriers (except Satellite)		X	X
5174	Satellite Telecommunications			
5179	Other Telecommunications	X	X	X
5182	Data Processing, Hosting, and Related Services	X	X	X
5191	Other Information Services	X		X
5211	Monetary Authorities-Central Bank			
5413	Architectural, Engineering, and Related Services	X	X	X
5415	Computer Systems Design and Related Services	X	X	X
5416	Management, Scientific, and Technical Consulting	X	X	X
5417	Scientific Research and Development Services	X	X	X
5419	Other Professional, Scientific, and Technical Services	X	X	X
5511	Management of Companies and Enterprises*	X	X	X
6211	Offices of Physicians	X	X	X
6212	Offices of Dentists	X	X	X
6213	Offices of Other Health Practitioners	X	X	X
6214	Outpatient Care Centers	X	X	X
6215	Medical and Diagnostic Laboratories	X	X	X
6216	Home Health Care Services	X	X	X
6219	Other Ambulatory Health Care Services	X	X	X
6221	General Medical and Surgical Hospitals	X	X	X
6222	Psychiatric and Substance Abuse Hospitals	X	X	X
6223	Specialty (except Psychiatric and Substance Abuse) Hospitals	X	X	
6231	Nursing Care Facilities (Skilled Nursing Facilities)	X	X	X
9991	Federal Executive Branch (OES Designation)*	X	X	X
	Total	30	36	37

STEM Health Care Industries in blue

\*Industries, while meeting the criteria for inclusion, were later removed from the official taxonomy



## IDAHO

The smallest of the three Pacific Northwest states in terms of population and employment, Idaho had the fewest high-tech industries at 39. The majority of the state's high-tech industries were in health care.

Of those 39, eight were not on the national list, and only one, the Occupational Employment Statistic designated 9992 State Government, was on neighboring Washington's list. Idaho was also the only state to have a unique industry in STEM Health Care. NAICS 4812 Nonscheduled Air Transportation had an employment concentration of STEM Health Care occupations higher than the national concentration.

Difference from the National Taxonomy - Idaho	
NAICS	Industry
2379	Other Heavy and Civil Engineering Construction
3365	Railroad Rolling Stock Manufacturing
4812	Nonscheduled Air Transportation
5622	Waste Treatment and Disposal
6114	Business Schools and Computer and Management Training (Private)
7132	Gambling Industries
8112	Electronic and Precision Equipment Repair and Maintenance
9992	State Government (OES Designation)
STEM Health Care Industries in blue	

Source: Idaho Department of Labor

## OREGON

Oregon is the second largest state in the Pacific Northwest in terms of employment and population and had the second most high-tech industries at 46. The majority of high-tech industries were in the manufacturing sector and health care.

Oregon had nine industries that did not appear in the national taxonomy. While Idaho only shared one unique industry with a neighboring state, Oregon shared two. The residual industries 3339 Other General Purpose Machinery Manufacturing and 3359 Other Electrical Equipment and Component Manufacturing were defined as high-tech in Oregon and Washington. Also, unlike Idaho, Oregon's unique industries were not as widespread with the majority in manufacturing.



### Difference from the National Taxonomy - Oregon

NAICS	Industry
3132	Fabric Mills
3314	Nonferrous Metal (except Aluminum) Production and Processing
3339	Other General Purpose Machinery Manufacturing
3359	Other Electrical Equipment and Component Manufacturing
4251	Wholesale Electronic Markets and Agents and Brokers
5152	Cable and Other Subscription Programming
5232	Securities and Commodity Exchanges
8113	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance
9241	Administration of Environmental Quality Programs

Source: Oregon Employment Department

## WASHINGTON

As the largest state in the region, Washington had the most high-tech industries at 48. Like Oregon, the majority were in manufacturing and health care. Washington also included most of the information sector industries in the national taxonomy, excepting only 5174 Satellite Telecommunication.

Washington also had the largest number of unique industries at 11. Again, the largest group were in manufacturing, but the state also had two unique mining industries and two unique administrative support and waste management industries.

### Difference from the National Taxonomy - Washington

NAICS	Industry
2121	Coal Mining
2122	Metal Ore Mining
3335	Metalworking Machinery Manufacturing
3339	Other General Purpose Machinery Manufacturing
3359	Other Electrical Equipment and Component Manufacturing
3363	Motor Vehicle Parts Manufacturing
4246	Chemical and Allied Products Merchant Wholesalers
4541	Electronic Shopping and Mail-Order Houses
5615	Travel Arrangement and Reservation Services
5629	Remediation and Other Waste Management Services
9992	State Government

Source: Washington State Employment Security Department



## USING STATEWIDE CONCENTRATION LEVEL

To get a truer picture of a state's high-tech employment, each state's analysts applied that state's average concentration ratios. But that method of defining a state's high-tech taxonomy created comparison problems with other states. Idaho's taxonomy remained unchanged using the statewide ratios because its concentration levels were similar to national concentrations. Oregon was similar except for the addition of 2373 Highway, Street, and Bridge Construction. This was caused by the wider threshold given the state's slightly lower high-tech employment concentration than the nation.

Washington, on the other hand, had a much higher concentration of high-tech employment in its STEM Core industries at 8.92 percent – two percentage points greater than the national concentration of 6.28 percent. This is magnified when holding the high-tech industry threshold to two and half times the average industry concentration. Using this method, Washington went from 37 high-tech industries to 25. While this more specific high-tech list can be valuable to a state, it essentially penalizes states with higher high-tech occupation employment in comparisons with other states and regions having lower high-tech concentrations.

This effect, however, was only noticeable in Washington for STEM Core industries. STEM Health Care taxonomies remained unchanged regardless of the method used.

## METHODOLOGY

Each state followed the methodology developed in the recent High-Tech Industrial and Occupational Cluster: National and State Comparisons paper. Using Occupational Employment Statistics staffing patterns as the data set, concentration levels by four-digit NAICS industry were calculated for STEM Core and STEM Health Care occupations. As in the national effort, the occupations were analyzed separately. Then, the national concentration ratios of 15.175 percent for STEM Core and 15.7 percent for STEM Health Care were used as the threshold for high-tech industries. All industries with higher concentration ratios were included in the states' taxonomies.

### Note on Oregon's Data

Due to data enriching that the Oregon Employment Department uses on its staffing patterns, some inconsistencies in data limited comparability among the states. Most notably, Oregon only had access to its 2010 staffing patterns while Washington and Idaho used 2012 staffing patterns. This problem was magnified by the SOC code change from 2011 and 2012. The 2012 staffing patterns were the first to fully use the 2010 Standard Occupation Classification system. There were additional issues because the occupation taxonomies for STEM Core and STEM Health Care were developed using SOC 2010 codes. Specifically, the 2010 SOC codes break out postsecondary educators into fields while the previous codes combined them. To avoid over inflating Oregon's statistics, the analyst removed the nine postsecondary occupations. Further research with more comparable data sets could be worthwhile.



# How to Create a State-Specific High Technology Industry Taxonomy

Creating a state-specific high technology taxonomy is a straightforward process in three basic steps. However, there were several methodological decisions made by the Workforce Information Council's High-Tech Study Committee in creating the national High-Tech Industry Taxonomy<sup>1</sup> that should be considered. This information is included in the Notes section at the end of this document.

## Step 1: Obtain and Prepare the Required Data Sets

- The SOC Policy Council's recommendations to the Office of Management and Budget for Science, Technology, Engineering and Mathematics occupations<sup>2</sup>.
- The state's Occupational Employment Statistics Industry-Occupation Matrix or Inverse Staffing Pattern counts.

## Step 2: Calculate the Concentrations

Calculate the occupation concentrations by industry in the subdomains.

## Step 3: Analyze Results

Employment concentrations should be derived keeping each chosen subdomain separate. This will mitigate the effects of STEM Health Care, which contains health care occupations, from skewing the average since health care occupations are heavily concentrated in health care industries. The identified threshold for the national taxonomy was 2.5 times the subdomains' average concentrations. All industries above that threshold should be considered.

## Notes

The Workforce Information Council's High-tech Study Committee used the basic framework above as the foundation for the national High-Tech Industry Taxonomy. The committee's specific procedures are discussed on the next page.

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<sup>1</sup> See High-Tech Industrial and Occupational Cluster: National and State Comparisons

<sup>2</sup> [http://www.bls.gov/soc/Attachment\\_A\\_STEM.pdf](http://www.bls.gov/soc/Attachment_A_STEM.pdf)



- The national High-Tech Industry Taxonomy is based on four-digit NAICS codes. This level of classification provides enough detail to be useful to many while still having a higher likelihood of containing publicly releasable employment data.
- Industries under NAICS sector 11 Agriculture, Forestry, Fishing and Hunting were not considered. Only three four-digit Industries are classified in this sector under the OES program, and the committee decided that removing them would add consistency in keeping with the traditional nonfarm approach to employment.
- Only STEM Core and STEM Health Care of the SOC Policy Council's recommendations to the Office of Management and Budget for Science, Technology, Engineering and Mathematics occupations were included in the national High-Tech Industry Taxonomy. The committee agreed these two groups covered a large swath of high-tech occupations without being overly inclusive.
- Three occupations were found in STEM Core and in one of the unused subdomains. They were 11-9041 Architectural and Engineering Managers, 17-3011 Architectural and Civil Drafters and 19-4099 Life, Physical and Social Science Technicians, All Other. The research team included these three occupations under STEM Core only for the purpose of the analysis.
- This research endeavor was not designed to discern between industries that are high-tech users versus those that are high-tech developers. Rather a smaller subset "STEM Core" and the broader "STEM Healthcare" taxonomies were developed to be separated or combined if desired by the user. The STEM Healthcare taxonomy certainly would lean more heavily to the user than the developer side. Also, in order to more effectively utilize the industry occupational matrices it was determined by the study group to not include federal government in the high-tech taxonomy. The federal government NAICS codes would, in some cases, include high tech industries.



If a state wants to compare its regional taxonomy to the national high-tech industry taxonomy or other regions, the above methods should be imitated to make the comparisons more accurate. State should also apply the national concentration cutoffs – 15.175 percent for STEM Core and 15.7 percent for STEM Health Care – instead of using the regional thresholds, which can penalize areas with higher high-tech occupation concentrations<sup>3</sup>. Because of this, even if a state is not comparing itself to the nation or other states, it may be beneficial to use the national concentrations.

There are reasons a state may want to stray from this methodology. Changing the industry detail level can allow a region to more precisely define its high-tech industries and permit expanded work like economic impact analysis. Similarly, expanding to include all subdomains may more accurately capture a state’s high-tech employment.



### High-Technology Taxonomy Study Group

Bob Uhlenkott, Idaho - Study Group Chair • Rebecca Rust, Florida - WIC State Co-Chair • Gary Crossley - Workforce Information Council Executive Director • Dalton Terrell - Bureau of Labor Statistics • Andrew Townsend, Idaho - Project Lead • Jill Cuyler, Oregon • Alex Roubinchtein, Washington • Tonya Lee, Alabama • Bill Anderson, Nevada • Leandra Copeland, Nevada • Nelse Grundvig, Wisconsin • Bruce Demay, New Hampshire • Dave Bieneman, Illinois



<sup>3</sup> See Pacific Northwest High Technology Taxonomy Comparison

