



# STEM ECONOMIC ACTIVITY BY METROPOLITAN AREA

**February 2021**

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## SUMMARY

Science, technology, engineering, and math (STEM) occupations — 81 in number — make up 10.7 percent of all occupations but accounted for only 5.51 percent of all employment in the United States in 2019. However, for aggregate earnings (calculated by multiplying the number of workers by earnings per job), the STEM share was 10.18 percent. The higher STEM share of aggregate earnings than employment results from the median earnings per job of STEM occupations being 1.94 times as high as the median of non-STEM occupations.

The STEM shares in the U.S. metropolitan area (the sum of the nation's 384 metropolitan areas) in 2019 of 5.70 percent of employment and 10.41 percent of aggregate earnings are greater than the national figures. In contrast, the STEM employment share in the U.S. nonmetropolitan area in 2019 was only 2.80 percent.

Moreover, STEM shares are positively related to metro area size, as measured by employment. To demonstrate this, the 384 metro areas were split into six size classes:

- The 36 metro areas with employment of at least 1 million in 2019 account for only 9.4 percent of the number of metro areas but 58.9 percent of metro area employment in 2019. The STEM shares in 2019 were 6.44 percent of employment and 11.66 percent of aggregate earnings.
- The 45 metro areas with employment of between 350,000 and 999,999 account for 11.7 percent of metro areas and 16.4 percent of metro area employment. The STEM shares in 2019 were 5.40 percent of employment and 9.47 percent of aggregate earnings.
- The 46 metro areas with employment of between 200,000 and 349,999 account for 12.0 percent of metro areas and 8.4 percent of metro area employment. The STEM shares in 2019 were 4.63 percent of employment and 8.37 percent of aggregate earnings.
- The 62 metro areas with employment of between 125,000 and 199,999 account for 16.1 percent of metro areas and 6.8 percent of metro area employment. The STEM shares in 2019 were 4.11 percent of employment and 7.28 percent of aggregate earnings.
- The 71 metro areas with employment of between 75,000 and 124,999 account for 18.5 percent of metro areas and only 4.7 percent of metro area employment. The STEM shares in 2019 were 3.92 percent of employment and 6.85 percent of aggregate earnings.
- The 124 metro areas with employment of less than 75,000 account for 32.3 percent of metro areas and only 4.7 percent of metro area employment. The STEM shares in 2019 were 3.61 percent of employment and 6.47 percent of aggregate earnings. Thus, even the smallest metro areas on average had a higher STEM share than the U.S. nonmetropolitan area.

While a relationship exists between metro size and STEM intensity, each of the six metro size classes include some metro areas with high STEM shares.

STEM shares of total employment and total aggregate earnings have increased over time. Nationally, the STEM share of employment rose 0.83 percentage points between 2005 and 2019, an increase of 18 percent. The STEM share of aggregate earnings rose 1.70 percentage points between 2005 and 2019, an increase of 20 percent.

The change over time in STEM intensity also is correlated to metro area size as measured by employment in 2019. The increase between 2005 and 2019 in the share of employment was 0.88



percentage points in the largest size class, 0.63 percentage points in the second-largest size class, and between 0.33-and-0.47 percentage points in the other four size classes. The increase in the U.S. nonmetro area was only 0.29 percentage points.

Between 2005 and 2019, the share of aggregate earnings rose 1.96 percentage points in the size class consisting of metro areas with employment of at least 1 million, 1.20 percentage points in the second-largest size class, 0.92 percentage points in the third-largest size class, and by between 0.63-and-0.76 percentage points in the other three size classes.

### **Leading Metropolitan Areas**

Because of the very wide differences in size of the 384 metro areas — 2019 employment ranged from 28,500 to 10.2 million — identification of the nation’s leading STEM centers is made by size class, based on the STEM shares of employment and aggregate earnings. The criteria for inclusion as a leading STEM center in 2019 is a share of employment of at least 6.5 percent *and* a share of aggregate earnings of at least 12 percent. The leading STEM centers based on the change in STEM share between 2005 and 2019 had a change in the share of employment of at least 1 percentage point *and* a change in the share of aggregate earnings of at least 2 percentage points. Each list includes 35 metro areas, with 20 metro areas meeting the criteria based on both 2019 share and the change in share between 2005 and 2019. The 50 metro areas appearing on at least one of the lists are shown in Table S-1.

Each size class includes metro areas with high STEM shares of aggregate earnings and employment in 2019, but the first size class has the highest proportion of metro areas on the list, followed by the next two largest size classes. Similarly, each size class includes metro areas with a strong change in STEM shares of aggregate earnings and employment, but the first size class has the highest proportion of metro areas on the list, followed by the next size class.

Among the largest metro areas, three stand out as ranking near the top on both the 2019 STEM share and the change in share between 2005 and 2019: San Jose and adjacent San Francisco, and Seattle. Washington, D.C. joins this group based on 2019 share, but lags behind on the gain in STEM intensity. Metro areas commonly considered to be leaders rank next highest on the 2019 share: Austin, Boston, and Denver. Metro Detroit joins this group. Except for Austin, each of these metro areas are among the leaders based on the change in share between 2005 and 2019.

Based on the nine regions defined by the U.S. Census Bureau, the geographical distribution of the 35 leading metro areas in 2019 is quite uneven, with 19 percent of the metro areas in the Rocky Mountain region on the list, followed by 15 percent of the metro areas in the Pacific region. In contrast, less than 5 percent of the metro areas in the West North Central, West South Central, and East South Central regions were among the leaders. Five of eight Pacific metro areas with employment of at least 1 million are on the list, compared to only 8 percent of all other metro areas.

The geographic distribution of the metro areas experiencing strong gains in STEM shares between 2005 and 2019 is quite different from the distribution based on the 2019 share. Sixty percent of the metro areas in the East North Central region are on the list of leading metros based on the change in share. The Pacific and Rocky Mountain regions are only average on the change

**TABLE S-1**  
**LEADING METROPOLITAN AREAS BASED ON 2019 STEM SHARE AND ON THE CHANGE IN STEM SHARE**  
**BETWEEN 2005 AND 2019**

	2019	2005-to- 2019		2019	2005-to- 2019
<b>Employment of At Least 1 Million</b>			<b>Employment of 200,000 to 349,999</b>		
Austin-Round Rock-Georgetown, TX	X		Ann Arbor, MI	X	
Baltimore-Columbia-Towson, MD	X	X	Boulder, CO	X	
Boston-Cambridge-Newton, MA-NH	X	X	Huntsville, AL	X	
Charlotte-Concord-Gastonia, NC-SC		X	Lansing-East Lansing, MI		X
Denver-Aurora-Lakewood, CO	X	X	Manchester-Nashua, NH	X	
Detroit-Warren-Dearborn, MI	X	X	Palm Bay-Melbourne-Titusville, FL	X	X
Pittsburgh, PA		X	Provo-Orem, UT	X	X
Portland-Vancouver-Hillsboro, OR-WA	X		Trenton-Princeton, NJ	X	X
San Diego-Chula Vista-Carlsbad, CA	X	X	<b>Employment of 125,000 to 199,999</b>		
San Jose-Sunnyvale-Santa Clara, CA	X	X	Cedar Rapids, IA	X	X
San Francisco-Oakland-Berkeley, CA	X	X	Charlottesville, VA		X
Seattle-Tacoma-Bellevue, WA	X	X	Fort Collins, CO	X	
Washington-Arlington-Alexandria, DC-VA-MD-WV	X		Kennewick-Richland, WA	X	
<b>Employment of 350,000 to 999,999</b>			Norwich-New London, CT	X	X
Akron, OH		X	Peoria, IL		X
Charleston-North Charleston, SC		X	<b>Employment of 75,000 to 124,999</b>		
Colorado Springs, CO	X		Bloomington, IL	X	X
Dayton-Kettering, OH	X	X	Idaho Falls, ID	X	
Des Moines-West Des Moines, IA		X	Warner Robins, GA	X	
Durham-Chapel Hill, NC	X		Midland, TX	X	
Greenville-Anderson, SC		X	<b>Employment of Less Than 75,000</b>		
Madison, WI	X	X	California-Lexington Park, MD	X	X
Raleigh-Cary, NC	X	X	Columbus, IN	X	X
Salt Lake City, UT	X	X	Corvallis, OR	X	
			Cumberland, MD-WV		X
			Dubuque, IA		X
			Fond du Lac, WI		X
			Jackson, MI		X
			Monroe, MI		X
			Springfield, OH		X

Note: The criteria for inclusion as a leading STEM center in 2019 is a share of employment of at least 6.5 percent and a share of aggregate earnings of at least 12 percent. The leading STEM centers based on the change in STEM share between 2005 and 2019 had a change in the share of employment of at least 1 percentage point and a change in the share of aggregate earnings of at least 2 percentage points.

Sources: Emsi (employment and earnings). Definition of STEM occupations produced by authors.

in share, with 8 percent of the metro areas in each region appearing on the list. In contrast, no metro area from the East South Central or West South Central regions is among the leaders on the change in share.

A highly disproportionate number of the leading metro areas are geographically adjacent to another leading metro area. Of the 35 leading metro areas in Table S-1 based on the 2019 share, nearly half (17) are adjacent to another metro area on the list:

- San Jose and San Francisco, California
- Salt Lake City and Provo, Utah
- Fort Collins, Boulder, Denver, and Colorado Springs, Colorado
- Detroit and Ann Arbor, Michigan
- Boston, Massachusetts and Manchester, New Hampshire
- Washington D.C., and Baltimore and California-Lexington Park, Maryland
- Raleigh and Durham, North Carolina

Of the 35 leading metro areas in Table S-1 based on the 2005-to-2019 change in share, 16 are adjacent to another metro area on the list:

- San Jose and San Francisco, California
- Salt Lake City and Provo, Utah
- Cedar Rapids and Dubuque, Iowa
- Bloomington and Peoria, Illinois
- Monroe, Detroit, Lansing, and Jackson, Michigan
- Dayton and Springfield, Ohio
- Baltimore and California-Lexington Park, Maryland

## INTRODUCTION

Economic activities closely associated with STEM — science, technology, engineering, and mathematics — are the focus of this paper. STEM essentially is synonymous with “high technology.” The latest STEM data and the change over time are analyzed.

Conceptually, it is far superior to define STEM by occupation than by industry. Every worker classified into a STEM occupation, such as electronics engineers, is involved in STEM activities. In contrast, though a particular industry, such as semiconductor manufacturing, may be STEM intensive, a sizable proportion of its workforce do not work in STEM occupations, such as business support functions and production activities that may not require a substantive STEM education or knowledge base. On the other hand, industries that have little relationship to STEM, such as retail trade, have some employees working in STEM occupations, particularly those related to computers. Only occupational data are analyzed in this report.

### Employment and Earnings Data

The data used to analyze STEM occupations were obtained from Emsi ([www.economicmodeling.com](http://www.economicmodeling.com)), a private-sector company providing selected economic and related data for the nation, states, metropolitan areas, and counties. Access to the data is available only to subscribers, and limits are in place as to the amount of detail a subscriber can make public. Thus, data for specific occupations are not revealed in this paper.

Emsi updates its data estimates quarterly; the data used in this report come from Emsi’s third quarter 2020 data release. Emsi uses a variety of sources, predominantly federal government agencies, to develop its industrial and occupational estimates. The advantage of using Emsi’s data is that Emsi imputes values for the large volume of data that are withheld by the federal government. Federal laws intended to prevent the disclosure of information of a specific business or a specific individual result in a substantial amount of data being withheld from publication except for highly populous geographic areas.

Among the data available from Emsi are employment and median earnings per job by occupation. The occupational employment estimates are available annually for 2001 through 2019, but the earliest occupational earnings estimates are for 2005. In this paper, the 2005-to-2019 period is used to examine changes in STEM activity over time. Both 2005 and 2019 were during the expansionary phase of an economic cycle, though 2005 was in the middle of its expansion while 2019 came at the end of its expansion.

The primary source for the occupational data reported by Emsi is the Occupational Employment Statistics (OES) program of the U.S. Department of Labor’s Bureau of Labor Statistics (BLS), which releases estimates annually. Data for May 2019 were released in March 2020. The OES data are subject to serious limitations. Since the data are derived from a survey of employers, sampling error is a concern. Further, the survey instructs employers to report the number of employees in each occupation by wage range rather than report actual wages. In addition, the survey is conducted over a three-year cycle — it takes three years of semiannual surveying for the full panel of respondents to be surveyed. Thus, most of the responses used to produce the May 2019 estimates were collected before 2019, though the wage data from the earlier periods were adjusted for inflation. Emsi must estimate employment and earnings for workers not

covered by the OES survey and for the substantial number of OES occupations for which employment and/or earnings data are withheld from publication.

The 2018 version of the Standard Occupational Classification (SOC) identifies 867 detailed occupations, each of which is assigned a six-digit number, such as 15-2041 (statisticians). The occupations are organized into 23 major groups. While Emsi's occupational data are based on the SOC, Emsi does not provide estimates for every SOC detailed occupation, combining some SOC occupations. Emsi releases estimates for 756 detailed occupations.

Employment and median earnings per job are reported by Emsi for each of four categories of workers. The sum of three of these categories are used for this STEM analysis: wage and salary employees who are covered by the unemployment insurance program; wage and salary workers who are not covered by unemployment insurance; and self-employed individuals whose self-employment constitutes a high proportion of their total earnings and working hours.

As in some federal government programs, Emsi does not allocate all economic activity to a specific county. Each state has a "county not reported" category. Thus, STEM activity likely is slightly understated in metropolitan areas.

### **Measurement of STEM Activity**

Commonly, economic analyses focus on employment due to its simple concept and more ready availability. However, employment as reported in the United States has a serious shortcoming in that no measure of full-time equivalency is available: a part-time worker is counted the same as a full-time worker. In addition, earnings per job vary widely by occupation; thus, an indicator measured in dollars is more indicative of the economic impact of particular activities.

Aggregate earnings are estimated by multiplying employment by median earnings per job for each occupation. STEM totals are obtained by summing employment/aggregate earnings across the relevant occupations. While conceptually preferable to employment, the occupational aggregate earnings data are disadvantaged by the necessity of using median rather than average earnings per worker. Arithmetic operations using median values are limited. For example, using the median, the nonmetro portion of a state's aggregate earnings cannot be calculated as the state total minus the sum of the metro counties minus "county not reported." Thus, in this paper, both employment and aggregate earnings are used to measure STEM activities.

Two ways of measuring STEM activity are employed in this paper: (1) the total number of STEM workers and/or the total value of STEM aggregate earnings; and (2) STEM activity as a share of total employment and/or total aggregate earnings. The latter measure is emphasized.

The employment and aggregate earnings shares are very highly correlated in the 384 metro areas. The correlation between the STEM share of employment and the STEM share of aggregate earnings in 2019 is 0.985 and the correlation between the change in STEM share of employment and the change in STEM share of aggregate earnings between 2005 and 2019 is 0.934. The difference between the employment and aggregate earnings measures results from including earnings per job in the aggregate earnings calculation. Median earnings per job has a correlation of 0.677 with the aggregate earnings share and of 0.618 with the employment share.



Conceptually, overall earnings per job can be split into two components: (1) the occupational mix among STEM occupations, and (2) other factors that cause earnings per job to vary across the 384 metro areas. The cost of living is one of these other factors.

To illustrate the importance of the occupational mix, consider the example of two metro areas with identical earnings per job in each STEM occupation. The overall aggregate earnings share will be lower in the metro area with a higher proportion of jobs in occupations with lower earnings, such as technicians.

In order to measure variations in the STEM occupational mix across geographic areas, a measure of job quality — defined in terms of median earnings per job — within the STEM occupations was created by summing the following across the 81 STEM occupations:

**(the difference in employment share from the national average) times (national median earnings as a ratio to the overall STEM median earnings less 1) times 100**

The employment share is measured as the percentage of total STEM employment in each STEM occupation. The job quality measure by metro area is expressed relative to the national average. For example, a job quality value of 4.7 indicates that the STEM earnings per job figure is 4.7 percent higher than it would have been had the employment mix equaled the national average. Across the 384 metro areas, STEM median earnings per job in 2019 had a correlation of 0.71 with STEM job quality and 0.96 with other factors influencing the level of earnings per job.

### **Adjustment for Inflation and the Cost of Living**

When the total value of STEM aggregate earnings is presented in this paper, the values are adjusted for the cost of living, which varies widely across the nation's metropolitan areas. The cost-of-living adjustment uses the regional price parity (RPP) estimates produced by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). Estimates of the RPP are available by state and metropolitan area.

The RPP series is available only for 2008 through 2019. The relative cost of living changes only slowly over time, with the most significant changes occurring at turning points in the economic cycle. In the analysis for this paper, the 2008 RPP estimates were applied to the 2005 earnings data. While this introduces some error, it is more accurate to compare metro areas based on imperfect cost-of-living estimates than to entirely ignore the large differences in the regional cost of living.

In order to compare the aggregate earnings figures for 2005 and 2019, inflation must be considered. The earnings data for 2005 were adjusted to 2019 dollars using the national gross domestic product implicit price deflator produced by the BEA.

### **Identification of STEM Occupations**

Several efforts to identify STEM (or "high-technology") occupations have been made (see Appendix A for some of these sources). While the efforts have produced slightly different lists of

occupations, the correspondence is strong across the sources. Based on the consensus of these efforts, the STEM occupational definition used in this report includes the following occupations:

- Three occupations in the “management” major group.
- All occupations in the “computer and mathematical” major group.
- The engineering portion of the “architecture and engineering” major group.
- The life and physical sciences portion of the “life, physical, and social science” major group.

A total of 81 STEM occupations have been selected. They have been grouped into six categories: computer, mathematical science (math), engineering, engineering technician, life and physical science (science), and science technician. See Appendix B for a list of the STEM occupations by category.

A significant difference in size, as measured by employment or aggregate earnings, existed across the six occupational categories in 2019, with the computer category the largest by far, followed by engineering. The other four categories were considerably smaller than engineering. These size differences affect the correlations across the metro areas between the overall STEM share and the share of each category. The correlation between the overall STEM share and each categorical share varied: 0.90 with computer, 0.79 with engineering, 0.73 with math; 0.67 with engineering technician, 0.54 with science, and 0.31 with science technician.

Based on the shares of total aggregate earnings in 2019 in the 384 metro areas, the correlation between the engineering and engineering technician category is high (0.78). Correlations are not quite as high between the computer and math categories (0.66) or between the science and science technician categories (0.52). Correlations are moderate (from 0.40 to 0.46) between the computer and engineering, math and engineering, and math and engineering technician categories. The shares in the science technician categories are only slightly correlated (less than 0.15) to the shares in the computer, math, engineering, and engineering technician categories. Correlations also are relatively weak (from 0.19 to 0.25) between the science category and the math, engineering, and engineering technician categories. Thus, considerable differences exist across the 384 metro areas on the relative importance of each of the STEM categories.

Correlations between the occupational categories on the change in share between 2005 and 2019 are generally lower than the correlations in the 2019 shares, but mostly follow the same pattern in regard to the strength of relationship between any two STEM categories. The exceptions are that the moderate relationships in 2019 between the engineering and computer, and the math and engineering technician, categories are not present in the changes in share of these categories.

### **Geographic Areas**

A metropolitan area is defined by the federal government as one or more adjacent counties or county equivalents that have at least one urban core area of at least 50,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Currently, 384 metro areas in the 50 U.S. states consisting of 1,080 counties/county equivalents are defined. The federal government also defines 543 micropolitan areas consisting of 661 counties/county equivalents using the same criteria except that the core area has a population between 10,000 and 49,999. For this paper, the micropolitan areas are

combined with the 1,401 counties not identified as being part of a metro or micro area to form the U.S. “nonmetropolitan area.”

Economic activity is closely tied to individual labor market areas, which correspond to official definitions of metropolitan and micropolitan areas. The 384 metropolitan areas vary widely in size, with employment in 2019 ranging from 28,500 in the smallest metro area to 10.2 million in the largest. Half of the metro areas had employment of less than 125,000 in 2019.

Prior research revealed that even after adjusting for the cost of living, various economic measures are positively correlated with metro size, as measured by population or employment.<sup>1</sup> Similarly, the STEM shares of total aggregate earnings and of total employment are correlated with metro size, with metro size measured by employment or aggregate earnings. While not especially high, the correlations between size and STEM intensity are significant across the 384 metro areas. The correlations using 2019 data were 0.25 between total employment and the employment share, 0.26 between total employment and the aggregate earnings share, 0.27 between total aggregate earnings and the employment share, and 0.28 between total aggregate earnings and the aggregate earnings share. The correlation between 2019 size and the change in share between 2005 and 2019 is not as strong; for example, the correlation between 2019 employment and the change in employment share was 0.17.

Due to the relationship between metro area size and STEM intensity, instead of comparing each metro area to the average of the 384 metro areas, each metro area is compared to a size-class average. Any number of size classes could be devised. For this analysis of STEM economic activity, the nation’s 384 metropolitan areas are grouped into six size classes by the number of workers in 2019. The selection of the size classes was based on a combination of natural breaks in the distribution of 2019 STEM activity as measured by STEM employment and aggregate earnings as a share of the total, and natural breaks in the distribution of 2019 employment, across the metro areas:

- 36 metro areas with employment of at least 1 million, accounting for 9.4 percent of the number of metro areas and 58.9 percent of metro area employment. In this paper, this group is referred to as either “the largest size class” or “SC1” (with “SC” the abbreviation for “size class”).
- 45 metro areas with employment of between 350,000 and 999,999, accounting for 11.7 percent of metro areas and 16.4 percent of metro area employment. This is “SC2.”
- 46 metro areas with employment of between 200,000 and 349,999, accounting for 12.0 percent of metro areas and 8.4 percent of metro area employment. This is “SC3.”
- 62 metro areas with employment of between 125,000 and 199,999, accounting for 16.1 percent of metro areas and 6.8 percent of metro area employment. This is “SC4.”
- 71 metro areas with employment of between 75,000 and 124,999, accounting for 18.5 percent of metro areas and 4.7 percent of metro area employment. This is “SC5.”
- 124 metro areas with employment of less than 75,000, accounting for 32.3 percent of metro areas and 4.7 percent of metro area employment. This is “SC6” or “the smallest size class.”

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<sup>1</sup> For example, see the May 2017 Office of the University Economist papers “The Geographic Distribution of Average Earnings Per Worker” and “Job Quality in the Metropolitan Areas of the United States,” available from <https://economist.asu.edu/P3/job-quality>.

Based on employment, the STEM share in 2005 and in 2019 was calculated for nonmetropolitan areas. The nonmetropolitan area of each state was calculated as the state total minus the sum of the metropolitan counties in the state minus the “county not reported” category. Direct measurement of the nonmetro area of each state is impractical due to the large number (more than 2,000) of nonmetro counties/county equivalents in the United States.

## **STEM ECONOMIC ACTIVITY BY METROPOLITAN AREA**

STEM occupations make up 10.7 percent of all occupations but accounted for only 5.51 percent of all employment in the United States in 2019. However, for aggregate earnings, the STEM share was 10.18 percent. The higher STEM share of aggregate earnings than employment results from the median earnings per job of STEM occupations being 1.94 times as high as the median of non-STEM occupations nationally.

### **STEM Share by Metropolitan Size Class and Occupational Category**

The STEM shares in the U.S. metropolitan area of 5.70 percent of employment and 10.41 percent of aggregate earnings in 2019 are greater than the national figures. Table 1 summarizes the 2019 STEM shares of aggregate earnings and employment by occupational category and by metropolitan size class, with comparisons to the nation and to the total of all 384 metro areas. Based on both aggregate earnings and employment, the overall STEM share was highest in SC1 and declined with size class, being lowest in SC6. The general pattern of decreasing STEM share with decreasing metro size was present in the computer, math, engineering, and science categories. In contrast, in the two technician categories, there was no clear relationship between STEM share and metro size, though the largest size class generally had the *lowest* share.

The computer category accounted for more than 55 percent of total STEM employment and total STEM aggregate earnings in the U.S. metropolitan area in 2019. The engineering category accounted for more than 20 percent of the STEM total. The share was less than 8 percent in each of the other four categories.

The computer category's share of both STEM employment and STEM aggregate earnings was positively correlated to metro size, with the share ranging from 62 percent in the largest size class to 40 percent in the smallest size class. The math category's share also was positively correlated to metro size. In contrast, the shares of the science, science technician, and engineering technician categories were inversely related to metro size and the engineering category's shares were partially inversely related.

The change between 2005 and 2019 in the occupational STEM share of aggregate earnings and employment by occupational category and by size class is displayed in Table 2. As with the 2019 shares, the change in the overall STEM share was related to metro size. The greatest increase occurred in SC1, followed by SC2 and then SC3. The increases in the three other size classes were similar but less than in SC3. The general pattern of decreasing change in share with decreasing metro size was present in the computer and math categories. In contrast, in the engineering and engineering technician categories, the change in STEM share largely was inversely related to metro size. In the science and science technician categories, there was no clear relationship between the change in STEM share and metro size.

The computer category accounted for more than 90 percent of the overall increase in the share of total STEM aggregate earnings and total STEM employment between 2005 and 2019 in the U.S. metropolitan area. The math, engineering, and science categories also contributed to the overall increase in STEM share, but the small positive contributions of these three categories were largely offset by the decline in share in the engineering technician category.



**TABLE 1**  
**STEM SHARES BY METROPOLITAN SIZE CLASS AND OCCUPATIONAL CATEGORY, 2019**

	STEM Total	Computer	Math	Engineer- ing	Engineer- ing Tech- nician	Science	Science Tech- nician
<b>Aggregate Earnings, Share of Total</b>							
United States	10.18%	5.96%	0.23%	2.52%	0.52%	0.74%	0.21%
U.S. Metro Area	10.41	6.12	0.24	2.57	0.51	0.76	0.21
Employment of At Least 1 Million	11.66	7.29	0.28	2.61	0.48	0.80	0.19
Employment of 350,000 to 999,999	9.47	5.12	0.22	2.65	0.59	0.68	0.21
Employment of 200,000 to 349,999	8.37	4.11	0.15	2.62	0.54	0.73	0.22
Employment of 125,000 to 199,999	7.28	3.29	0.13	2.38	0.56	0.69	0.24
Employment of 75,000 to 124,999	6.85	3.09	0.14	2.11	0.56	0.68	0.26
Employment of Less Than 75,000	6.47	2.61	0.12	2.28	0.56	0.65	0.25
<b>Employment, Share of Total</b>							
United States	5.51	3.11	0.12	1.22	0.43	0.41	0.21
U.S. Metro Area	5.70	3.24	0.13	1.26	0.44	0.42	0.21
Employment of At Least 1 Million	6.44	3.89	0.16	1.31	0.43	0.45	0.20
Employment of 350,000 to 999,999	5.40	2.90	0.12	1.30	0.49	0.39	0.20
Employment of 200,000 to 349,999	4.63	2.28	0.08	1.22	0.44	0.40	0.21
Employment of 125,000 to 199,999	4.11	1.89	0.07	1.11	0.45	0.39	0.21
Employment of 75,000 to 124,999	3.92	1.79	0.07	0.99	0.44	0.38	0.25
Employment of Less Than 75,000	3.61	1.50	0.06	1.05	0.42	0.35	0.23
U.S. Nonmetro Area	2.79	1.02	0.04	0.84	0.36	0.32	0.21

Sources: Emsi (employment and earnings). Definition of STEM occupations produced by authors.

**TABLE 2**  
**STEM SHARES BY METROPOLITAN SIZE CLASS AND OCCUPATIONAL CATEGORY,**  
**CHANGE BETWEEN 2005 AND 2019**

	STEM Total	Computer	Math	Engineer- ing	Engineer- ing Tech- nician	Science	Science Tech- nician
<b>Aggregate Earnings, Percentage-Point Change in Share of Total</b>							
United States	1.70	1.61	0.11	0.09	-0.18	0.09	-0.01
U.S. Metro Area	1.64	1.56	0.11	0.09	-0.19	0.08	-0.01
Employment of At Least 1 Million	1.96	1.95	0.13	0.01	-0.21	0.09	-0.01
Employment of 350,000 to 999,999	1.20	1.04	0.08	0.21	-0.16	0.05	-0.02
Employment of 200,000 to 349,999	0.92	0.83	0.06	0.12	-0.18	0.09	0.00
Employment of 125,000 to 199,999	0.76	0.60	0.05	0.23	-0.16	0.05	-0.01
Employment of 75,000 to 124,999	0.63	0.45	0.06	0.19	-0.12	0.06	-0.01
Employment of Less Than 75,000	0.76	0.40	0.06	0.34	-0.09	0.06	-0.01
<b>Employment, Percentage-Point Change in Share of Total</b>							
United States	0.83	0.74	0.06	0.09	-0.12	0.06	0.00
U.S. Metro Area	0.74	0.69	0.06	0.08	-0.13	0.05	0.00
Employment of At Least 1 Million	0.88	0.87	0.07	0.03	-0.15	0.06	0.00
Employment of 350,000 to 999,999	0.63	0.53	0.05	0.14	-0.12	0.04	-0.01
Employment of 200,000 to 349,999	0.47	0.41	0.03	0.08	-0.12	0.06	0.01
Employment of 125,000 to 199,999	0.36	0.28	0.03	0.12	-0.11	0.05	0.00
Employment of 75,000 to 124,999	0.33	0.20	0.03	0.12	-0.09	0.05	0.00
Employment of Less Than 75,000	0.41	0.22	0.03	0.18	-0.07	0.04	0.00
U.S. Nonmetro Area	0.16	0.10	0.02	0.10	-0.08	0.04	-0.01

Sources: Emsi (employment and earnings). Definition of STEM occupations produced by authors.

The computer category's change in share of both STEM employment and STEM aggregate earnings was positively correlated to metro size, accounting for nearly 100 percent of the overall change in the largest size class to less than 55 percent of the total change in the smallest size class. In contrast, the contribution from the engineering category was inversely related to metro size, ranging from more than 40 percent of the total change in SC6 to nearly zero in SC1. The change in share in the science category was partially inversely related to metro size; no pattern with metro size can be discerned in the contributions of the other categories.

The relationship between size and STEM intensity extends to include the U.S. nonmetropolitan area. Based on employment, the nonmetro STEM share of 2.79 percent in 2019 was considerably less than the 3.61 percent share in SC6. The change in the nonmetro share between 2005 and 2019 of 0.16 percentage points was less than the change in each of the six metro size classes. By category, the 2019 STEM share in the nonmetro area was less than in each of the metro size classes except in the science technician category. The 2005-to-2019 change in share was less than in each of the size classes in the computer and math categories.

STEM shares in the "county not reported" category are significantly greater than the shares even in SC1. In 2019, the national "county not reported" share was 12.35 percent based on employment and 20.52 percent based on aggregate earnings. The change in share between 2005 and 2019 was 5.55 percentage points based on employment and 8.28 percentage points based on aggregate earnings.

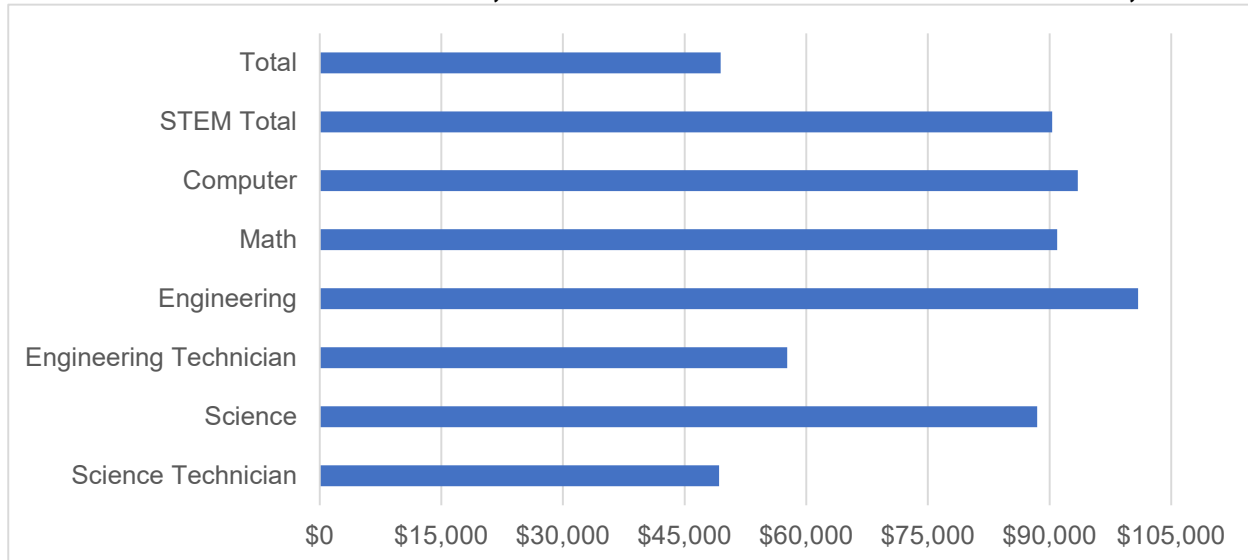
### **Occupational Median Earnings Per Job**

In 2019, the cost-of-living-adjusted median earnings per job in STEM occupations was \$90,310 in the U.S. metropolitan area (the sum of the 384 metro areas), 1.83 times higher than the overall adjusted median earnings per job of all occupations of \$49,460. Among the STEM occupational categories, adjusted median earnings per job in 2019 was highest in engineering at 2.04 times the adjusted median of all occupations. The ratio was between 1.79 and 1.89 in the computer, math, and science categories (see Chart 1). Thus, in each of these four categories, the STEM share of aggregate earnings was much higher than the STEM share of employment. In contrast, the median earnings ratio to the overall median was only 1.17 in the engineering technician category. In the science technician category, median earnings per job was marginally less than the overall median earnings per job. Thus, the STEM share in the science technician category was similar based on employment and aggregate earnings.

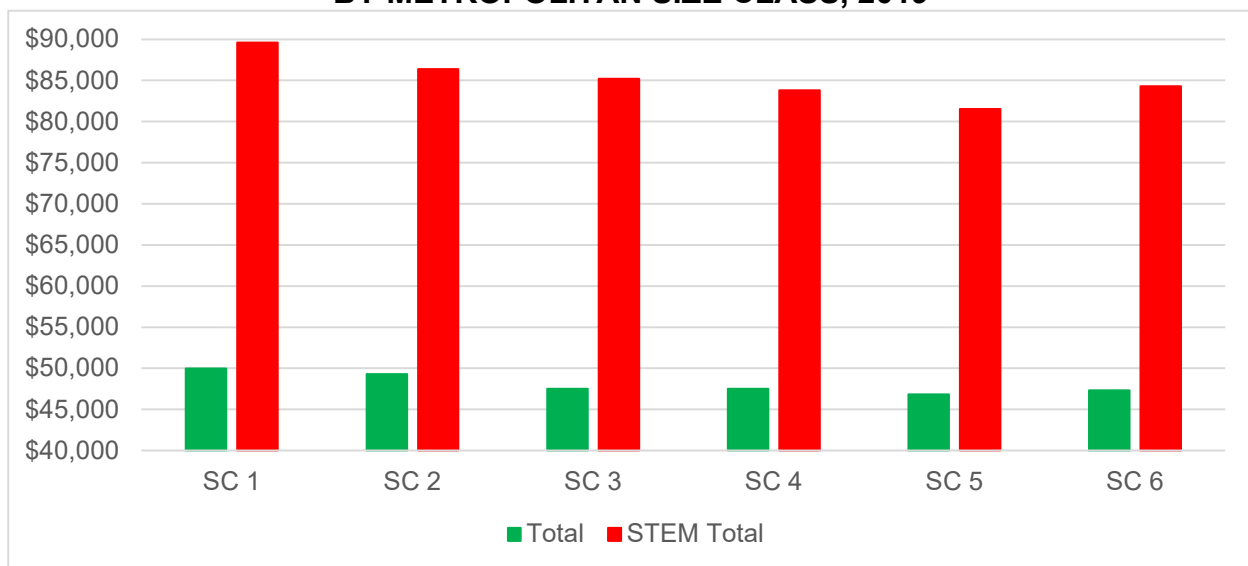
Even after adjustment for the cost of living, median earnings per job in 2019 was related to metropolitan size, both for all occupations and for STEM occupations. As seen in Chart 2, median earnings was highest in the largest size class and next highest in SC2.

The inflation-adjusted percent change in cost-of-living-adjusted median earnings per job between 2005 and 2019 is displayed in Chart 3 by occupational category. While the overall percent increase in STEM occupations exceeded the overall total, this entirely resulted from the computer category. The real percent change in adjusted median earnings by size class is shown in Chart 4; differences in the percent change by size class were not substantial for either the total of all occupations or the STEM total.

**CHART 1**  
**MEDIAN EARNINGS PER JOB ADJUSTED FOR THE COST OF LIVING BY**  
**OCCUPATIONAL CATEGORY, UNITED STATES METROPOLITAN AREA, 2019**



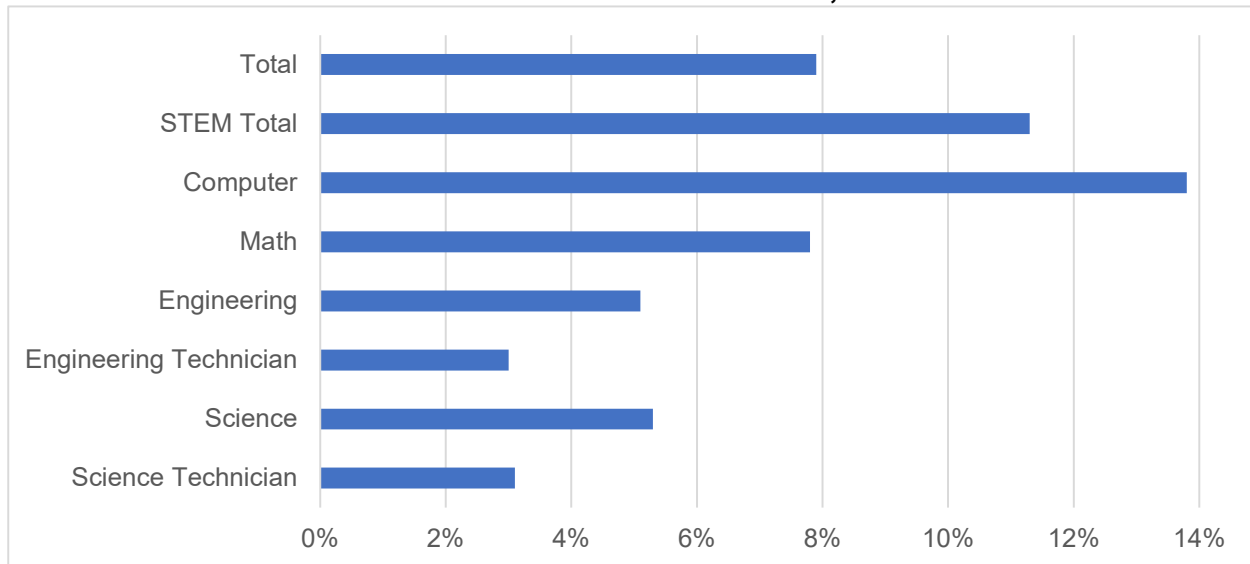
**CHART 2**  
**MEDIAN EARNINGS PER JOB ADJUSTED FOR THE COST OF LIVING**  
**BY METROPOLITAN SIZE CLASS, 2019**



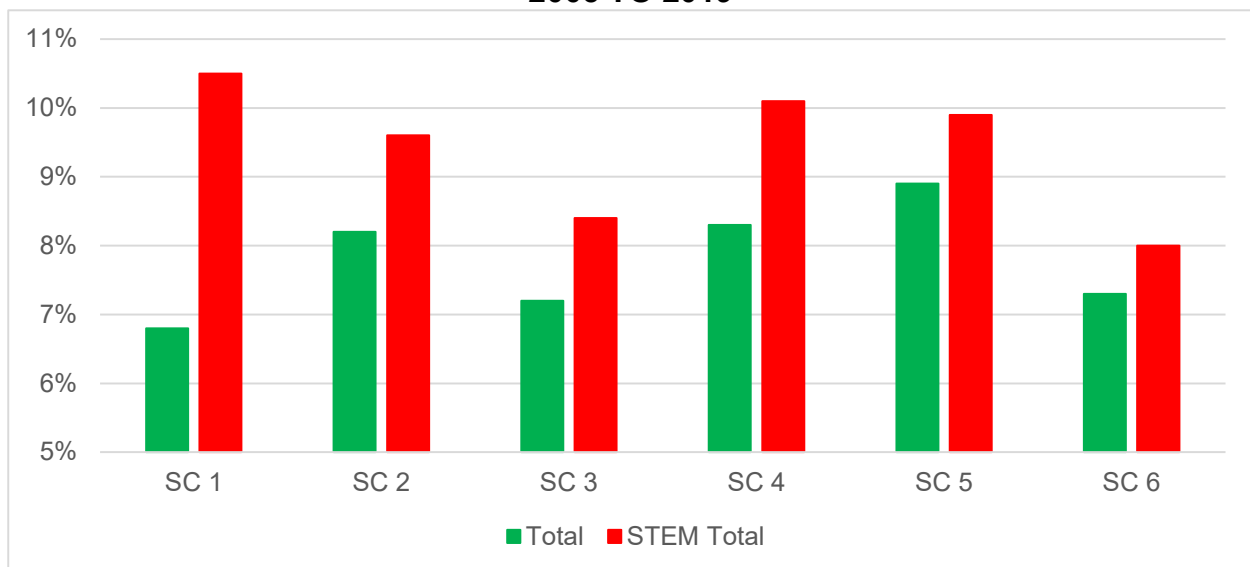
Note: The size classes are based on employment in 2019. SC1: at least 1 million; SC2: 350,000 to 999,999; SC3: 200,000 to 349,999; SC4: 125,000 to 199,999; SC5: 75,000 to 124,999; SC6: less than 75,000.

Sources (Charts 1 and 2): Emsi (median earnings per job) and U.S. Department of Commerce, Bureau of Economic Analysis (regional price parity). Definition of STEM occupations produced by authors.

**CHART 3**  
**INFLATION-ADJUSTED PERCENT CHANGE IN MEDIAN EARNINGS PER JOB**  
**ADJUSTED FOR THE COST OF LIVING BY OCCUPATIONAL CATEGORY,**  
**UNITED STATES METROPOLITAN AREA, 2005 TO 2019**



**CHART 4**  
**INFLATION-ADJUSTED PERCENT CHANGE IN MEDIAN EARNINGS PER JOB**  
**ADJUSTED FOR THE COST OF LIVING BY METROPOLITAN SIZE CLASS,**  
**2005 TO 2019**



Sources (Charts 3 and 4): Emsi (median earnings per job) and U.S. Department of Commerce, Bureau of Economic Analysis (regional price parity and gross domestic product implicit price deflator). Definition of STEM occupations produced by authors.



Median earnings per job in STEM occupations adjusted for the cost of living was greater than the national average of \$89,697 in 2019 in only 82 of the 384 metro areas (21 percent of the areas). The inflation-adjusted percent change between 2005 and 2019 in adjusted median earnings exceeded the national average of 10.1 percent in 155 metro areas (40 percent); two other metros matched the U.S. average.

### **Occupational STEM Job Quality and**

#### **Median Earnings Per Job in STEM Occupations After Adjustment for Job Quality**

As with the adjusted median earnings per job and the STEM share of total employment and aggregate earnings, STEM job quality in 2019 was strongly related to metro size. Differences in the job quality were large between SC1 and SC2 and between SC2 and SC3. Little difference was present between SCs 5 and 6. In only 55 metro areas — 14 percent of all metros — was job quality greater than the national average. Only in SC1 was the median job quality value in 2019 greater than the national average.

The change in STEM job quality between 2005 and 2019 also was related to metro size, with a large difference between SC1 and SC2 and moderate differences between SC2 and SC3 and between SC3 and SC4. Only 90 metro areas (23 percent) had a change greater than the national average. The change in the median job quality value between 2005 and 2019 was greater than the national average only in SC1.

The portion of median earnings per job affected by factors other than job quality also was related to metro size. In 2019, the figure was highest in SC1 and declined through SC5. The 2005-to-2019 change in median earnings adjusted for job quality also was related to metro size, with the greatest change in SC1, followed by SC2. The change was similar in the other size classes at less than in SC2.

### **Leading Metropolitan Areas Based on STEM Share in 2019**

Each metropolitan area with a 2019 occupational STEM share of total aggregate earnings of at least 12 percent *and* an employment share of at least 6.5 percent are shown by size class in Table 3. Also included in the table is the STEM value of aggregate earnings adjusted for the cost of living and STEM employment. STEM activity in each of the 384 metro areas is summarized in Appendix C.

Each of the regions of the country, as defined by the U.S. Census Bureau, has at least one representative among the 35 metro areas listed in Table 3. However, the geographical distribution of these 35 metro areas is quite uneven, with 19 percent of the metro areas in the Rocky Mountain region and 15 percent of the metro areas in the Pacific region appearing on the list. In contrast, less than 5 percent of the metro areas in the West North Central, West South Central, and East South Central regions were among the leaders. Five of eight Pacific metro areas in SC1 are on the list, compared to only 8 percent of all other metro areas.

Of the 35 metro areas listed in Table 3, nearly half (17) are adjacent to another metro area on the list:

- San Jose and San Francisco, California
- Salt Lake City and Provo, Utah

- Fort Collins, Boulder, Denver, and Colorado Springs, Colorado
- Detroit and Ann Arbor, Michigan
- Boston, Massachusetts and Manchester, New Hampshire
- Washington D.C., and Baltimore and California-Lexington Park, Maryland
- Raleigh and Durham, North Carolina

Each size class includes metro areas with high STEM shares of aggregate earnings and employment, but SC1 has the highest proportion of metro areas on the list, followed by SCs 2 and 3. The STEM value of aggregate earnings and employment varies much more widely across the size classes than the STEM share. The average metro area value of aggregate earnings in 2019 was \$13.6 billion in SC1, \$2.4 billion in SC2, \$1.0 billion in SC3, \$544 million in SC4, \$306 million in SC5, and \$167 million in SC6. The value in Metro Las Vegas, the lowest of the 36 metro areas in SC1, is exceeded only by 14 metro areas in SC2 and one in SC3.

For the 35 metro areas listed in Table 3, the 2019 STEM employment shares for each of the six occupational categories are displayed in Table 4. The mix of employment in STEM occupations varies considerably across the leading metro areas.

### **Leading Metropolitan Areas Based on the Change in STEM Share Between 2005 and 2019**

Each metropolitan area with a 2005-to-2019 change in occupational STEM share of total aggregate earnings of at least 2 percentage points *and* a change in employment share of at least 1 percentage point is shown by size class in Table 5.

The geographic distribution of the metro areas experiencing a strong gain in STEM share between 2005 and 2019 is quite different from the 2019 distribution. The Pacific and Rocky Mountain regions are only average on the change in share with 8 percent of the metro areas in each region appearing on the list. In contrast, 60 percent of the metro areas in the East North Central region (Illinois, Indiana, Michigan, Ohio, and Wisconsin) are on the list of leading metros based on the change in share. No metro area from the East South Central (Alabama, Kentucky, Mississippi, and Tennessee) or West South Central (Arkansas, Louisiana, Oklahoma, and Texas) regions is among the leaders on the change in share.

Of the 35 metro areas listed in Table 5, 16 are adjacent to another metro area on the list:

- San Jose and San Francisco, California
- Salt Lake City and Provo, Utah
- Cedar Rapids and Dubuque, Iowa
- Bloomington and Peoria, Illinois
- Monroe, Detroit, Lansing, and Jackson, Michigan
- Dayton and Springfield, Ohio
- Baltimore and California-Lexington Park, Maryland

Each size class includes metro areas with a strong change in STEM share of aggregate earnings and employment, but SC1 has the highest proportion of metro areas on the list, followed by SC 2.

**TABLE 3**  
**LEADING METROPOLITAN AREAS BASED ON THE 2019 STEM SHARE OF EMPLOYMENT**  
**AND AGGREGATE EARNINGS, BY SIZE CLASS**

	STEM Share				STEM Value			
	Aggregate Earnings		Employment		Aggregate Earnings		Employment	
	Rank	Share	Rank	Share	Rank	Dollars*	Rank	Number
<b>SC1: Employment of At Least 1 Million (N=36)</b>								
San Jose-Sunnyvale-Santa Clara, CA	1	31.13%	1	18.35%	6	\$23,622	9	228,393
Seattle-Tacoma-Bellevue, WA	2	18.85	2	10.34	5	24,146	8	238,464
San Francisco-Oakland-Berkeley, CA	3	17.83	4	10.14	4	25,371	4	280,319
Washington-Arlington-Alexandria, DC-VA-MD-WV	4	16.91	3	10.30	2	34,333	2	365,255
Austin-Round Rock-Georgetown, TX	5	15.92	5	9.00	19	9,538	19	105,762
Detroit-Warren-Dearborn, MI	6	14.70	7	8.45	12	16,367	13	177,716
Boston-Cambridge-Newton, MA-NH	7	14.39	6	8.77	7	23,318	5	264,449
Denver-Aurora-Lakewood, CO	8	14.17	8	8.33	15	12,940	15	140,160
Baltimore-Columbia-Towson, MD	9	14.06	9	7.86	18	11,100	18	119,300
San Diego-Chula Vista-Carlsbad, CA	10	14.05	10	7.82	17	11,755	16	138,636
Portland-Vancouver-Hillsboro, OR-WA	11	12.22	11	7.43	20	8,481	21	101,190
<b>SC2: Employment of 350,000 to 999,999 (N=45)</b>								
Durham-Chapel Hill, NC	1	16.95	1	9.84	7	3,480	10	35,678
Raleigh-Cary, NC	2	16.68	2	9.37	1	6,135	1	65,964
Madison, WI	3	14.39	3	9.12	10	3,267	6	39,508
Colorado Springs, CO	4	13.56	7	7.09	19	2,462	22	26,066
Dayton-Kettering, OH	5	13.13	5	7.28	11	2,997	16	30,161
Salt Lake City, UT	6	12.45	4	7.46	2	4,913	2	60,918
<b>SC3: Employment of 200,000 to 349,999 (N=46)</b>								
Huntsville, AL	1	28.15	1	14.86	1	4,149	1	37,491
Boulder, CO	2	24.18	2	14.28	2	2,930	2	30,483
Palm Bay-Melbourne-Titusville, FL	3	18.43	3	9.43	4	2,202	4	23,262
Trenton-Princeton, NJ	4	14.59	4	8.97	3	2,290	3	24,973
Manchester-Nashua, NH	5	14.20	6	7.74	7	1,551	7	17,418
Ann Arbor, MI	6	13.10	5	8.75	6	1,660	5	21,671
Provo-Orem, UT	7	12.35	7	6.85	5	1,661	6	20,260

(continued)

**TABLE 3 (continued)**  
**LEADING METROPOLITAN AREAS BASED ON THE 2019 STEM SHARE OF EMPLOYMENT**  
**AND AGGREGATE EARNINGS, BY SIZE CLASS**

	STEM Share				STEM Value			
	Aggregate Earnings		Employment		Aggregate Earnings		Employment	
	Rank	Share	Rank	Share	Rank	Dollars*	Rank	Number
<b>SC4: Employment of 125,000 to 199,999 (N=62)</b>								
Cedar Rapids, IA	1	14.48%	1	7.98%	2	\$1,241	2	12,546
Kennewick-Richland, WA	2	14.12	3	7.34	4	1,035	5	10,208
Fort Collins, CO	3	13.22	2	7.67	3	1,201	1	14,583
Norwich-New London, CT	5	12.26	6	7.05	6	884	7	9,809
<b>SC5: Employment of 75,000 to 124,999 (N=71)</b>								
Bloomington, IL	1	22.25	1	11.10	1	1,098	1	10,075
Idaho Falls, ID	2	18.44	2	8.57	4	671	4	6,536
Warner Robins, GA	3	12.59	4	6.97	5	532	8	5,802
Midland, TX	4	12.48	5	6.89	2	809	3	8,329
<b>SC6: Employment of Less Than 75,000 (N=124)</b>								
California-Lexington Park, MD	1	36.96	1	23.40	1	1,348	1	12,146
Columbus, IN	2	19.20	2	11.14	2	568	2	6,066
Corvallis, OR	3	14.35	3	8.86	7	313	7	3,952

\* In millions, adjusted for the cost of living.

Note: Metropolitan areas with a STEM aggregate earnings share of at least 12 percent *and* a STEM employment share of at least 6.5 percent are listed. The ranks are within the size class.

Sources: Emsi (employment and earnings) and U.S. Department of Commerce, Bureau of Economic Analysis (regional price parity). Definition of STEM occupations produced by authors.

**TABLE 4**  
**STEM EMPLOYMENT SHARES BY CATEGORY IN LEADING METROPOLITAN AREAS, 2019**

	Share of Employment, Rank in Size Class						Share of Employment					
	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech
<b>SC1 (N=36)</b>												
San Jose	1	11	2	1	9	4	12.66%	0.19%	3.68%	0.90%	0.62%	0.31%
Seattle	2	6	6	15	7	18	6.96	0.21	1.84	0.49	0.65	0.19
San Francisco	4	3	10	10	4	10	6.61	0.22	1.66	0.51	0.87	0.27
Washington DC	3	1	14	22	3	27	6.91	0.43	1.46	0.40	0.94	0.16
Austin	5	10	9	5	13	17	5.85	0.19	1.67	0.64	0.46	0.19
Detroit	18	27	1	6	29	24	3.43	0.12	3.90	0.60	0.25	0.16
Boston	7	4	8	11	1	3	4.89	0.22	1.70	0.50	1.15	0.31
Denver	6	25	7	16	12	9	5.26	0.13	1.72	0.47	0.47	0.28
Baltimore	8	2	11	13	10	6	4.67	0.26	1.54	0.50	0.60	0.30
San Diego	15	30	4	4	2	5	3.71	0.10	2.07	0.67	0.96	0.31
Portland	16	22	3	2	14	8	3.67	0.14	2.14	0.73	0.46	0.29
<b>SC2 (N=45)</b>												
Durham	3	1	22	18	1	4	5.43	0.32	1.37	0.50	1.86	0.37
Raleigh	1	9	10	12	4	6	5.88	0.20	1.59	0.56	0.83	0.31
Madison	2	7	18	23	2	3	5.55	0.21	1.44	0.45	1.05	0.42
Colorado Springs	4	23	23	13	30	34	4.69	0.09	1.36	0.54	0.27	0.15
Dayton	8	6	1	15	24	37	3.83	0.21	2.24	0.53	0.32	0.13
Salt Lake City	5	4	26	8	9	5	4.53	0.24	1.23	0.63	0.50	0.33
<b>SC3 (N=46)</b>												
Huntsville	2	2	1	1	20	30	6.53	0.20	6.19	1.44	0.34	0.16
Boulder	1	12	3	7	1	4	7.85	0.10	3.27	0.65	1.97	0.44
Palm Bay	7	10	2	2	32	38	4.00	0.11	3.81	1.14	0.26	0.11
Trenton	4	1	12	9	2	2	4.38	0.25	1.40	0.55	1.85	0.54
Manchester	5	8	5	4	24	24	4.25	0.13	2.10	0.77	0.31	0.17
Ann Arbor	6	5	4	21	3	1	4.05	0.16	2.25	0.44	1.05	0.81
Provo	3	21	26	25	17	27	5.04	0.08	0.84	0.36	0.37	0.17

(continued)



**TABLE 4 (continued)**  
**STEM EMPLOYMENT SHARES BY CATEGORY IN LEADING METROPOLITAN AREAS, 2019**

	Share of Employment, Rank in Size Class						Share of Employment					
	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech
<b>SC4 (N=62)</b>												
Cedar Rapids	1	6	5	9	29	33	4.69%	0.13%	2.02%	0.70%	0.26%	0.18%
Kennewick	36	21	2	5	3	1	1.57	0.07	2.58	0.78	1.47	0.86
Fort Collins	9	35	4	4	2	18	2.98	0.06	2.07	0.80	1.52	0.25
Norwich	19	17	1	15	11	5	2.09	0.09	3.41	0.52	0.53	0.42
<b>SC5 (N=71)</b>												
Bloomington, IL	1	1	68	70	50	49	9.63	0.52	0.44	0.15	0.21	0.15
Idaho Falls	10	5	1	8	3	2	2.41	0.15	3.23	0.63	1.18	0.97
Warner Robins	7	4	3	2	30	24	2.68	0.15	2.53	1.02	0.36	0.24
Midland, TX	28	23	2	4	8	4	1.71	0.08	2.92	0.88	0.69	0.62
<b>SC6 (N=124)</b>												
California, MD	1	1	1	1	7	48	8.94	1.37	9.17	2.91	0.80	0.22
Columbus, IN	9	9	2	2	50	80	2.82	0.12	5.62	2.10	0.33	0.14
Corvallis	6	18	8	6	1	1	3.19	0.10	2.23	0.93	1.39	1.02

Note: Metropolitan areas with a STEM aggregate earnings share of at least 12 percent *and* a STEM employment share of at least 6.5 percent are listed. The ranks are within the size class.

Sources: Emsi (employment). Definition of STEM occupations produced by authors.

**TABLE 5**  
**LEADING METROPOLITAN AREAS BASED ON THE 2005-TO-2019 PERCENTAGE-POINT CHANGE**  
**IN STEM SHARE OF EMPLOYMENT AND AGGREGATE EARNINGS, BY SIZE CLASS**

	Aggregate Earnings		Employment	
	Rank	Share	Rank	Share
<b>SC1: Employment of At Least 1 Million (N=36)</b>				
San Jose-Sunnyvale-Santa Clara, CA	1	6.47	1	3.79
San Francisco-Oakland-Berkeley, CA	2	5.58	2	2.78
Seattle-Tacoma-Bellevue, WA	3	5.32	3	2.28
Detroit-Warren-Dearborn, MI	4	3.07	6	1.48
Baltimore-Columbia-Towson, MD	5	2.70	9	1.23
Boston-Cambridge-Newton, MA-NH	6	2.58	4	1.63
Charlotte-Concord-Gastonia, NC-SC	7	2.42	8	1.25
Denver-Aurora-Lakewood, CO	9	2.32	5	1.51
San Diego-Chula Vista-Carlsbad, CA	10	2.24	13	1.09
Pittsburgh, PA	12	2.08	7	1.25
<b>SC2: Employment of 350,000 to 999,999 (N=45)</b>				
Madison, WI	1	4.64	1	2.68
Raleigh-Cary, NC	2	4.02	2	2.08
Charleston-North Charleston, SC	3	3.02	3	1.53
Salt Lake City, UT	4	2.79	5	1.44
Des Moines-West Des Moines, IA	5	2.64	4	1.45
Dayton-Kettering, OH	6	2.41	6	1.27
Greenville-Anderson, SC	7	2.35	7	1.23
Akron, OH	8	2.03	9	1.16
<b>SC3: Employment of 200,000 to 349,999 (N=46)</b>				
Palm Bay-Melbourne-Titusville, FL	1	3.41	1	1.57
Provo-Orem, UT	2	2.99	3	1.47
Trenton-Princeton, NJ	3	2.99	2	1.51
Lansing-East Lansing, MI	4	2.28	4	1.42

(continued)

**TABLE 5 (continued)**  
**LEADING METROPOLITAN AREAS BASED ON THE 2005-TO-2019 PERCENTAGE-POINT CHANGE**  
**IN STEM SHARE OF EMPLOYMENT AND AGGREGATE EARNINGS, BY SIZE CLASS**

	Aggregate Earnings		Employment	
	Rank	Share	Rank	Share
<b>SC4: Employment of 125,000 to 199,999 (N=62)</b>				
Peoria, IL	1	3.58	2	1.27
Cedar Rapids, IA	2	3.03	1	1.47
Norwich-New London, CT	3	2.53	3	1.19
Charlottesville, VA	4	2.02	4	1.16
<b>SC5: Employment of 75,000 to 124,999 (N=71)</b>				
Bloomington, IL	1	7.70	1	2.39
<b>SC6: Employment of Less Than 75,000 (N=124)</b>				
Columbus, IN	1	8.54	1	4.80
Jackson, MI	2	4.40	4	2.30
Fond du Lac, WI	3	4.39	3	2.82
Springfield, OH	4	4.07	5	1.97
Cumberland, MD-WV	5	2.90	6	1.46
Dubuque, IA	6	2.82	7	1.37
Monroe, MI	7	2.78	8	1.28
California-Lexington Park, MD	9	2.42	2	2.89

Note: Metropolitan areas with a change in the STEM aggregate earnings share of at least 2 percentage points *and* a change in the STEM employment share of at least 1 percentage point are listed. The ranks are within the size class.

Sources: Emsi (employment and earnings). Definition of STEM occupations produced by authors.

**TABLE 6**  
**CHANGE IN STEM EMPLOYMENT SHARES BETWEEN 2005 AND 2019 BY CATEGORY**  
**IN LEADING STEM METROPOLITAN AREAS**

	Share of Employment, Rank in Size Class						Share of Employment					
	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech
<b>SC1 (N=36)</b>												
San Jose	1	10	36	36	12	31	4.75	0.09	-0.61	-0.48	0.06	-0.02
San Francisco	2	3	13	24	2	26	2.43	0.11	0.11	-0.17	0.31	-0.01
Seattle	3	4	30	32	8	24	2.39	0.11	-0.06	-0.24	0.08	-0.01
Detroit	24	25	1	4	32	27	0.63	0.06	0.89	-0.08	0.00	-0.01
Baltimore	7	2	19	25	17	25	1.23	0.11	0.02	-0.18	0.04	-0.01
Boston	8	5	16	30	1	1	1.15	0.11	0.07	-0.21	0.47	0.05
Charlotte	10	13	7	13	20	20	1.09	0.08	0.16	-0.12	0.03	0.00
Denver	5	27	14	23	11	2	1.40	0.05	0.10	-0.17	0.07	0.05
San Diego	23	32	4	21	3	10	0.65	0.04	0.26	-0.15	0.28	0.01
Pittsburgh	16	9	2	1	7	4	0.83	0.09	0.28	-0.07	0.10	0.03
<b>SC2 (N=45)</b>												
Madison	1	9	7	30	1	2	2.05	0.07	0.31	-0.13	0.33	0.05
Raleigh	2	5	9	33	4	20	1.70	0.10	0.28	-0.14	0.14	-0.01
Charleston, SC	4	14	2	5	38	38	1.11	0.05	0.46	-0.04	-0.02	-0.03
Salt Lake City	3	4	26	23	6	5	1.22	0.11	0.11	-0.12	0.10	0.02
Des Moines	6	6	14	3	8	3	1.08	0.09	0.19	-0.03	0.06	0.05
Dayton	5	3	15	31	27	26	1.08	0.12	0.19	-0.13	0.02	-0.01
Greenville, SC	16	40	1	4	19	11	0.58	0.02	0.63	-0.03	0.03	0.00
Akron	7	18	11	11	15	10	0.86	0.04	0.27	-0.07	0.04	0.01
<b>SC3 (N=46)</b>												
Palm Bay	3	17	1	15	40	37	1.06	0.03	0.59	-0.08	-0.01	-0.03
Provo	1	14	17	4	19	39	1.28	0.04	0.16	-0.02	0.05	-0.03
Trenton	7	1	12	39	1	6	0.81	0.11	0.19	-0.20	0.55	0.06
Lansing	2	5	8	27	3	26	1.09	0.07	0.23	-0.12	0.14	0.00

(continued)

**TABLE 6 (continued)**  
**CHANGE IN STEM EMPLOYMENT SHARES BETWEEN 2005 AND 2019 BY CATEGORY**  
**IN LEADING STEM METROPOLITAN AREAS**

	Share of Employment, Rank in Size Class						Share of Employment					
	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech	Comp- uter	Math	Engin- eering	Eng Tech	Sci- ence	Sci Tech
<b>SC4 (N=62)</b>												
Peoria	10	3	2	6	58	47	0.63	0.06	0.66	0.01	-0.06	-0.03
Cedar Rapids	1	9	30	27	17	28	1.35	0.05	0.09	-0.09	0.07	0.00
Norwich	41	28	1	59	61	54	0.15	0.03	1.52	-0.25	-0.22	-0.04
Charlottesville	3	32	47	56	1	1	0.91	0.03	-0.03	-0.24	0.36	0.12
<b>SC5 (N=71)</b>												
Bloomington, IL	1	1	69	51	59	44	2.51	0.29	-0.26	-0.12	-0.01	-0.02
<b>SC6 (N=124)</b>												
Columbus, IN	2	4	1	1	43	56	1.29	0.09	2.68	0.66	0.07	0.01
Jackson, MI	20	84	3	12	28	28	0.45	0.01	1.67	0.03	0.09	0.04
Fond du Lac	6	3	4	2	45	21	0.85	0.11	1.51	0.23	0.06	0.05
Springfield, OH	5	2	68	87	122	63	3.25	0.18	0.78	0.29	0.06	0.18
Cumberland	3	5	16	79	7	81	1.00	0.09	0.31	-0.09	0.17	-0.02
Dubuque	31	14	5	6	55	44	0.35	0.06	0.83	0.07	0.05	0.02
Monroe, MI	40	41	8	20	1	4	0.29	0.03	0.50	0.01	0.30	0.15
California, MD	119	1	2	3	89	119	-0.23	0.62	2.49	0.17	-0.01	-0.16

Note: Metropolitan areas with a change in the STEM aggregate earnings share of at least 2 percentage points *and* a change in the STEM employment share of at least 1 percentage point are listed. The ranks are within the size class.

Sources: Emsi (employment). Definition of STEM occupations produced by authors.

For the 35 metro areas listed in Table 5, the change in share for each of the six occupational categories is displayed in Table 6. The mix of employment change in STEM occupations varies considerably across the leading metro areas.

### **Summary of Leading Metro Areas Based on the STEM Share in 2019 or the Change in STEM Share Between 2005 and 2019**

Table 7 displays the overall STEM share in 2019 and the change in share between 2005 and 2019 for each metro area among the top 35 based on either STEM activity in 2019 or the change in STEM activity between 2005 and 2019. Thus, Table 7 represents a combination of Tables 3 and 5. Twenty metro areas appear on the list of leaders on both the 2019 share and the change in share:

- Pacific, SC1: San Diego, San Francisco, San Jose, and Seattle
- Mountain, SC1: Denver
- Mountain, SC2: Salt Lake City
- Mountain, SC3: Provo
- West North Central, SC4: Cedar Rapids
- East North Central, SC1: Detroit
- East North Central, SC2: Dayton and Madison
- East North Central, SC5: Bloomington, IL
- East North Central, SC1: Columbus, IN
- Northeast, SC1: Boston
- Northeast, SC4: Norwich
- Middle Atlantic, SC3: Trenton
- South Atlantic, SC1: Baltimore
- South Atlantic, SC2: Raleigh
- South Atlantic, SC3: Palm Bay
- South Atlantic, SC6: California-Lexington Park

A total of 50 metropolitan areas are listed in Table 7.

A short summary based on the employment share of the leading metro areas in SC1, incorporating categorical information from Tables 4 and 6, follows. The metro areas are listed geographically, beginning in the Northwest:

- **Seattle-Tacoma-Bellevue, Washington.** Ranking second on the overall STEM share in SC1 in 2019, Metro Seattle's share was higher than the size-class average in each category except science technician, including ranks among the top seven metro areas in SC1 in the computer, math, engineering, and science categories. The overall 2005-to-2019 change in STEM share ranked third in the size class, with ranks of third and fourth in the computer and math categories. However, the change in share was below average in the engineering and engineering technician categories.
- **Portland-Vancouver-Hillsboro, Oregon-Washington.** Ranking 11th on the overall STEM share in SC1 in 2019, Metro Portland's share was higher than the size-class average except in the computer and math categories, including ranks among the top three metro areas in SC1 in the engineering and engineering technician categories. The overall 2005-to-2019 change in STEM share also ranked 11th in the size class, with an

**TABLE 7**  
**LEADING STEM METROPOLITAN AREAS, 2019 STEM SHARE**  
**OR 2005-TO-2019 CHANGE IN STEM SHARE**

	2019 Share				2005-to-2019 Change in Share			
	Aggregate Earnings		Employment		Aggregate Earnings		Employment	
	Rank	Share	Rank	Share	Rank	Share	Rank	Share
<b>SC1: Employment of At Least 1 Million (N=36)</b>								
Austin-Round Rock-Georgetown, TX	5	15.92%	5	9.00%	14	1.88	14	1.09
Baltimore-Columbia-Towson, MD	9	14.06	9	7.86	5	2.70	9	1.23
Boston-Cambridge-Newton, MA-NH	7	14.39	6	8.77	6	2.58	4	1.63
Charlotte-Concord-Gastonia, NC-SC	17	11.01	20	5.89	7	2.42	8	1.25
Denver-Aurora-Lakewood, CO	8	14.17	8	8.33	9	2.32	5	1.51
Detroit-Warren-Dearborn, MI	6	14.70	7	8.45	4	3.07	6	1.48
Pittsburgh, PA	22	10.10	19	5.95	12	2.08	7	1.25
Portland-Vancouver-Hillsboro, OR-WA	11	12.22	11	7.43	17	1.70	11	1.17
San Diego-Chula Vista-Carlsbad, CA	10	14.05	10	7.82	10	2.24	13	1.09
San Jose-Sunnyvale-Santa Clara, CA	1	31.13	1	18.35	1	6.47	1	3.79
San Francisco-Oakland-Berkeley, CA	3	17.83	4	10.14	2	5.58	2	2.78
Seattle-Tacoma-Bellevue, WA	2	18.85	2	10.34	3	5.32	3	2.28
Washington-Arlington-Alexandria, DC-VA-MD-WV	4	16.91	3	10.30	22	1.49	20	0.85
<b>SC2: Employment of 350,000 to 999,999 (N=45)</b>								
Akron, OH	23	9.12	22	5.26	8	2.03	9	1.16
Charleston-North Charleston, SC	15	9.86	20	5.39	3	3.02	3	1.53
Colorado Springs, CO	4	13.56	7	7.09	29	0.63	39	0.02
Dayton-Kettering, OH	5	13.13	5	7.28	6	2.41	6	1.27
Des Moines-West Des Moines, IA	12	10.50	10	6.14	5	2.64	4	1.45
Durham-Chapel Hill, NC	1	16.95	1	9.84	42	-0.26	32	0.27
Greenville-Anderson, SC	26	8.80	27	4.81	7	2.35	7	1.23
Madison, WI	3	14.39	3	9.12	1	4.64	1	2.68
Raleigh-Cary, NC	2	16.68	2	9.37	2	4.02	2	2.08
Salt Lake City, UT	6	12.45	4	7.46	4	2.79	5	1.44

(continued)

**TABLE 7 (continued)**  
**LEADING STEM METROPOLITAN AREAS, 2019 STEM SHARE**  
**OR 2005-TO-2019 CHANGE IN STEM SHARE**

	2019 Share				2005-to-2019 Change in Share			
	Aggregate Earnings		Employment		Aggregate Earnings		Employment	
	Rank	Share	Rank	Share	Rank	Share	Rank	Share
<b>SC3: Employment of 200,000 to 349,999 (N=46)</b>								
Ann Arbor, MI	6	13.10%	5	8.75%	11	1.37	6	1.06
Boulder, CO	2	24.18	2	14.28	16	0.93	8	0.91
Huntsville, AL	1	28.15	1	14.86	10	1.40	7	0.95
Lansing-East Lansing, MI	10	9.46	8	6.09	4	2.28	4	1.42
Manchester-Nashua, NH	5	14.20	6	7.74	5	2.18	12	0.84
Palm Bay-Melbourne-Titusville, FL	3	18.43	3	9.43	1	3.41	1	1.57
Provo-Orem, UT	7	12.35	7	6.85	2	2.99	3	1.47
Trenton-Princeton, NJ	4	14.59	4	8.97	3	2.99	2	1.51
<b>SC4: Employment of 125,000 to 199,999 (N=62)</b>								
Cedar Rapids, IA	1	14.48	1	7.98	2	3.03	1	1.47
Charlottesville, VA	8	10.72	8	6.40	4	2.02	4	1.16
Fort Collins, CO	3	13.22	2	7.67	38	0.38	23	0.46
Kennewick-Richland, WA	2	14.12	3	7.34	61	-2.61	62	-2.15
Norwich-New London, CT	5	12.26	6	7.05	3	2.53	3	1.19
Peoria, IL	4	12.33	9	6.23	1	3.58	2	1.27
<b>SC5: Employment of 75,000 to 124,999 (N=71)</b>								
Bloomington, IL	1	22.25	1	11.10	1	7.70	1	2.39
Idaho Falls, ID	2	18.44	2	8.57	57	-0.16	71	-0.94
Warner Robins, GA	3	12.59	4	6.97	70	-1.43	70	-0.88
Midland, TX	4	12.48	5	6.89	6	1.72	2	1.76

(continued)



**TABLE 7 (continued)**  
**LEADING STEM METROPOLITAN AREAS, 2019 STEM SHARE**  
**OR 2005-TO-2019 CHANGE IN STEM SHARE**

	2019 Share				2005-to-2019 Change in Share			
	Aggregate Earnings		Employment		Aggregate Earnings		Employment	
	Rank	Share	Rank	Share	Rank	Share	Rank	Share
<b>SC6: Employment of Less Than 75,000 (N=124)</b>								
California-Lexington Park, MD	1	36.96%	1	23.40%	9	2.42	2	2.89
Columbus, IN	2	19.20	2	11.14	1	8.54	1	4.80
Corvallis, OR	3	14.35	3	8.86	121	-1.04	124	-1.10
Cumberland, MD-WV	15	9.03	18	4.74	5	2.90	6	1.46
Dubuque, IA	16	8.68	15	4.93	6	2.82	7	1.37
Fond du Lac, WI	9	10.80	8	6.82	3	4.39	3	2.82
Jackson, MI	6	11.80	7	6.82	2	4.40	4	2.30
Monroe, MI	14	9.15	17	4.75	7	2.78	8	1.28
Springfield, OH	17	8.42	19	4.73	4	4.07	5	1.97

Note: Metropolitan areas with a 2019 STEM aggregate earnings share of at least 12 percent *and* a STEM employment share of at least 6.5 percent, and/or a 2005-to-2019 change in STEM aggregate earnings share of at least 2 percentage points *and* a change in STEM employment share of at least 1 percentage point are listed. The ranks are within the size class.

Sources: Emsi (employment and earnings). Definition of STEM occupations produced by authors.

above-average change in share in each category except computer; Metro Portland ranked third in the engineering and science technician categories.

- **San Jose-Sunnyvale-Santa Clara, California.** The overall 2019 STEM share was the highest in SC1. The share was greater than the size class average in each category and ranked among the top four metro areas in SC1 in the computer, engineering, engineering technician, and science technician categories. The 2005-to-2019 change in STEM share also was the highest in the size class, including the top rank in the computer category and above-average changes in the math and science categories. However, Metro San Jose ranked among the bottom six metros in SC1 on the change in share in the engineering, engineering technician, and science technician categories.
- **San Francisco-Oakland-Berkeley, California.** The overall 2019 STEM share ranked fourth in SC1; the share was greater than the size-class average in each category and ranked among the top four metro areas in SC1 in the computer, math, and science categories. The overall 2005-to-2019 change in share ranked second, including top three ranks in the computer, math, and science categories. The change was below average in the engineering technician category.
- **San Diego-Chula Vista-Carlsbad, California.** The overall 2019 STEM share ranked 10th in SC1, with top-five ranks in the engineering, engineering technician, science, and science technician categories. However, the shares were below average in the computer and math categories. The overall 2005-to-2019 change in STEM share ranked 13th, with top-four ranks in the engineering and science categories, but below-average changes in the computer and math categories.
- **Denver-Aurora-Lakewood, Colorado.** The overall 2019 STEM share ranked eighth in SC1, with above-average shares in all but the math category, including ranks of sixth and seventh in the computer and engineering categories. The overall 2005-to-2019 change in STEM share ranked fifth, with top-five ranks in the computer and science technician categories and above-average changes in the engineering and science categories.
- **Austin-Round Rock-Georgetown, Texas.** Ranking fifth on the overall STEM share in SC1 in 2019, Metro Austin's share was higher than the size-class average in each category except science technician, including ranks of fifth in the computer and engineering technician categories. The overall 2005-to-2019 change in STEM share ranked 14th in the size class, with a rank of fourth in the computer category. However, the change in share ranked among the bottom-five metros in the engineering, engineering technician, science, and science technician categories.
- **Detroit-Warren-Dearborn, Michigan.** The overall 2019 STEM share ranked seventh and the overall 2005-to-2019 change in STEM share ranked sixth in SC1. In each case, the engineering category ranked first and the engineering technician category ranked in the top six. Metro Detroit was below the size-class average in the other categories on both the 2019 share and the change in share.
- **Pittsburgh, Pennsylvania.** Ranking only 19th on the overall STEM share in SC1 in 2019, Metro Pittsburgh's share was less than the size-class average in the computer and science categories. The overall 2005-to-2019 change in STEM share ranked seventh in the size class, with ranks in the top seven in the engineering, engineering technician, science, and science technician categories. However, the change in share was below average in the computer category.

- **Boston-Cambridge-Newton, Massachusetts-New Hampshire.** The overall 2019 STEM share ranked sixth in SC1. The share was greater than the size-class average in each category and ranked among the top four metro areas in the computer, math, science, and science technician categories. The overall 2005-to-2019 change in STEM share was above average in each category except engineering technician, and ranked in the top five in the math, science, and science technician categories.
- **Baltimore-Columbia-Towson, Maryland.** The overall 2019 STEM share ranked ninth in SC1. The share was greater than the size-class average in each category and ranked among the top six metro areas in the math and science technician categories. The overall 2005-to-2019 change in STEM share also ranked ninth, including top-seven ranks in the computer and math categories. However, the change was below average in the engineering, engineering technician, and science categories.
- **Washington-Arlington-Alexandria, District of Columbia-Virginia-Maryland-West Virginia.** Ranking third on the overall STEM share in SC1 in 2019, Metro Washington's share ranked among the top three metro areas in the computer, math, and science categories, but its shares in the two technician categories were below average. The overall 2005-to-2019 change in STEM share was slightly less than the size-class average, ranking 20th. The changes in the computer and math categories rank in the top six. However, the change in share ranked among the bottom four metros in each of the other categories.
- **Charlotte-Concord-Gastonia, North Carolina-South Carolina.** Ranking only 20th on the overall STEM share in SC1 in 2019, Metro Charlotte's share was less than or equal to the size-class average in each category, including bottom-seven ranks in the science and science technician categories. The overall 2005-to-2019 change in STEM share ranked eighth in the size class, including a rank of seventh in the engineering category. The change in share was below average only in the science category.

A more extensive summary of selected leading metro areas — not limited to SC1 — follows, with the metro areas listed geographically, starting in the Northwest. The discussion includes some information on specific STEM occupations. Since the data for individual occupations are subject to more error than the data that combine occupations into the occupational categories, caution is urged in the interpretation of individual occupations. Only those STEM occupations accounting for at least 0.1 percent of a metro area's total aggregate earnings in 2019, or those with a change in share of at least 0.05 percentage points between 2005 and 2019, are included in the following summaries. Except as noted, ranks in this section are based on aggregate earnings and are expressed among the nation's 384 metro areas. The ranks shown in bold are for the overall STEM share.

The presence of major employers and research universities are noted in the following summaries. A research university is a doctoral university with high research activity, as measured by four indicators: research and development expenditures in science and engineering; other R&D expenditures; science and engineering research staff; and number of doctoral conferrals. A university with very high research activity is designated as "R1" and a university with high research activity is designated as "R2."

Also included in the summary is a typology of the metropolitan geography of higher education created by Ehlenz and Mawhorter.<sup>2</sup> They placed each metropolitan area into one of six categories based on its number, size, type, and quality of higher education institutions offering a four-year degree:

- “Super Center.” These metro areas have numerous higher education institutions of varying size and type (for example, doctoral universities, master’s universities, baccalaureate universities, etc.), with no individual institution dominant.
- “Major Center.” These metro areas are similar to super centers, but on a smaller scale.
- “Multicollege Town.” Relative to metro areas classified as “centers,” college towns are more highly dominated by one university (or a few in the case of multicollege towns).
- “Strong College Town.” These metro areas are dominated by one highly reputable large institution, such as a public land-grant university.
- “Minor Center.” These metro areas not only have fewer institutions than major centers, but the institutions are of a lesser quality (as measured, for example, by selectivity of student admittance and graduation rates).
- “Weak College Town.” These metro areas are dominated by one smaller institution of lower quality.

As discussed in the last section of this paper, the correlation between STEM share and the typology category is strongest for super center and declines in the following order: major center, multicollege town, strong college town, minor center, and weak college town.

#### **Seattle-Tacoma-Bellevue, Washington: Seventh in 2019 and fifth on 2005-to-2019 change.**

Employment in Metro Seattle (King, Snohomish, and Pierce counties) was 2.31 million in 2019. Metro Seattle is a university super center, with STEM activity boosted by the University of Washington (R1), Joint Base Lewis-McChord, and companies such as Amazon, Boeing, and Microsoft.

The Seattle metro area in 2019 ranked fourth in the computer category, with ranks in the top 25 in the “computer and information systems managers,” “computer and information research scientists,” “computer programmers,” “software developers and software quality assurance analysts and testers,” and “Web developers; and Web and digital interface designers” occupations. Metro Seattle ranked 22nd in the math category, 59th in the engineering category, and 73rd in the science category, with ranks in the top 25 in the “aerospace engineers” and “medical scientists, except epidemiologists” occupations. It ranked 133rd in the engineering technician category and only 247th in the science technician category.

Metro Seattle ranked third in the computer category and 15th in the math category on the change in STEM share between 2005 and 2019, including ranks in the top 25 in the “computer and information systems managers,” “software developers and software quality assurance analysts and testers,” “Web developers; and Web and digital interface designers,” and “data scientists; and mathematical science occupations, all other” occupations. In the science category, it ranked 137th. Its ranks were much lower in the other three categories, ranging from 277th to 349th, including a bottom-25 rank in the “aerospace engineers” occupation.

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<sup>2</sup> Ehlenz, Meagan and Sarah Mawhorter. 2021. “Higher Education Centers and College Towns: A Typology of the US Metropolitan Geography of Higher Education,” *Urban Affairs Review*, forthcoming.

Median earnings per job in STEM occupations adjusted for the cost of living was \$101,257 in Metro Seattle in 2019, considerably greater than the national average and 12th highest among the 384 metro areas. At 16.6 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 48th. The cost-of-living-adjusted change in dollars ranked 22nd.

STEM job quality in Metro Seattle in 2019 was considerably better than the national average, 10th best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly inferior to the national average, but ranked 96th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 30th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 22nd.

**Portland-Vancouver-Hillsboro, Oregon-Washington: 36th in 2019 and 64th on 2005-to-2019 change.** Employment in Metro Portland, which consists of five Oregon counties and two Washington counties, was 1.36 million in 2019. Metro Portland is a university super center, with STEM activity boosted by Portland State University (R2) and companies such as Intel and Tektronix.

The Portland metro area in 2019 ranked between 38th and 48th in the computer, engineering, and engineering technician categories, with ranks in the top 25 in the “Web developers; and Web and digital interface designers,” “architectural and engineering managers,” “computer hardware engineers,” and “electronics engineers, except computer” occupations. Metro Portland ranked 67th in the math category and 109th in the science technician category, and 112th in the science category.

Metro Portland ranked between 52nd and 68th in the computer, math, and science technician categories on the change in STEM share between 2005 and 2019. The only occupation in the top 25 was “Web developers; and Web and digital interface designers;” the “computer network support specialists” occupation ranked in the bottom 25. Metro Portland ranked 125th in the science category, 167th in the engineering category, and 212th in the engineering technician category.

Median earnings per job in STEM occupations adjusted for the cost of living was \$83,810 in Metro Portland in 2019, less than the national average and 170th highest among the 384 metro areas. At 3.5 percent, the inflation-adjusted change between 2005 and 2019 was less than the national average, ranking 309th. The cost-of-living-adjusted change in dollars ranked 307th.

STEM job quality in Metro Portland in 2019 was slightly stronger than the national average, 46th best among the 384 metro areas. The change in job quality between 2005 and 2019 was somewhat inferior to the national average, ranking 160th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 272nd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 307th.

**San Jose-Sunnyvale-Santa Clara, California: Second in 2019 and third on 2005-to-2019 change.** Employment in Metro San Jose (San Benito and Santa Clara counties) was 1.25 million

in 2019. Metro San Jose is a university major center, with STEM activity boosted by Stanford University (R1) and multiple high-tech companies such as Apple and HP.

The San Jose metro area in 2019 had the highest share in the computer category and ranked ninth in the engineering category. It ranked in the top 25 in 12 of the computer occupations and in four of the engineering occupations, including “computer hardware engineers,” “electrical engineers,” and “electronics engineers, except computer.” It ranked 44th in the math category and 45th in the engineering technician category, including in the top 25 in the “electrical and electronic engineering technologists and technicians” occupation. The science rank was 74th and the science technician category ranked 123rd.

Metro San Jose had the greatest gain in STEM share between 2005 and 2019 in the computer category, including ranks in the top 25 in eight occupations. It ranked 48th in the math category. In contrast, Metro San Jose ranked only 206th in the science category, 302nd in the science technician category, 380th in the engineering technician category, and 382nd in the engineering category, with bottom-25 ranks in seven engineering occupations and four engineering technician occupations.

Median earnings per job in STEM occupations adjusted for the cost of living was \$103,425 in Metro San Jose in 2019, far greater than the national average and eighth highest among the 384 metro areas. At 10.9 percent, the inflation-adjusted change between 2005 and 2019 was slightly higher than the national average, ranking 132nd. The cost-of-living-adjusted change in dollars ranked 90th.

STEM job quality in Metro San Jose in 2019 was far better than the national average, the highest among the 384 metro areas. The change in job quality between 2005 and 2019 slightly exceeded the national average, ranking 46th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 51st in the nation in 2019 and the dollar change between 2005 and 2019 ranked 91st.

**San Francisco-Oakland-Berkeley, California: 10th in 2019 and fourth on 2005-to-2019 change.** Employment in Metro San Francisco (Alameda, Contra Costa, San Francisco, San Mateo, and Marin counties) was 2.76 million in 2019. Metro San Francisco is a university super center, with STEM activity boosted by the University of California Berkeley (R1) and companies such as Advent Software and Salesforce.

The San Francisco metro area in 2019 ranked seventh in the computer category, 13th in math, and 23rd in science. It ranked in the top 25 in 11 of the computer occupations and in the “biochemists and biophysicists,” “biological scientists, all other,” and “medical scientists, except epidemiologists” occupations. Metro San Francisco ranked 78th in the engineering category, including in the top 25 in the “computer hardware engineers” and “civil engineers” occupations. Its ranks were 162nd in the science technician category and 198th in the engineering technician category.

Metro San Francisco ranked fourth in the computer, 10th in the math, and sixth in the science categories on the change in STEM share between 2005 and 2019, including among the top 25 in

eight of the computer occupations and in the three science occupations in which it ranked in the top 25 in 2019. In contrast, Metro San Francisco ranked 201st in the engineering, 341st in the engineering technician, and 237th in the science technician categories.

Median earnings per job in STEM occupations adjusted for the cost of living was \$90,508 in Metro San Francisco in 2019, slightly greater than the national average and 69th highest among the 384 metro areas. At 11.2 percent, the inflation-adjusted change between 2005 and 2019 was slightly higher than the national average, ranking 126th. The cost-of-living-adjusted change in dollars ranked 108th.

STEM job quality in Metro San Francisco in 2019 was far better than the national average, sixth best among the 384 metro areas. The change in job quality between 2005 and 2019 was far better than the national average, ranking third. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 231st in the nation in 2019 and the dollar change between 2005 and 2019 ranked 114th.

**San Diego-Chula Vista-Carlsbad, California: 25th in 2019 and 35th on 2005-to-2019 change.** Employment in Metro San Diego (San Diego County) was 1.77 million in 2019. Metro San Diego is a university super center, with STEM activity boosted by the University of California San Diego (R1), San Diego State University (R2), University of San Diego (R2), the U.S. Navy, and companies such as Qualcomm.

The San Diego metro area in 2019 ranked 19th in the science category, with ranks in the top 25 in the “natural sciences managers,” “biochemists and biophysicists,” “biological scientists, all other,” and “medical scientists, except epidemiologists” occupations. It ranked 34th in both the computer and engineering categories, including in the top 25 in the “computer and information systems managers,” “computer programmers,” “computer occupations, all other,” “architectural and engineering managers,” “computer hardware engineers,” and “electronics engineers, except computer” occupations. Its ranks were between 59th and 92nd in the other three categories.

Metro San Diego ranked 12th in the science category on the change in STEM share between 2005 and 2019, including top-25 ranks in the four science occupations in which it ranked in the top 25 in 2019. Metro San Diego ranked 48th in the computer category, including top 25 ranks in the “computer and information systems managers” and “software developers; and software quality assurance analysts and testers” occupations. It ranked between 79th and 124th in the math, engineering, and science technician categories but only 316th in the engineering technician category.

Median earnings per job in STEM occupations adjusted for the cost of living was \$84,793 in Metro San Diego in 2019, less than the national average and 146th highest among the 384 metro areas. At 9.0 percent, the inflation-adjusted change between 2005 and 2019 was slightly less than the national average, ranking 182nd. The cost-of-living-adjusted change in dollars ranked 176th.

STEM job quality in Metro San Diego in 2019 was better than the national average, 17th best among the 384 metro areas. The change in job quality between 2005 and 2019 was somewhat better than the national average, ranking 39th. After removing the effect of job quality, the

balance of median earnings per job adjusted for the cost of living ranked 302nd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 183rd.

**Salt Lake City, Utah: 32nd in 2019 and 20th on 2005-to-2019 change.** Employment in Metro Salt Lake City (Salt Lake and Tooele counties) was 0.82 million in 2019. Metro Salt Lake City is a multicollage town, with STEM activity boosted by the University of Utah (R1) and companies such as ARUP Laboratories and L3 Technologies.

The Salt Lake City metro area in 2019 ranked 21st in the computer category and 24th in the math category, with ranks in the top 25 in seven computer occupations and in the math occupation of “operations research analysts.” Metro Salt Lake City ranked 65th in the engineering technician category, including a top-25 rank in the “architectural and civil drafters” occupation. It ranked between 101st and 142nd in the other three categories.

Metro Salt Lake ranked 10th in the computer category on the change in STEM share between 2005 and 2019, including five occupations in the top 25, and 33rd in the math category, including a top-25 rank in the “operations research analysts” occupation. It ranked 105th in the science category, 200th in engineering, 242nd in engineering technician, and 323rd in the science technician category.

Median earnings per job in STEM occupations adjusted for the cost of living was \$80,656 in Metro Salt Lake City in 2019, considerably less than the national average and 236th highest among the 384 metro areas. At 9.5 percent, the inflation-adjusted change between 2005 and 2019 was slightly less than the national average, ranking 171st. The cost-of-living-adjusted change in dollars ranked 174th.

STEM job quality in Metro Salt Lake City in 2019 was slightly worse than the national average, 112th best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly greater than the national average, ranking 49th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 294th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 179th.

**Provo-Orem, Utah: 33rd in 2019 and 16th on 2005-to-2019 change.** Employment in Metro Provo (Juab and Utah counties) was 0.30 million in 2019. Metro Provo is a multicollage town, with STEM activity boosted by Brigham Young University (R2) and companies such as Adobe and Qualtrics.

The Provo metro area in 2019 ranked 12th in the computer category, with ranks in the top 25 in seven occupations. Ranks ranged from 161st to 274th in the other five categories.

Metro Provo ranked ninth in the computer category on the change in STEM share between 2005 and 2019, including five occupations in the top 25: “computer and information systems managers,” “computer user support specialists,” “database administrators; and database architects,” “software developers; and software quality assurance analysts and testers,” and “Web developers; and Web and digital interface designers.” It ranked between 120th and 164th in the math, engineering, and engineering technician categories, including a top-25 rank in the



“computer hardware engineers” occupation. The science and science technician ranks were 225th and 263rd respectively.

Median earnings per job in STEM occupations adjusted for the cost of living was \$81,990 in Metro Provo in 2019, less than the national average and 207th highest among the 384 metro areas. At 15.4 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 61st. The cost-of-living-adjusted change in dollars ranked 71st.

STEM job quality in Metro Provo in 2019 was slightly better than the national average, 51st best among the 384 metro areas. The change in job quality between 2005 and 2019 was better than the national average, ranking 27th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 309th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 77th.

**Boulder, Colorado: fourth in 2019 and 147th on 2005-to-2019 change.** Employment in Metro Boulder (Boulder County) was 0.21 million in 2019. Metro Boulder is a multicollege town, with STEM activity boosted by the University of Colorado Boulder (R1) and scientific institutes such NOAA (National Oceanic and Atmospheric Administration).

The Boulder metro area in 2019 ranked third in the science, fifth in the computer, and 11th in the engineering categories, with ranks in the top 25 in eight computer occupations and in seven engineering occupations: “architectural and engineering managers,” “aerospace engineers,” “bioengineers and biomedical engineers,” “chemical engineers,” “computer hardware engineers,” “electronics engineers, except computer,” and “materials engineers.” Seven science occupations ranked in the top 25: “natural sciences managers,” “biochemists and biophysicists,” “astronomers,” “physicists,” “atmospheric and space scientists,” “environmental scientists and specialists, including health,” and “geoscientists, except hydrologists and geographers.” Metro Boulder ranked 34th in the science technician category, including top-25 ranks in the “environmental science and protection technicians, including health” and “life, physical, and social science technicians, all other” occupations. It ranked 83rd in the engineering technician category and 113th in the math category.

Metro Boulder ranked fifth in the science category on the change in STEM share between 2005 and 2019, with top-25 gains in the “biochemists and biophysicists,” “astronomers,” “physicists,” and “environmental scientists and specialists, including health,” occupations. Metro Boulder ranked 30th in the science technician category but only 118th in the computer and 180th in the math categories. It ranked 344th in the engineering technician category and 357th in the engineering category. The computer and engineering categories had a mix of occupations ranking near the top and near the bottom.

Median earnings per job in STEM occupations adjusted for the cost of living was \$96,111 in Metro Boulder in 2019, greater than the national average and 21st highest among the 384 metro areas. At only 2.3 percent, the inflation-adjusted change between 2005 and 2019 was considerably less than the national average, ranking 328th. The cost-of-living-adjusted change in dollars ranked 321st.

STEM job quality in Metro Boulder in 2019 was considerably better than the national average, 13th best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was inferior to the national average, ranking 231st. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 82nd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 321st.

**Denver-Aurora-Lakewood, Colorado: 22nd in 2019 and 33rd on 2005-to-2019 change.**

Employment in Metro Denver, which consists of 10 counties, was 1.68 million in 2019. Metro Denver is a university major center, with STEM activity boosted by the University of Colorado Denver (R1), Colorado School of Mines (R2), University of Denver (R2), and companies such as Arrow Electronics.

The Denver metro area in 2019 ranked 13th in the computer category, with ranks in the top 25 in six occupations: “computer network support specialists,” “computer network architects,” “network and computer systems administrators,” “database administrators; and database architects,” “software developers; and software quality assurance analysts and testers,” and “computer occupations, all other.” Metro Denver ranked 61st in engineering and 80th in math, including top-25 ranks in the “civil engineers,” “computer hardware engineers,” and “electronics engineers, except computer” occupations. It ranked 110th in science and 122nd in the science technician category, but included a rank in the top 25 in the “geoscientists, except hydrologists and geographers” occupation. The engineering technician category ranked 187th.

Metro Denver ranked 14th in the computer category on the change in STEM share between 2005 and 2019, including top-25 ranks in the “computer network architects” and “software developers; and software quality assurance analysts and testers” occupations. It ranked 121st in both the math and science technician categories, 209th in engineering, 286th in science, and 324th in the engineering technician category, including a bottom-25 rank in the “surveying and mapping technicians” occupation.

Median earnings per job in STEM occupations adjusted for the cost of living was \$92,323 in Metro Denver in 2019, somewhat greater than the national average and 48th highest among the 384 metro areas. At 5.8 percent, the inflation-adjusted change between 2005 and 2019 was somewhat lower than the national average, ranking 258th. The cost-of-living-adjusted change in dollars ranked 232nd.

STEM job quality in Metro Denver in 2019 was better than the national average, 24th best among the 384 metro areas. The change in job quality between 2005 and 2019 was better than the national average, ranking 31st. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 105th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 236th.

**Austin-Round Rock-Georgetown, Texas: 14th in 2019 and 50th on 2005-to-2019 change.**

Employment in Metro Austin (Bastrop, Caldwell, Hays, Travis, and Williamson counties) was 1.18 million in 2019. Metro Austin is a university major center, with STEM activity boosted by the University of Texas Austin (R1), Texas State University (R2), and companies such as Cirrus Logic and Cisco Systems.

The Austin metro area in 2019 ranked 10th in the computer category, with ranks in the top 25 in 10 occupations. It ranked 29th in the math category, 51st in the engineering category (with a rank in the top 25 in the “electronics engineers, except computer” occupation), 71st in the engineering technician, 121st in the science, and 213th in the science technician categories.

Metro Austin ranked 12th in the computer category on the change in STEM share between 2005 and 2019, including eight occupations ranking in the top 25 but two in the bottom 25. It ranked 77th in the math category, but ranked 308th or worse in the other four categories. It was in the bottom 25 in the “electronics engineers, except computer,” “electrical and electronic engineering technologists and technicians,” and “industrial engineering technologists and technicians” occupations.

Median earnings per job in STEM occupations adjusted for the cost of living was \$90,184 in Metro Austin in 2019, slightly greater than the national average and 75th highest among the 384 metro areas. At 9.2 percent, the inflation-adjusted change between 2005 and 2019 was slightly less than the national average, ranking 177th. The cost-of-living-adjusted change in dollars ranked 156th.

STEM job quality in Metro Austin in 2019 was somewhat better than the national average, 31st best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly inferior to the national average but ranked 99th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 137th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 161st.

**Des Moines-West Des Moines, Iowa: 61st in 2019 and 23rd on 2005-to-2019 change.**

Employment in Metro Des Moines, which consists of six counties, was 0.42 million in 2019. Metro Des Moines is a university major center but does not have a R1 or R2 university. Its STEM activity results from companies such as Wells Fargo and Principal Life Insurance.

The Des Moines metro area in 2019 ranked 10th in the math category and 25th in the computer category, with ranks in the top 25 in the “computer and information systems managers,” “computer systems analysts,” “computer network architects,” “computer programmers,” and “actuaries” occupations. It ranked 133rd in the science technician category and between 244th and 280th in the other three categories.

Metro Des Moines ranked 22nd in the computer category and 31st in the math category on the change in STEM share between 2005 and 2019, with top-25 ranks in the “computer and information systems managers,” “computer systems analysts,” “software developers; and software quality assurance analysts and testers,” “actuaries,” and “statisticians” occupations. It ranked 65th in engineering technician, 77th in science technician, 126th in science, and 132nd in engineering.

Median earnings per job in STEM occupations adjusted for the cost of living was \$90,353 in Metro Des Moines in 2019, slightly greater than the national average and 72nd highest among the 384 metro areas. At 15.3 percent, the inflation-adjusted change between 2005 and 2019 was

higher than the national average, ranking 63rd. The cost-of-living-adjusted change in dollars ranked 55th.

STEM job quality in Metro Des Moines in 2019 was slightly better than the national average, 38th best among the 384 metro areas. The change in job quality between 2005 and 2019 was better than the national average, ranking 25th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 122nd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 59th.

**Cedar Rapids, Iowa: 17th in 2019 and 14th on 2005-to-2019 change.** Employment in Metro Cedar Rapids (Benton, Jones, and Linn counties) was 0.16 million in 2019. Metro Cedar Rapids is a university minor center, but it does not have a R1 or R2 university. Its STEM activity results from companies such as Collins Aerospace and Transamerica.

The Cedar Rapids metro area in 2019 ranked 17th in the computer category, with ranks in the top 25 in the “computer network support specialists” and “software developers; and software quality assurance analysts and testers” occupations. It ranked between 33rd and 48th in the math, engineering, and engineering technician categories, with ranks in the top 25 in the “architectural and engineering managers,” “electrical engineers,” and “electrical and electronic engineering technologists and technicians” occupations. Its ranks were 239th in science technician and 298th in science.

Metro Cedar Rapids ranked eighth in the computer category on the change in STEM share between 2005 and 2019, with a top-25 rank in the “software developers; and software quality assurance analysts and testers” occupation. It ranked between 122nd and 192nd in the other five categories.

Median earnings per job in STEM occupations adjusted for the cost of living was \$98,891 in Metro Cedar Rapids in 2019, considerably greater than the national average and 16th highest among the 384 metro areas. At 16.3 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 52nd. The cost-of-living-adjusted change in dollars ranked 31st.

STEM job quality in Metro Cedar Rapids in 2019 was considerably better than the national average, 12th best among the 384 metro areas. The change in job quality between 2005 and 2019 was somewhat inferior to the national average, ranking 133rd. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 48th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 30th.

**Madison, Wisconsin: 19th in 2019 and sixth on 2005-to-2019 change.** Employment in Metro Madison (Columbia, Dane, Green, and Iowa counties) was 0.43 million in 2019. Metro Madison is a multicollage town, with STEM activity boosted by the University of Wisconsin Madison (R1) and companies such as Epic Systems.

The Madison metro area in 2019 ranked 15th in the computer, 23rd in the math, 27th in the science, and 39th in the science technician categories, with ranks in the top 25 in seven computer

occupations and in the “biochemists and biophysicists,” “medical scientists, except epidemiologists,” and “biological technicians” occupations. The ranks were 119th in engineering and 189th in engineering technician.

Metro Madison ranked fifth in the computer and eighth in the science categories on the change in STEM share between 2005 and 2019, including top-25 ranks in six computer occupations and in the “chemists” occupation. It ranked between 40th and 69th in the science technician, math, and engineering categories, including top-25 ranks in the same three science/science technician occupations ranking in the top 25 in 2019. The rank was only 235th in the engineering technician category, including a bottom-25 rank in the “civil engineering technologists and technicians” occupation.

Median earnings per job in STEM occupations adjusted for the cost of living was \$82,691 in Metro Madison in 2019, less than the national average and 194th highest among the 384 metro areas. At 14.1 percent, the inflation-adjusted change between 2005 and 2019 was somewhat higher than the national average, ranking 77th. The cost-of-living-adjusted change in dollars ranked 88th.

STEM job quality in Metro Madison in 2019 was somewhat worse than the national average, 93rd best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly better than the national average, ranking 82nd. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 251st in the nation in 2019 and the dollar change between 2005 and 2019 ranked 89th.

**Peoria, Illinois: 34th in 2019 and 11th on 2005-to-2019 change.** Employment in Metro Peoria, which consists of six counties, was 0.19 million in 2019. Metro Peoria is a multicollage town but does not have a R1 or R2 university. Its STEM activity results from companies such as Caterpillar.

The Peoria metro area in 2019 ranked 12th in the engineering and 15th in the engineering technician categories, with ranks in the top 25 in the “architectural and engineering managers,” “electrical engineers,” “industrial engineers,” “mechanical engineers,” “electrical and electronics drafters,” and “industrial engineering technologists and technicians” occupations. It ranked 70th in the math and 106th in the computer categories, including a top-25 rank in the “computer and information research scientists” occupation. The ranks were 235th in science technician and 275th in science.

Metro Peoria ranked seventh in the engineering and 16th in the engineering technician categories on the change in STEM share between 2005 and 2019, including top-25 ranks in most of the same occupations that were in the top 25 in 2019, as well as the “aerospace engineers” occupation. Metro Peoria ranked 37th in math and 47th in the computer category, with top-25 ranks in the “computer and information systems managers,” “computer systems analysts,” “database administrators; and database architects,” and “actuaries” occupations. In contrast, the ranks were 329th in the science technician and 366th in the science categories, including a bottom-25 rank in the “microbiologists” occupation.

Median earnings per job in STEM occupations adjusted for the cost of living was \$108,893 in Metro Peoria in 2019, far greater than the national average and fourth highest among the 384 metro areas. At 31.5 percent, the inflation-adjusted change between 2005 and 2019 was far higher than the national average, the highest in the nation. The cost-of-living-adjusted change in dollars also ranked first.

STEM job quality in Metro Peoria in 2019 was slightly better than the national average, 40th best among the 384 metro areas. The change in job quality between 2005 and 2019 was somewhat inferior to the national average, ranking 139th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked fourth in the nation in 2019 and the dollar change between 2005 and 2019 ranked first.

**Bloomington, Illinois: fifth in 2019 and second on 2005-to-2019 change.** Employment in Metro Bloomington (McLean County) was only 91,000 in 2019. Metro Bloomington is a multicollage town, with STEM activity boosted by the Illinois State University (R2) and companies such as State Farm Insurance.

The Bloomington metro area in 2019 ranked second in both the computer and math categories, including top-25 ranks in nine occupations. It ranked 212th in both the science and science technician categories and 368th in both the engineering and engineering technician categories.

Metro Bloomington ranked second in the computer and math categories on the change in STEM share between 2005 and 2019. Four computer occupations ranked in the top 25, but three were in the bottom 25. Three math occupations ranked in the top 25. Metro Bloomington ranked 55th in the science category and just below 100th in the two technician categories. In engineering, however, it ranked 355th, including bottom-25 ranks in the “industrial engineers,” “mechanical engineers,” and “engineers, all other” occupations.

Median earnings per job in STEM occupations adjusted for the cost of living was \$108,945 in Metro Bloomington in 2019, far greater than the national average and third highest among the 384 metro areas. At 30.9 percent, the inflation-adjusted change between 2005 and 2019 was far higher than the national average, ranking second. The cost-of-living-adjusted change in dollars also ranked second.

STEM job quality in Metro Bloomington in 2019 was far better than the national average, fourth best among the 384 metro areas. The change in job quality between 2005 and 2019 was considerably better than the national average, ranking 14th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 10th in the nation in 2019 and the dollar change between 2005 and 2019 ranked second.

**Columbus, Indiana: sixth in 2019 and first on 2005-to-2019 change.** Employment in Metro Columbus (Bartholomew County) was only 54,000 in 2019. It does not have an institution granting a four-year degree. Its STEM activity results from companies such as Cummins.

The Columbus metro area in 2019 ranked third in both the engineering and engineering technician categories, including top-25 ranks in 15 occupations. The rank was 50th in the math

category and 78th in the computer category, including top-25 ranks in the “computer systems analysts” and “operations research analysts” occupations. The rank was 147th in the science category but the “medical scientists, except epidemiologists” occupation was in the top 25. The science technician category ranked 356th.

Metro Columbus had the greatest increase in STEM share between 2005 and 2019 in the engineering and engineering technician categories. Ten engineering occupations ranked in the top 25, as did four engineering technician occupations, but two occupations in the latter category ranked in the bottom 25. Metro Columbus ranked 15th in the computer category and 19th in the math category, with top-25 ranks in six occupations. The rank was 104th in the science category but 300th in the science technician category. The “medical scientists, except epidemiologists” occupation was in the top 25 but the “chemists” occupation was in the bottom 25.

Median earnings per job in STEM occupations adjusted for the cost of living was \$93,653 in Metro Columbus in 2019, somewhat greater than the national average and 35th highest among the 384 metro areas. At 15.4 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 62nd. The cost-of-living-adjusted change in dollars ranked 46th.

STEM job quality in Metro Columbus in 2019 was worse than the national average, 127th best among the 384 metro areas. The change in job quality between 2005 and 2019 was much inferior to the national average, ranking 316th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 35th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 46th.

**Detroit-Warren-Dearborn, Michigan: 15th in 2019 and 13th on 2005-to-2019 change.**

Employment in Metro Detroit, which consists of six counties, was 2.10 million in 2019. Metro Detroit is a university major center, with STEM activity boosted by Wayne State University (R1), Oakland University (R2), and various automotive companies.

The Detroit metro area in 2019 ranked eighth in the engineering category, with ranks in the top 25 in the “architectural and engineering managers,” “electrical engineers,” “industrial engineers,” “mechanical engineers,” and “engineers, all other” occupations. Metro Detroit ranked between 49th and 84th in the computer, math, and engineering technician categories, including a top-25 rank in the “mechanical engineering technologists and technicians” occupation. It ranked 278th in the science technician category and 290th in the science category.

Metro Detroit ranked ninth in the engineering category on the change in STEM share between 2005 and 2019, including top-25 ranks in the “architectural and engineering managers,” “electronics engineers, except computer,” “industrial engineers,” and “mechanical engineers” occupations. It ranked 69th in the computer, 83rd in the math, 134th in the engineering technician, 251st in the science, and 256th in the science technician categories.

Median earnings per job in STEM occupations adjusted for the cost of living was \$92,094 in Metro Detroit in 2019, somewhat greater than the national average and 52nd highest among the 384 metro areas. At 5.1 percent, the inflation-adjusted change between 2005 and 2019 was

somewhat less than the national average, ranking 272nd. The cost-of-living-adjusted change in dollars ranked 256th.

STEM job quality in Metro Detroit in 2019 was better than the national average, 22nd best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was much inferior to the national average, ranking 264th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 112th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 253rd.

**Dayton-Kettering, Ohio: 28th in 2019 and 31st on 2005-to-2019 change.** Employment in Metro Dayton (Greene, Miami, and Montgomery counties) was 0.41 million in 2019. Metro Dayton is a university major center, with STEM activity boosted by three R2 universities — the Air Force Institute of Technology, the University of Dayton, and Wright State University — and the Wright-Patterson Air Force Base.

The Dayton metro area in 2019 ranked 15th in the math, 24th in the engineering, and 35th in the computer categories, with ranks in the top 25 in the “Web developers; and Web and digital interface designers,” “computer occupations, all other,” “operations research analysts,” “data scientists; and mathematical science occupations, all other,” “aerospace engineers,” “electronics engineers, except computer,” “materials engineers,” and “engineers, all other” occupations. Metro Dayton ranked 100th in the engineering technician, 143rd in the science, and 261st in the science technician categories.

Metro Dayton ranked fifth in the math category and 30th in the computer category on the change in STEM share between 2005 and 2019, including top-25 ranks in the “software developers; and software quality assurance analysts and testers,” “Web developers; and Web and digital interface designers,” “computer occupations, all other,” “operations research analysts,” and “data scientists; and mathematical science occupations, all other” occupations. It ranked between 87th and 155th in the other categories, including top-25 ranks in the “materials engineers” and “engineers, all other” occupations.

Median earnings per job in STEM occupations adjusted for the cost of living was \$99,381 in Metro Dayton in 2019, considerably greater than the national average and 15th highest among the 384 metro areas. At 11.5 percent, the inflation-adjusted change between 2005 and 2019 was slightly higher than the national average, ranking 118th. The cost-of-living-adjusted change in dollars ranked 87th.

STEM job quality in Metro Dayton in 2019 was better than the national average, 23rd best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was inferior to the national average, ranking 216th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 25th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 85th.

**Pittsburgh, Pennsylvania: 70th in 2019 and 40th on 2005-to-2019 change.** Employment in Metro Pittsburgh, which consists of seven counties, was 1.24 million in 2019. Metro Pittsburgh is a university super center, with STEM activity boosted by two R1 universities — Carnegie



Mellon and the University of Pittsburgh — a R2 university (Duquesne), and companies such as Accion Labs.

The Pittsburgh metro area in 2019 ranked between 43rd and 98th in the computer, math, engineering, and engineering technician categories, 136th in science, and 184th in science technician. No occupation ranked in the top 25.

Metro Pittsburgh ranked 36th in the math and 42nd in the computer categories on the change in STEM share between 2005 and 2019, including top-25 ranks in the “computer systems analysts” and “statisticians” occupations. It ranked 87th in the engineering, 127th in the science, 180th in the engineering technician, and 252nd in the science technician categories.

Median earnings per job in STEM occupations adjusted for the cost of living was \$87,719 in Metro Pittsburgh in 2019, slightly less than the national average and 108th highest among the 384 metro areas. At 8.8 percent, the inflation-adjusted change between 2005 and 2019 was slightly less than the national average, ranking 187th. The cost-of-living-adjusted change in dollars ranked 171st.

STEM job quality in Metro Pittsburgh in 2019 was slightly worse than the national average, but was 71st best among the 384 metro areas. The change in job quality between 2005 and 2019 was somewhat better than the national average, ranking 40th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 148th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 173rd.

**Boston-Cambridge-Newton, Massachusetts-New Hampshire: 18th in 2019 and 25th on 2005-to-2019 change.** Employment in Metro Boston, which consists of five counties in Massachusetts and two in New Hampshire, was 3.02 million in 2019. Metro Boston is a university super center, with STEM activity boosted by eight R1 universities — Boston College, Boston University, Brandeis, Harvard, MIT, University of New Hampshire, Northeastern, and Tufts — two R2 universities (University of Massachusetts Boston and University of Massachusetts Lowell), and companies such as General Electric and Raytheon.

The Boston metro area in 2019 ranked between 14th and 20th in the computer, math, and science categories, with ranks in the top 25 in the “computer and information systems managers,” “computer network architects,” “software developers; and software quality assurance analysts and testers,” “Web developers; and Web and digital interface designers,” “statisticians,” “natural sciences managers,” “biochemists and biophysicists,” and “medical scientists, except epidemiologists” occupations. Metro Boston ranked 70th in the engineering and 94th in the science technician categories, including a top-25 rank in the “biological technicians” occupation. It ranked 185th in the engineering technician category.

Metro Boston ranked fourth in the science, 23rd in the math, and 29th in the computer categories on the change in STEM share between 2005 and 2019. It ranked 81st in the science technician category but only 254th in the engineering category and 328th in the engineering technician category. The same occupations were in the top 25 as in 2019 except for the addition of

“biological scientists, all other” and the deletion of “Web developers; and Web and digital interface designers.”

Median earnings per job in STEM occupations adjusted for the cost of living was \$88,176 in Metro Boston in 2019, slightly less than the national average and 104th highest among the 384 metro areas. At 4.1 percent, the inflation-adjusted change between 2005 and 2019 was less than the national average, ranking 297th. The cost-of-living-adjusted change in dollars ranked 285th.

STEM job quality in Metro Boston in 2019 was better than the national average, 16th best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly better than the national average, ranking 65th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 229th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 289th.

**Trenton-Princeton, New Jersey: 16th in 2019 and 17th on 2005-to-2019 change.**

Employment in Metro Trenton (Mercer County) was 0.28 million in 2019. Metro Trenton is a university major center, with STEM activity boosted by Princeton University (R1) and companies such as Bristol-Myers Squibb.

The Trenton metro area in 2019 ranked first in the science, ninth in the math, 21st in the science technician, and 30th in the computer categories, with ranks in the top 25 in the “database administrators; and database architects,” “software developers; and software quality assurance analysts and testers,” “statisticians,” “natural sciences managers,” “biochemists and biophysicists,” “medical scientists, except epidemiologists,” “chemists,” “environmental scientists and specialists, including health,” “chemical technicians,” and “life, physical, and social science technicians, all other” occupations. Metro Trenton ranked 118th in the engineering technician and 139th in the engineering categories, including a top-25 rank in the “civil engineers” occupation.

Metro Trenton ranked first in the science, 16th in the math, 44th in the science technician, and 51st in the computer categories on the change in STEM share between 2005 and 2019. Several occupations ranked in the top 25: “computer and information systems managers,” “software developers; and software quality assurance analysts and testers,” “statisticians,” “data scientists; and mathematical science occupations, all other,” “natural sciences managers,” “biochemists and biophysicists,” “medical scientists, except epidemiologists,” “chemists,” and “chemical technicians.” The engineering rank was 151st and the engineering technician rank was 272nd, including a bottom-25 rank in the “architectural and civil drafters” occupation.

Median earnings per job in STEM occupations adjusted for the cost of living was \$91,714 in Metro Trenton in 2019, slightly greater than the national average and 57th highest among the 384 metro areas. At 17.1 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 39th. The cost-of-living-adjusted change in dollars ranked 36th.

STEM job quality in Metro Trenton in 2019 was slightly worse than the national average, but was 56th best among the 384 metro areas. The change in job quality between 2005 and 2019 was

somewhat better than the national average, ranking 38th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 87th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 40th.

**California-Lexington Park, Maryland: first in 2019 and 30th on 2005-to-2019 change.**

Employment in Metro California-Lexington Park (St. Mary's County) was only 52,000 in 2019. Metro California-Lexington Park is a weak college town, with STEM activity largely due to the Patuxent River Naval Air Station. It does not have a R1 or R2 university.

The California-Lexington Park metro area in 2019 had the highest share in the math, engineering, and engineering technician categories. It ranked third in the computer category and 36th in the science category. Numerous occupations ranked in the top 25: 10 in computer, two in math, seven in engineering, six in engineering technician, and four in science. It ranked 227th in the science technician category.

Metro California-Lexington Park ranked first in math, second in engineering, and 40th in the engineering technician categories on the change in STEM share between 2005 and 2019, including top-25 ranks in two math, six engineering, and four engineering technician occupations. However, four engineering technician occupations and one engineering occupation ranked in the bottom 25. The metro area ranked between 377th and 384th in the computer, science, and science technician categories. It had mixed ranks in the computer (four occupations in the top 25 but three in the bottom 10) and science (two occupations in the top 25 but four in the bottom 25) categories. Two science technician occupations were in the bottom 25.

Median earnings per job in STEM occupations adjusted for the cost of living was \$111,019 in Metro California-Lexington Park in 2019, far greater than the national average and highest among the 384 metro areas. At 20.3 percent, the inflation-adjusted change between 2005 and 2019 was considerably higher than the national average, ranking 19th. The cost-of-living-adjusted change in dollars ranked sixth.

STEM job quality in Metro California-Lexington Park in 2019 was considerably better than the national average, 15th best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was inferior to the national average, ranking 225th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked seventh in the nation in 2019 and the dollar change between 2005 and 2019 ranked sixth.

**Baltimore-Columbia-Towson, Maryland: 24th in 2019 and 22nd on 2005-to-2019 change.**

Employment in Metro Baltimore, which includes six counties and Baltimore city, was 1.52 million in 2019. Metro Baltimore is a university super center, with STEM activity boosted by Johns Hopkins University (R1), Morgan State University (R2), and the University of Maryland Baltimore County (R2).

The Baltimore metro area in 2019 ranked seventh in the math category and 16th in the computer category, with ranks in the top 25 in nine occupations. Metro Baltimore ranked between 65th and 91st in the engineering, science, and science technician categories, and 114th in the engineering

technician category. It had top-25 ranks in the “computer hardware engineers,” “physical scientists, all other,” and “biological technicians” occupations.

Metro Baltimore ranked 11th in the computer and 12th in the math categories on the change in STEM share between 2005 and 2019, with top-25 ranks in the “information security analysts,” “computer and information research scientists,” “computer network support specialists,” “computer network architects,” “network and computer systems administrators,” “computer occupations, all other,” and “data scientists; and mathematical science occupations, all other” occupations. The science rank was 158th; the other three categories ranked between 227th and 268th.

Median earnings per job in STEM occupations adjusted for the cost of living was \$93,044 in Metro Baltimore in 2019, somewhat greater than the national average and 38th highest among the 384 metro areas. At 16.6 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 47th. The cost-of-living-adjusted change in dollars ranked 40th.

STEM job quality in Metro Baltimore in 2019 was somewhat better than the national average, 27th best among the 384 metro areas. The change in job quality between 2005 and 2019 also was somewhat better than the national average, ranking 42nd. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 93rd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 41st.

**Washington-Arlington-Alexandria, District of Columbia-Virginia-Maryland-West Virginia: 12th in 2019 and 85th on 2005-to-2019 change.** Employment in Metro Washington D.C., which includes five Maryland counties, 18 Virginia counties/independent cities, and one West Virginia county, was 3.55 million in 2019. Metro Washington is a university super center, with STEM activity boosted by four R1 universities — George Mason, George Washington, Georgetown, and the University of Maryland College Park — four R2 universities (American, Catholic, Gallaudet, and Howard), and the federal government.

The Washington D.C. metro area in 2019 ranked third in the math, eighth in the computer, and 20th in the science categories. Along with 10 computer occupations, the “operations research analysts,” “statisticians,” “natural sciences managers,” “biological scientists, all other,” “physicists,” and “physical scientists, all other” occupations ranked in the top 25. The metro area ranked 108th in the engineering category and in the 250s in the two technician categories.

Metro Washington D.C. ranked 11th in the math and 16th in the computer categories on the change in STEM share between 2005 and 2019, including top-25 ranks in two math and three computer occupations, but in the bottom 25 in two computer occupations. It ranked between 333rd and 365th in the four other categories, including bottom-25 ranks in the “civil engineers” and “physical scientists, all other” occupations.

Median earnings per job in STEM occupations adjusted for the cost of living was \$93,998 in Metro Washington D.C. in 2019, somewhat greater than the national average and 33rd highest among the 384 metro areas. At 13.7 percent, the inflation-adjusted change between 2005 and

2019 was somewhat higher than the national average, ranking 85th. The cost-of-living-adjusted change in dollars ranked 62nd.

STEM job quality in Metro Washington D.C. in 2019 was considerably better than the national average, 11th best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly inferior to the national average but ranked 98th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 114th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 69th.

**Raleigh-Cary, North Carolina: 13th in 2019 and 10th on 2005-to-2019 change.** Employment in Metro Raleigh (Franklin, Johnston, and Wake counties) was 0.70 million in 2019. Metro Raleigh is a university major center, with STEM activity boosted by North Carolina State University (R1) and various companies located in either or both Metro Raleigh and neighboring Metro Durham. Some of these companies are located in Research Triangle Park, which is partially in each of the two metro areas.

The Raleigh metro area in 2019 ranked ninth in the computer category and 17th in math, with ranks in the top 25 in 11 occupations. Metro Raleigh ranked 39th in the science category, with a top-25 rank in the “medical scientists, except epidemiologists” occupation. It ranked between 61st and 116th in the engineering and two technician categories. It had top 25 ranks in the “civil engineers,” “computer hardware engineers,” and “surveying and mapping technicians” occupations.

Metro Raleigh ranked sixth in the computer category and 14th in math on the change in STEM share between 2005 and 2019, with top-25 ranks in 10 occupations but a bottom-25 rank in the “computer programmers” occupation. It ranked 65th in the engineering and 70th in the science categories, with top-25 ranks in the “civil engineers,” “computer hardware engineers,” and “medical scientists, except epidemiologists” occupations. The rank was 125th in the science technician category and only 286th in the engineering technician category.

Median earnings per job in STEM occupations adjusted for the cost of living was \$93,009 in Metro Raleigh in 2019, somewhat greater than the national average and 39th highest among the 384 metro areas. At 15.1 percent, the inflation-adjusted change between 2005 and 2019 was higher than the national average, ranking 67th. The cost-of-living-adjusted change in dollars ranked 50th.

STEM job quality in Metro Raleigh in 2019 was slightly better than the national average, 49th best among the 384 metro areas. The change in job quality between 2005 and 2019 was somewhat better than the national average, ranking 47th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 74th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 54th.

**Durham-Chapel Hill, North Carolina: 11th in 2019 and 335th on 2005-to-2019 change.** Employment in Metro Durham (Chatham, Durham, Granville, Orange, and Person counties) was 0.36 million in 2019. Metro Durham is a multicollege town, with STEM activity boosted by the

University of North Carolina Chapel Hill and Duke University (both R1) and various companies located in either or both Metro Durham and neighboring Metro Raleigh.

The Durham metro area in 2019 ranked second in the science, fourth in the math, and 11th in the computer categories. Along with seven computer occupations, “statisticians,” “data scientists; and mathematical science occupations, all other,” “medical scientists, except epidemiologists,” “chemists,” and “physical scientists, all other” ranked in the top 25. Metro Durham ranked 72nd in the science technician and 115th in the engineering categories, including top-25 ranks in the “biological technicians” and “bioengineers and biomedical engineers” occupations. The rank was 182nd in the engineering technician category.

Metro Durham ranked third in the math category and ninth in the science category on the change in STEM share between 2005 and 2019, including top-25 ranks in the “statisticians,” “data scientists; and mathematical science occupations, all other,” “medical scientists, except epidemiologists,” and “natural sciences managers” occupations, but in the bottom 25 in the “chemists” occupation. Metro Durham ranked 170th in the computer category but only between 366th and 379th in the engineering and two technician categories, including bottom-25 ranks in the “computer hardware engineers,” “electronics engineers, except computer,” “industrial engineers,” “electrical and electronic engineering technologists and technicians,” and “industrial engineering technologists and technicians” occupations.

Median earnings per job in STEM occupations adjusted for the cost of living was \$97,530 in Metro Durham in 2019, greater than the national average and 17th highest among the 384 metro areas. At 5.3 percent, the inflation-adjusted change between 2005 and 2019 was somewhat less than the national average, ranking 266th. The cost-of-living-adjusted change in dollars ranked 239th.

STEM job quality in Metro Durham in 2019 was better than the national average, 25th best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was somewhat inferior to the national average, ranking 121st. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 42nd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 240th.

**Charlotte-Concord-Gastonia, North Carolina-South Carolina: 54th in 2019 and 29th on 2005-to-2019 change.** Employment in Metro Charlotte, which consists of eight North Carolina counties and three South Carolina counties, was 1.35 million in 2019. Metro Charlotte is a university major center, with STEM activity boosted by the University of North Carolina Charlotte (R2) and finance-sector companies such as Bank of America and Wells Fargo.

The Charlotte metro area in 2019 ranked 26th in both the computer and math categories, including top-25 ranks in the “computer and information systems managers,” “computer systems analysts,” “information security analysts,” and “operations research analysts” occupations. It ranked 158th in the engineering category but only between 241st and 291st in the science and two technician categories.

Metro Charlotte ranked 22nd in the math and 23rd in the computer categories on the change in STEM share between 2005 and 2019, including top-25 ranks in the “computer systems analysts,” “information security analysts,” “database administrators; and database architects,” and “operations research analysts” occupations. Metro Charlotte ranked 121st in the engineering, 179th in the science, 188th in the science technician, and 308th in the engineering technician categories.

Median earnings per job in STEM occupations adjusted for the cost of living was \$94,430 in Metro Charlotte in 2019, greater than the national average and 29th highest among the 384 metro areas. At 10.8 percent, the inflation-adjusted change between 2005 and 2019 was slightly higher than the national average, ranking 137th. The cost-of-living-adjusted change in dollars ranked 107th.

STEM job quality in Metro Charlotte in 2019 was somewhat better than the national average, 32nd best among the 384 metro areas. The change in job quality between 2005 and 2019 was better than the national average, ranking 35th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 67th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 110th.

**Charleston-North Charleston, South Carolina: 75th in 2019 and 15th on 2005-to-2019 change.** Employment in Metro Charleston (Berkeley, Charleston, and Dorchester counties) was 0.40 million in 2019. Metro Charleston is a university minor center, with STEM activity boosted by the Joint Base Charleston and companies such as Boeing. It does not have a R1 or R2 university.

The Charleston metro area in 2019 ranked between 65th and 73rd in the computer, math, engineering, and engineering technician categories, including top-25 ranks in the “network and computer systems administrators,” “Web developers; and Web and digital interface designers,” and “materials engineers” occupations. It ranked 265th in the science and 316th in the science technician categories.

Metro Charleston ranked 18th in the computer category and 25th in engineering on the change in STEM share between 2005 and 2019, including top-25 ranks in the “computer systems analysts,” “computer and information research scientists,” “network and computer systems administrators,” “Web developers; and Web and digital interface designers,” “aerospace engineers,” “industrial engineers,” and “materials engineers” occupations. It ranked 61st in the math category, 125th in the engineering technician category, and in the 310s in the science and science technician categories.

Median earnings per job in STEM occupations adjusted for the cost of living was \$84,113 in Metro Charleston in 2019, less than the national average and 163rd highest among the 384 metro areas. At 14.8 percent, the inflation-adjusted change between 2005 and 2019 was somewhat higher than the national average, ranking 71st. The cost-of-living-adjusted change in dollars ranked 75th.

STEM job quality in Metro Charleston in 2019 was worse than the national average, 103rd best among the 384 metro areas. The change in job quality between 2005 and 2019 was slightly better than the national average, ranking 55th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 224th in the nation in 2019 and the dollar change between 2005 and 2019 ranked 78th.

**Palm Bay-Melbourne-Titusville, Florida: ninth in 2019 and 12th on 2005-to-2019 change.**

Employment in Metro Palm Bay (Brevard County) was 0.25 million in 2019. Metro Palm Bay is a university minor center, with STEM activity boosted by the Florida Institute of Technology (R2); the John F. Kennedy Space Center, and companies such as Raytheon and L3Harris Technologies.

The Palm Bay metro area in 2019 ranked fourth in the engineering, eighth in the engineering technician, and 23rd in the computer categories, with ranks in the top 25 in the “information security analysts,” “computer and information research scientists,” “computer network support specialists,” “computer network architects,” “software developers; and software quality assurance analysts and testers,” “aerospace engineers,” “computer hardware engineers,” “electrical engineers,” “electronics engineers, except computer,” “industrial engineers,” “engineers, all other,” “aerospace engineering and operations technologists and technicians,” and “electrical and electronic engineering technologists and technicians” occupations. Metro Palm Bay ranked 108th in the math, 251st in the science, and 298th in the science technician categories.

Metro Palm Bay ranked 15th in the engineering and 17th in the computer categories on the change in STEM share between 2005 and 2019, including top-25 ranks in most of the occupations ranked in the top 25 in 2019, but in the bottom 25 in the “computer hardware engineers” occupation. It ranked between 160th and 214th in the math and two technician categories. The rank in the science category was only 306th.

Median earnings per job in STEM occupations adjusted for the cost of living was \$94,661 in Metro Palm Bay in 2019, greater than the national average and 27th highest among the 384 metro areas. At 11.3 percent, the inflation-adjusted change between 2005 and 2019 was slightly higher than the national average, ranking 123rd. The cost-of-living-adjusted change in dollars ranked 96th.

STEM job quality in Metro Palm Bay in 2019 was considerably better than the national average, 14th best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was much inferior to the national average, ranking 266th. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked 102nd in the nation in 2019 and the dollar change between 2005 and 2019 ranked 94th.

**Huntsville, Alabama: third in 2019 and 96th on 2005-to-2019 change.** Employment in Metro Huntsville (Madison County) was 0.25 million in 2019. Metro Huntsville is a university minor center, with STEM activity boosted by the University of Alabama Huntsville (R2); the U.S. Army, particularly its Aviation and Missile Command and its Space and Missile Defense Command; and NASA’s Marshall Space Flight Center.



The Huntsville metro area in 2019 ranked in the top 16 in the computer, math, engineering, and engineering technician categories. Seven computer occupations, one math occupation, 10 engineering occupations, and two engineering technician occupations ranked in the top 25. Metro Huntsville ranked 155th in the science category and 285th in the science technician category.

Metro Huntsville ranked 19th in the computer category on the change in STEM share between 2005 and 2019, including top-25 ranks in five occupations, but it was in the bottom 25 in the “computer systems analysts” occupation. It ranked 64th in the math category, with a top-25 rank in the “operations research analysts” occupation. The rank was only 265th in the engineering category, which had two occupations in the top 25 — “electrical engineers” and “materials engineers” — but three in the bottom 25: “architectural and engineering managers,” “aerospace engineers,” and “computer hardware engineers.” The ranks in the other three categories were 352nd or worse, with five engineering technician occupations ranking in the bottom 25.

Median earnings per job in STEM occupations adjusted for the cost of living was \$110,675 in Metro Huntsville in 2019, far greater than the national average and second highest among the 384 metro areas. At 11.8 percent, the inflation-adjusted change between 2005 and 2019 was slightly higher than the national average, ranking 110th. The cost-of-living-adjusted change in dollars ranked 58th.

STEM job quality in Metro Huntsville in 2019 was far better than the national average, third best among the 384 metro areas. However, the change in job quality between 2005 and 2019 was somewhat inferior to the national average, ranking 163rd. After removing the effect of job quality, the balance of median earnings per job adjusted for the cost of living ranked ninth in the nation in 2019 and the dollar change between 2005 and 2019 ranked 58th.

## **GEOGRAPHIC VARIATIONS IN STEM ECONOMIC ACTIVITY**

This section provides an initial examination of the reasons why the STEM share of total employment and total aggregate earnings varies so much by metropolitan area. The STEM share of total employment in 2019 ranged from 1.42-to-23.40 percent across the 384 metro areas. The median was 3.84 percent.

### **Educational Attainment**

The STEM share is highly correlated to educational attainment, as measured by the share of employed individuals between the ages of 25 and 64 who have earned at least a bachelor's degree.<sup>3</sup> The educational attainment variable ranged from 15.7-to-66.3 percent across the 384 metro areas, with a median of 32.3 percent. The correlation between this measure of educational attainment and the STEM employment share is 0.66 across all 384 metro areas. The correlation is highest in size class 1 at 0.77. In SCs 2 and 3, the correlation is 0.70. The correlation drops across the three smallest size classes to 0.45 in SC6. Correlations between educational attainment and the STEM share of aggregate earnings are slightly lower.

The correlation between educational attainment and STEM intensity does not indicate cause and effect. Since so many STEM occupations require at least a bachelor's degree, the decision of a company with a high share of its workforce in STEM occupations to locate in a particular metro area will boost the educational attainment of the area. However, it also is likely that the location decision in part depends on the educational attainment of the metro areas under consideration prior to the company's location decision.

If it is assumed that educational attainment plays a role in determining the STEM intensity in a metro area, the importance of this factor can be estimated through a regression analysis in which the STEM share is the dependent variable. Using educational attainment as the only explanatory variable, 44 percent of the variation in the STEM share of employment across the 384 metro areas is explained. The coefficient of the educational attainment variable is 0.173. Thus, an increase of 1 percentage point in the share of the employed population between the ages of 25 and 64 with at least a bachelor's degree adds 0.17 to the STEM share of total employment.

Using the same regression model for each of the six size classes, the explained share of the variation in the STEM share of employment ranges from 48-to-60 percent across the first three size classes, but is between 19-and-41 percent in the three smallest size classes. The coefficient of the educational attainment variable is greater in the larger size classes than in the smaller size classes, indicating that boosting educational attainment in large metro areas results in a greater increase in the STEM share than in small metro areas.

### **Other Factors**

Other factors play a role in explaining the geographic variation in the STEM share, but the correlations between STEM intensity and each of these variables is much lower than the correlation with educational attainment:

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<sup>3</sup> The data come from Table B23006 of the American Community Survey (ACS) produced by the U.S. Department of Commerce, Census Bureau. In order to minimize sampling error, results for the five years from 2015 through 2019 were combined.

- Metropolitan size. The correlation between the STEM share of employment and metro size as measured by employment is only 0.25.
- The region of the country in which a metro area is located. The nine regions of the country defined by the U.S. Census Bureau were used to create eight dummy variables for inclusion in the regression equation.<sup>4</sup>
- The presence of research universities. The research university measure was calculated as follows:
  - The number of R1 universities was multiplied by a factor of 1.5 and added to the number of R2 universities.
  - This weighted sum was divided by the population (in millions) of the metro area. The correlation between the STEM share and the research university variable is only 0.22. Only 145 metro areas have a research university. Thus the median value of the research university variable is zero; the highest value is 16.1.
- Typology of universities in a metro area. Using the typology created by Ehlenz and Mawhorter, six dummy variables corresponding to their six categories were created for inclusion in the regressions. Some metro areas do not have any such institutions and thereby form a seventh category.

Significant correlation is present between the educational attainment variable and each of these other independent variables. Thus, the educational attainment variable cannot be used in conjunction with other variables in a regression. For instance, including educational attainment with the metro size and research universities variables in a single equation causes the sign of the latter two variables to become negative.

Initially, univariate regressions — those with just one independent variable — were run using all 384 metro areas. With metro size as measured by employment as the only independent variable, only 5.9 percent of the variation in the STEM share of employment is explained (the adjusted R-squared is 0.059), but this relationship is statistically significant with more than 99 percent confidence. The coefficient of the employment variable indicates that on average a metro area with 1 million more residents than another would have a STEM share 0.67 percentage points higher.

Using the set of dummy variables for region as the only independent variable, only 2.4 percent of the variation in the STEM share of employment is explained; this relationship is significant with 97 percent confidence. The STEM share is highest in the East North Central, Mountain, and New England regions and lowest in the West South Central and East South Central regions.

With research universities as the only independent variable, only 4.5 percent of the variation in the STEM share of employment is explained. This small adjusted R-squared value is significant at more than 99 percent confidence, but the adjusted R-square value is generally not significant

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<sup>4</sup> A dummy variable has a value of zero or one. For example, Metro New York City is in the Middle Atlantic region. The dummy variable for Metro New York receives a value of one for this region, while each of the other dummy variables receive a value of zero. Each of the eight dummy variables included in the regression are expressed relative to the dummy variable not included (in this case, the West South Central region, which has the worst negative correlation with STEM intensity).

when the same regression model is applied to each of the six size classes. The coefficient of the research university variable is 0.193.

A slightly better fit is attained by including the dummy variables for the typology created by Ehlenz and Mawhorter. Using this set of dummy variables as the only independent variable results in an R-squared of 0.132. The coefficients of the dummy variables are sensible, and indicate the degree to which each of the typology's categories increase STEM share relative to a metro area with no four-year university:

- “Super Center:” 3.57.
- “Major Center:” 2.20.
- “Multicollege Town:” 1.89.
- “Strong College Town:” 1.49.
- “Minor Center:” 0.88.
- “Weak College Town:” 0.65.

Expanding the regressions to include more than one independent variable only slightly boosts the explanatory power. For example, a regression using metro size and research universities explains only 11 percent of the variation in the STEM share of employment across the 384 metro areas. The addition of the regional dummy variables improves the explanatory power to only 13 percent.

The best fit without using the educational attainment variable is achieved with the research university variable and the typology dummy values. The explanatory power is 15 percent, with both the research university variable and the typology variable statistically significant with the proper sign.

In conclusion, little of the geographic variability in STEM intensity can be explained by metro size, region, the presence of research universities, and the typology of universities in a metro area — even though these variables are significantly related to the STEM share. A stronger fit is present between STEM intensity and educational attainment, but it is not clear how much of this relationship is due to higher educational attainment being the cause of higher STEM intensity.

## APPENDIX A: SOURCES OF DEFINITIONS OF STEM OCCUPATIONS

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## APPENDIX B: STEM OCCUPATIONS

<b>Emsi Occupation</b>	<b>Description</b>
	<b>COMPUTER CATEGORY</b>
11-3021	Computer and Information Systems Managers
15-1211	Computer Systems Analysts
15-1212	Information Security Analysts
15-1221	Computer and Information Research Scientists
15-1231	Computer Network Support Specialists
15-1232	Computer User Support Specialists
15-1241	Computer Network Architects
15-1244	Network and Computer Systems Administrators
15-1245*	Database Administrators; and Database Architects
15-1251	Computer Programmers
15-1256**	Software Developers; and Software Quality Assurance Analysts and Testers
15-1257***	Web Developers; and Web and Digital Interface Designers
15-1299	Computer Occupations, All Other
	<b>MATH CATEGORY</b>
15-2011	Actuaries
15-2021	Mathematicians
15-2031	Operations Research Analysts
15-2041	Statisticians
15-2098****	Data Scientists; and Mathematical Science Occupations, All Other
	<b>ENGINEERING CATEGORY</b>
11-9041	Architectural and Engineering Managers
17-2011	Aerospace Engineers
17-2021	Agricultural Engineers
17-2031	Bioengineers and Biomedical Engineers
17-2041	Chemical Engineers
17-2051	Civil Engineers
17-2061	Computer Hardware Engineers
17-2071	Electrical Engineers
17-2072	Electronics Engineers, Except Computer
17-2081	Environmental Engineers
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors
17-2112	Industrial Engineers
17-2121	Marine Engineers and Naval Architects
17-2131	Materials Engineers
17-2141	Mechanical Engineers
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers
17-2161	Nuclear Engineers
17-2171	Petroleum Engineers
17-2199	Engineers, All Other
	<b>ENGINEERING TECHNICIAN CATEGORY</b>
17-3011	Architectural and Civil Drafters
17-3012	Electrical and Electronics Drafters
17-3013	Mechanical Drafters
17-3019	Drafters, All Other
17-3021	Aerospace Engineering and Operations Technologists and Technicians
17-3022	Civil Engineering Technologists and Technicians
17-3023	Electrical and Electronic Engineering Technologists and Technicians
17-3024	Electro-Mechanical & Mechatronics Technologists and Technicians
17-3025	Environmental Engineering Technologists and Technicians
17-3026	Industrial Engineering Technologists and Technicians
17-3027	Mechanical Engineering Technologists and Technicians
17-3031	Surveying and Mapping Technicians
17-3098^	Calibration Technologists and Technicians; and Engineering Technologists and Technicians, Except Drafters, All Other

(continued)

## APPENDIX B: STEM OCCUPATIONS (continued)

Emsi Occupation	Description
	SCIENCE CATEGORY
11-9121	Natural Sciences Managers
19-1011	Animal Scientists
19-1012	Food Scientists and Technologists
19-1013	Soil and Plant Scientists
19-1021	Biochemists and Biophysicists
19-1022	Microbiologists
19-1023	Zoologists and Wildlife Biologists
19-1029	Biological Scientists, All Other
19-1031	Conservation Scientists
19-1032	Foresters
19-1041	Epidemiologists
19-1042	Medical Scientists, Except Epidemiologists
19-1099	Life Scientists, All Other
19-2011	Astronomers
19-2012	Physicists
19-2021	Atmospheric and Space Scientists
19-2031	Chemists
19-2032	Materials Scientists
19-2041	Environmental Scientists and Specialists, Including Health
19-2042	Geoscientists, Except Hydrologists and Geographers
19-2043	Hydrologists
19-2099	Physical Scientists, All Other
	SCIENCE TECHNICIAN CATEGORY
19-4011^^	Agricultural Technicians; and Food Science Technicians
19-4021	Biological Technicians
19-4031	Chemical Technicians
19-4042	Environmental Science and Protection Technicians, Including Health
19-4045^^^	Geological Technicians; and Hydrologic Technicians
19-4051	Nuclear Technicians
19-4071	Forest and Conservation Technicians
19-4092	Forensic Science Technicians
19-4099	Life, Physical, and Social Science Technicians, All Other

\* Combination of two Standard Occupational Classification (SOC) occupations: 15-1242 and 15-1243.

\*\* Combination of two SOC occupations: 15-1252 and 15-1253.

\*\*\* Combination of two SOC occupations: 15-1254 and 15-1255.

\*\*\*\* Combination of two SOC occupations: 15-2051 and 15-2099.

^ Combination of two SOC occupations: 17-3028 and 17-3029.

^^ Combination of two SOC occupations: 19-4012 and 19-4013.

^^^ Combination of two SOC occupations: 19-4043 and 19-4044.

Sources: Emsi (occupational classification adapted from Executive Office of the President, Office of Management and Budget, "Standard Occupational Classification Manual," [https://www.bls.gov/soc/2018/soc\\_2018\\_manual.pdf](https://www.bls.gov/soc/2018/soc_2018_manual.pdf)). Definition of STEM occupations produced by authors.

## **APPENDIX C: STEM SUMMARY FOR EACH METROPOLITAN AREA BY SIZE CLASS**

This appendix presents overall STEM aggregate earnings data. The dollar values are in millions and are adjusted for the cost of living. The 2005-to-2019 change in value is inflation adjusted. The rank is within the size class.



	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC1: Employment of at Least 1 Million (N=36)</b>		<b>11.66%</b>		<b>\$488,076</b>		<b>1.96</b>		<b>\$157,878</b>
San Jose-Sunnyvale-Santa Clara, CA	1	31.13	6	23,622	1	6.47	3	10,449
Seattle-Tacoma-Bellevue, WA	2	18.85	5	24,146	3	5.32	2	11,309
San Francisco-Oakland-Berkeley, CA	3	17.83	4	25,371	2	5.58	1	11,968
Washington-Arlington-Alexandria, DC-VA-MD-WV	4	16.91	2	34,333	22	1.49	5	9,217
Austin-Round Rock-Georgetown, TX	5	15.92	19	9,538	14	1.88	14	4,493
Detroit-Warren-Dearborn, MI	6	14.70	12	16,367	4	3.07	20	3,337
Boston-Cambridge-Newton, MA-NH	7	14.39	7	23,318	6	2.58	7	7,611
Denver-Aurora-Lakewood, CO	8	14.17	15	12,940	9	2.32	12	5,111
Baltimore-Columbia-Towson, MD	9	14.06	18	11,100	5	2.70	17	3,717
San Diego-Chula Vista-Carlsbad, CA	10	14.05	17	11,755	10	2.24	18	3,556
Portland-Vancouver-Hillsboro, OR-WA	11	12.22	20	8,481	17	1.70	21	2,794
Atlanta-Sandy Springs-Alpharetta, GA	12	11.99	11	18,039	7	2.51	9	6,563
Minneapolis-St. Paul-Bloomington, MN-WI	13	11.97	14	13,733	13	1.91	15	3,986
Dallas-Fort Worth-Arlington, TX	14	11.87	8	23,286	23	1.48	6	9,123
Houston-The Woodlands-Sugar Land, TX	15	11.79	10	19,660	34	0.70	8	6,625
Columbus, OH	16	11.23	24	6,809	15	1.77	22	2,135
Charlotte-Concord-Gastonia, NC-SC	17	11.01	22	7,505	8	2.42	19	3,399
Kansas City, MO-KS	18	10.85	25	6,513	16	1.75	26	1,866
Sacramento-Roseville-Folsom, CA	19	10.44	27	6,167	28	1.09	33	1,446
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	20	10.35	13	16,339	29	1.04	16	3,801
Phoenix-Mesa-Chandler, AZ	21	10.34	16	11,783	21	1.56	13	4,606
Pittsburgh, PA	22	10.10	26	6,468	12	2.08	24	1,919
St. Louis, MO-IL	23	9.90	21	7,761	20	1.58	30	1,646
Cincinnati, OH-KY-IN	24	9.85	28	5,973	18	1.69	29	1,694
Indianapolis-Carmel-Anderson, IN	25	9.52	30	5,518	19	1.65	28	1,849
Los Angeles-Long Beach-Anaheim, CA	26	9.21	3	29,909	35	0.59	10	6,208
Tampa-St. Petersburg-Clearwater, FL	27	8.88	29	5,838	11	2.14	23	1,943
Chicago-Naperville-Elgin, IL-IN-WI	28	8.80	9	22,204	24	1.39	11	5,994
Orlando-Kissimmee-Sanford, FL	29	8.63	32	5,106	25	1.30	27	1,849
Cleveland-Elyria, OH	30	8.56	31	5,174	26	1.28	35	841
New York-Newark-Jersey City, NY-NJ-PA	31	8.35	1	41,299	31	0.86	4	10,152
San Antonio-New Braunfels, TX	32	8.30	33	4,661	30	1.01	25	1,906
Nashville-Davidson--Murfreesboro--Franklin, TN	33	7.36	34	3,987	27	1.12	31	1,537
Miami-Fort Lauderdale-Pompano Beach, FL	34	6.10	23	7,208	32	0.78	32	1,518

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC1: Employment of at Least 1 Million (N=36; continued)</b>		<b>11.66%</b>		<b>\$488,076</b>		<b>1.96</b>		<b>\$157,878</b>
Las Vegas-Henderson-Paradise, NV	35	5.15	36	2,616	33	0.74	34	876
Riverside-San Bernardino-Ontario, CA	36	4.51	35	3,548	36	0.05	36	835
<b>SC2: Employment of 350,000 to 999,999 (N=45)</b>		<b>9.47</b>		<b>109,782</b>		<b>1.20</b>		<b>29,176</b>
Durham-Chapel Hill, NC	1	16.95	7	3,480	42	-0.26	16	735
Raleigh-Cary, NC	2	16.68	1	6,135	2	4.02	1	3,135
Madison, WI	3	14.39	10	3,267	1	4.64	3	1,487
Colorado Springs, CO	4	13.56	19	2,462	29	0.63	22	562
Dayton-Kettering, OH	5	13.13	11	2,997	6	2.41	17	710
Salt Lake City, UT	6	12.45	2	4,913	4	2.79	2	2,179
Albuquerque, NM	7	12.21	17	2,524	40	-0.19	38	265
<b>Tucson, AZ</b>	8	11.57	20	2,404	19	1.13	21	563
Albany-Schenectady-Troy, NY	9	11.36	12	2,875	9	1.94	12	801
Hartford-East Hartford-Middletown, CT	10	10.97	5	4,130	12	1.65	10	871
Boise City, ID	11	10.83	28	1,892	44	-0.37	25	494
Des Moines-West Des Moines, IA	12	10.50	21	2,317	5	2.64	6	1,027
Virginia Beach-Norfolk-Newport News, VA-NC	13	10.33	3	4,569	15	1.37	9	875
Omaha-Council Bluffs, NE-IA	14	9.95	13	2,792	16	1.27	11	863
Charleston-North Charleston, SC	15	9.86	31	1,817	3	3.02	8	943
Richmond, VA	16	9.84	6	3,549	13	1.63	5	1,055
Oxnard-Thousand Oaks-Ventura, CA	17	9.69	37	1,618	45	-1.14	45	-138
Rochester, NY	18	9.65	15	2,619	24	0.70	31	392
Bridgeport-Stamford-Norwalk, CT	19	9.53	18	2,493	26	0.69	26	467
Oklahoma City, OK	20	9.45	9	3,307	30	0.62	7	959
Tulsa, OK	21	9.39	23	2,279	11	1.80	13	791
Harrisburg-Carlisle, PA	22	9.33	34	1,651	25	0.70	35	289
Akron, OH	23	9.12	35	1,643	8	2.03	29	408
Milwaukee-Waukesha, WI	24	8.94	4	4,238	17	1.18	14	768
Worcester, MA-CT	25	8.85	26	1,978	31	0.60	27	444
Greenville-Anderson, SC	26	8.80	30	1,818	7	2.35	15	742
Knoxville, TN	27	8.35	33	1,695	20	1.12	28	426
Providence-Warwick, RI-MA	28	8.25	8	3,361	23	0.80	18	681
Columbia, SC	29	8.19	36	1,623	14	1.40	23	528
Bakersfield, CA	30	8.17	40	1,488	38	0.03	32	352

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC2: Employment of 350,000 to 999,999 (N=45; continued)</b>		<b>9.47%</b>		<b>\$109,782</b>		<b>1.20</b>		<b>\$29,176</b>
Louisville/Jefferson County, KY-IN	31	8.03	14	2,728	10	1.84	4	1,062
Birmingham-Hoover, AL	32	7.72	24	2,153	34	0.31	36	283
Baton Rouge, LA	33	7.71	38	1,595	28	0.65	30	407
Grand Rapids-Kentwood, MI	34	7.69	22	2,297	22	0.98	20	613
Little Rock-North Little Rock-Conway, AR	35	7.53	41	1,380	39	-0.01	43	172
New Haven-Milford, CT	36	7.39	39	1,571	41	-0.25	40	205
Buffalo-Cheektowaga, NY	37	7.26	25	2,105	18	1.18	24	511
Jacksonville, FL	38	7.26	16	2,547	27	0.66	19	643
Urban Honolulu, HI	39	6.94	32	1,720	43	-0.37	42	185
Greensboro-High Point, NC	40	6.79	42	1,249	21	1.11	37	272
New Orleans-Metairie, LA	41	6.68	27	1,917	35	0.21	34	299
Allentown-Bethlehem-Easton, PA-NJ	42	6.64	43	1,077	32	0.54	44	136
Memphis, TN-MS-AR	43	5.63	29	1,845	33	0.36	33	300
El Paso, TX	44	4.93	45	820	37	0.08	39	225
Fresno, CA	45	4.02	44	841	36	0.10	41	191
<b>Sc3: Employment of 200,000 to 349,999 (N=46)</b>		<b>8.37</b>		<b>47,459</b>		<b>0.92</b>		<b>11,710</b>
Huntsville, AL	1	28.15	1	4,149	10	1.40	1	1,242
Boulder, CO	2	24.18	2	2,930	16	0.93	4	716
Palm Bay-Melbourne-Titusville, FL	3	18.43	4	2,202	1	3.41	5	695
Trenton-Princeton, NJ	4	14.59	3	2,290	3	2.99	3	862
Manchester-Nashua, NH	5	14.20	7	1,551	5	2.18	7	413
Ann Arbor, MI	6	13.10	6	1,660	11	1.37	9	366
Provo-Orem, UT	7	12.35	5	1,661	2	2.99	2	928
Ogden-Clearfield, UT	8	10.97	8	1,494	21	0.74	6	444
Santa Maria-Santa Barbara, CA	9	9.80	15	1,085	20	0.75	22	204
Lansing-East Lansing, MI	10	9.46	12	1,240	4	2.28	11	333
Augusta-Richmond County, GA-SC	11	9.26	14	1,178	15	1.19	15	293
Wichita, KS	12	8.92	9	1,443	46	-1.51	46	-80
Portland-South Portland, ME	13	8.81	11	1,295	6	1.81	8	407
Lincoln, NE	14	8.72	23	858	14	1.22	16	274
Anchorage, AK	15	8.70	20	928	43	-0.26	32	109
Syracuse, NY	16	8.01	10	1,320	18	0.79	20	227
Fayetteville-Springdale-Rogers, AR	17	7.37	19	951	26	0.46	10	353

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC3: Employment of 200,000 to 349,999 (N=46; continued)</b>		<b>8.37%</b>		<b>\$47,459</b>		<b>0.92</b>		<b>\$11,710</b>
Lexington-Fayette, KY	18	7.18	17	1,001	34	0.16	24	187
Fort Wayne, IN	19	7.06	26	785	31	0.24	28	137
Winston-Salem, NC	20	6.97	16	1,003	7	1.67	12	328
Chattanooga, TN-GA	21	6.91	21	915	19	0.77	21	212
Reno, NV	22	6.69	25	812	8	1.56	13	300
Springfield, MA	23	6.63	13	1,217	17	0.81	14	295
Santa Rosa-Petaluma, CA	24	6.57	29	705	41	-0.14	35	90
Corpus Christi, TX	25	6.53	33	618	38	0.05	30	125
Poughkeepsie-Newburgh-Middletown, NY	26	6.33	22	865	45	-1.18	45	-56
Spokane-Spokane Valley, WA	27	6.11	24	834	30	0.38	23	197
Fayetteville, NC	28	6.09	31	641	32	0.22	36	88
Pensacola-Ferry Pass-Brent, FL	29	5.95	36	549	28	0.41	31	112
Lancaster, PA	30	5.90	28	719	12	1.36	18	236
Jackson, MS	31	5.81	27	772	39	0.01	38	82
Salem, OR	32	5.80	35	555	23	0.57	25	160
Toledo, OH	33	5.74	18	978	13	1.33	17	252
Springfield, MO	34	5.60	34	592	9	1.45	19	233
Scranton--Wilkes-Barre, PA	35	5.16	30	650	42	-0.16	42	30
Asheville, NC	36	5.13	38	511	24	0.56	27	149
Lafayette, LA	37	4.77	40	480	33	0.21	40	43
North Port-Sarasota-Bradenton, FL	38	4.55	32	631	22	0.63	29	134
Salinas, CA	39	4.37	43	432	44	-0.44	43	25
Lakeland-Winter Haven, FL	40	4.33	41	459	29	0.38	34	95
Youngstown-Warren-Boardman, OH-PA	41	4.26	42	453	25	0.55	44	25
Cape Coral-Fort Myers, FL	42	4.09	37	516	27	0.43	26	158
Deltona-Daytona Beach-Ormond Beach, FL	43	3.75	46	324	36	0.10	41	32
Stockton, CA	44	3.66	39	489	37	0.05	37	86
Modesto, CA	45	3.56	45	351	35	0.15	39	57
McAllen-Edinburg-Mission, TX	46	2.74	44	366	40	-0.01	33	108
<b>SC4: Employment of 125,000 to 199,999 (N=62)</b>		<b>7.28</b>		<b>33,844</b>		<b>0.76</b>		<b>7,669</b>
Cedar Rapids, IA	1	14.48	2	1,241	2	3.03	2	448
Kennewick-Richland, WA	2	14.12	4	1,035	61	-2.69	33	97
Fort Collins, CO	3	13.22	3	1,201	38	0.38	3	346

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC4: Employment of 125,000 to 199,999 (N=62; continued)</b>		<b>7.28%</b>		<b>\$33,844</b>		<b>0.76</b>		<b>\$7,669</b>
Peoria, IL	4	12.33	1	1,276	1	3.58	1	458
Norwich-New London, CT	5	12.26	6	884	3	2.53	18	171
Crestview-Fort Walton Beach-Destin, FL	6	11.86	8	775	13	1.55	14	199
Olympia-Lacey-Tumwater, WA	7	11.10	16	711	6	1.93	7	256
Charlottesville, VA	8	10.72	17	699	4	2.02	4	290
Burlington-South Burlington, VT	9	10.33	20	685	29	0.64	28	112
Columbus, GA-AL	10	10.08	19	695	7	1.92	19	152
Davenport-Moline-Rock Island, IA-IL	11	9.23	5	915	9	1.81	8	247
Springfield, IL	12	9.20	14	722	37	0.43	30	103
College Station-Bryan, TX	13	9.19	24	577	60	-2.47	50	50
Gulfport-Biloxi, MS	14	8.92	11	737	39	0.37	27	125
Wilmington, NC	15	8.66	26	548	11	1.64	12	206
Beaumont-Port Arthur, TX	16	8.54	7	779	21	1.07	11	224
Tallahassee, FL	17	8.35	12	728	49	0.05	55	29
York-Hanover, PA	18	8.16	9	767	20	1.17	16	181
Montgomery, AL	19	8.12	18	699	22	0.98	29	109
Kingsport-Bristol, TN-VA	20	7.94	30	487	10	1.76	22	148
Reading, PA	21	7.92	10	741	5	1.97	6	267
Green Bay, WI	22	7.70	13	723	15	1.47	15	191
Mobile, AL	23	7.44	15	718	26	0.80	21	148
Savannah, GA	24	7.44	21	665	17	1.39	9	239
Appleton, WI	25	7.41	29	497	18	1.36	20	149
San Luis Obispo-Paso Robles, CA	26	7.35	34	464	8	1.89	17	174
Fargo, ND-MN	27	7.32	23	590	42	0.32	10	231
Kalamazoo-Portage, MI	28	7.21	33	473	23	0.96	31	99
Sioux Falls, SD	29	7.09	22	593	16	1.45	5	273
Gainesville, FL	30	6.98	27	520	27	0.78	32	97
Spartanburg, SC	31	6.85	28	514	14	1.48	13	201
Roanoke, VA	32	6.23	31	486	32	0.59	40	74
Waco, TX	33	6.22	43	384	53	-0.27	42	65
Killeen-Temple, TX	34	6.19	25	573	55	-0.36	35	87
Vallejo, CA	35	5.97	35	458	28	0.75	26	127
Duluth, MN-WI	36	5.94	38	438	19	1.18	24	128
Eugene-Springfield, OR	37	5.90	32	479	58	-0.46	59	5

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC4: Employment of 125,000 to 199,999 (N=62; continued)</b>		<b>7.28%</b>		<b>\$33,844</b>		<b>0.76</b>		<b>\$7,669</b>
Utica-Rome, NY	38	5.88	45	374	54	-0.30	60	0
Atlantic City-Hammonton, NJ	39	5.82	44	379	36	0.45	48	53
Evansville, IN-KY	40	5.77	36	453	43	0.29	44	57
Flint, MI	41	5.67	39	416	34	0.58	58	12
Longview, TX	42	5.60	48	343	48	0.10	43	58
Rockford, IL	43	5.57	37	441	41	0.34	52	43
South Bend-Mishawaka, IN-MI	44	5.39	41	389	24	0.86	34	89
Erie, PA	45	5.33	54	314	40	0.34	56	19
Greeley, CO	46	5.21	52	322	30	0.63	23	146
Clarksville, TN-KY	47	5.20	55	307	57	-0.39	57	18
Lubbock, TX	48	5.17	46	370	52	-0.10	38	79
Hickory-Lenoir-Morganton, NC	49	5.13	42	388	12	1.59	25	128
Amarillo, TX	50	4.95	57	294	50	-0.01	46	54
Elkhart-Goshen, IN	51	4.87	53	321	31	0.61	36	81
Huntington-Ashland, WV-KY-OH	52	4.85	51	327	35	0.52	49	51
Rochester, MN	53	4.72	47	364	62	-2.73	62	-122
Canton-Massillon, OH	54	4.50	40	392	25	0.82	37	81
Port St. Lucie, FL	55	4.33	56	307	51	-0.03	45	56
Salisbury, MD-DE	56	4.11	49	342	45	0.14	51	44
Shreveport-Bossier City, LA	57	4.00	50	336	59	-0.79	61	-61
Naples-Marco Island, FL	58	3.76	59	270	33	0.58	39	77
Visalia, CA	59	3.56	58	283	44	0.24	41	67
Myrtle Beach-Conway-North Myrtle Beach, SC-NC	60	3.42	60	248	56	-0.38	53	42
Brownsville-Harlingen, TX	61	3.15	61	209	47	0.14	47	53
Yakima, WA	62	3.03	62	177	46	0.14	54	40
<b>SC5: Employment of 75,000 to 124,999 (N=71)</b>		<b>6.85</b>		<b>21,761</b>		<b>0.63</b>		<b>5,173</b>
Bloomington, IL	1	22.25	1	1,098	1	7.70	2	421
Idaho Falls, ID	2	18.44	4	671	57	-0.16	4	161
Warner Robins, GA	3	12.59	5	532	70	-1.43	50	43
Midland, TX	4	12.48	2	809	6	1.72	1	485
Bremerton-Silverdale-Port Orchard, WA	5	11.78	3	685	61	-0.32	42	50
State College, PA	6	11.19	12	417	12	1.43	14	106
Bloomington, IN	7	10.48	17	390	13	1.43	16	104

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC5: Employment of 75,000 to 124,999 (N=71; continued)</b>		<b>6.85%</b>		<b>\$21,761</b>		<b>0.63</b>		<b>\$5,173</b>
Panama City, FL	8	10.17	19	372	7	1.71	21	90
Las Cruces, NM	9	10.14	15	399	67	-1.01	41	50
Jefferson City, MO	10	9.74	16	395	3	1.87	25	76
Binghamton, NY	11	9.46	7	494	71	-2.38	71	-119
Lynchburg, VA	12	9.28	6	508	2	2.63	3	184
Champaign-Urbana, IL	13	9.18	8	494	28	0.76	20	91
Iowa City, IA	14	8.66	9	471	44	0.27	6	148
Oshkosh-Neenah, WI	15	8.29	11	426	16	1.22	17	104
Lafayette-West Lafayette, IN	16	7.71	13	407	5	1.74	7	148
Athens-Clarke County, GA	17	7.43	24	357	68	-1.04	55	34
Santa Cruz-Watsonville, CA	18	7.29	18	388	58	-0.16	43	50
Charleston, WV	19	7.25	10	433	23	0.89	62	23
Bismarck, ND	20	7.17	31	296	33	0.62	10	116
Hagerstown-Martinsburg, MD-WV	21	7.11	21	365	15	1.22	12	114
Racine, WI	22	7.07	32	281	11	1.50	28	70
Topeka, KS	23	6.99	14	405	8	1.64	11	116
Florence, SC	24	6.95	30	301	20	0.99	32	61
Wausau-Weston, WI	25	6.81	28	307	4	1.85	13	107
Columbia, MO	26	6.80	22	362	10	1.54	8	138
Billings, MT	27	6.60	26	311	52	0.07	23	81
Tuscaloosa, AL	28	6.59	20	369	9	1.55	5	150
Waterloo-Cedar Falls, IA	29	6.51	29	304	14	1.41	18	101
La Crosse-Onalaska, WI-MN	30	6.42	37	254	22	0.93	31	66
Bellingham, WA	31	6.19	27	308	26	0.85	22	88
Redding, CA	32	6.18	41	233	25	0.89	37	54
Bend, OR	33	6.12	33	277	17	1.14	9	117
Greenville, NC	34	6.09	38	251	39	0.49	26	74
Barnstable Town, MA	35	6.02	25	326	45	0.24	51	42
Eau Claire, WI	36	6.02	34	265	69	-1.36	68	-5
Lake Charles, LA	37	5.98	23	361	60	-0.23	15	105
Dover, DE	38	5.91	45	228	41	0.42	38	52
Rapid City, SD	39	5.74	52	202	37	0.56	34	56
Johnson City, TN	40	5.65	44	228	54	-0.05	59	26
Jacksonville, NC	41	5.62	35	262	63	-0.38	61	25

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC5: Employment of 75,000 to 124,999 (N=71; continued)</b>		<b>6.85%</b>		<b>\$21,761</b>		<b>0.63</b>		<b>\$5,173</b>
Saginaw, MI	42	5.53	40	243	19	1.03	56	33
Bowling Green, KY	43	5.34	49	202	30	0.71	33	59
Yuma, AZ	44	5.27	54	191	24	0.89	30	67
Jackson, TN	45	5.27	42	231	36	0.58	45	48
Janesville-Beloit, WI	46	5.22	53	197	21	0.96	36	54
Macon-Bibb County, GA	47	5.16	36	259	27	0.80	49	44
Chico, CA	48	4.99	48	211	38	0.49	48	45
Odessa, TX	49	4.97	47	215	51	0.09	19	96
Bangor, ME	50	4.96	59	177	64	-0.44	66	-1
Medford, OR	51	4.84	46	227	40	0.49	44	49
Abilene, TX	52	4.77	58	177	31	0.68	46	47
Merced, CA	53	4.64	51	202	29	0.73	29	69
Tyler, TX	54	4.54	43	230	62	-0.34	58	29
St. George, UT	55	4.36	67	137	18	1.05	27	72
Sioux City, IA-NE-SD	56	4.28	62	170	42	0.40	47	46
Terre Haute, IN	57	4.27	65	150	65	-0.60	69	-22
Hilton Head Island-Bluffton, SC	58	4.26	57	178	32	0.64	40	50
St. Cloud, MN	59	4.24	39	249	35	0.59	24	79
Houma-Thibodaux, LA	60	4.15	55	187	59	-0.20	65	15
Napa, CA	61	4.13	63	164	50	0.11	54	38
Fort Smith, AR-OK	62	4.09	50	202	66	-0.65	70	-23
Prescott Valley-Prescott, AZ	63	4.07	68	135	48	0.15	57	29
Monroe, LA	64	4.05	64	161	55	-0.05	67	-1
Gainesville, GA	65	3.93	60	176	49	0.15	39	52
Joplin, MO	66	3.81	66	146	34	0.60	52	38
Hattiesburg, MS	67	3.79	70	122	47	0.16	63	22
Laredo, TX	68	3.56	56	180	53	0.05	35	55
Ocala, FL	69	3.55	61	171	43	0.33	60	26
Daphne-Fairhope-Foley, AL	70	3.49	69	124	46	0.18	53	38
Kahului-Wailuku-Lahaina, HI	71	2.81	71	107	56	-0.10	64	17
<b>SC6: Employment of Less Than 75,000 (N=124)</b>		<b>6.47</b>		<b>20,744</b>		<b>0.76</b>		<b>4,133</b>
California-Lexington Park, MD	1	36.96	1	1,348	9	2.42	1	518
Columbus, IN	2	19.20	2	568	1	8.54	2	338

(continued)



	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC6: Employment of Less Than 75,000 (N=124; continued)</b>		<b>6.47%</b>		<b>\$20,744</b>		<b>0.76</b>		<b>\$4,133</b>
Corvallis, OR	3	14.35	7	313	121	-1.04	81	11
Sierra Vista-Douglas, AZ	4	12.21	10	280	29	1.13	56	28
Midland, MI	5	11.81	15	262	58	0.51	27	49
Jackson, MI	6	11.80	3	390	2	4.40	3	158
Ames, IA	7	11.25	4	372	13	1.87	9	97
Ithaca, NY	8	11.14	5	337	15	1.58	8	108
Fond du Lac, WI	9	10.80	8	298	3	4.39	4	137
Carson City, NV	10	10.03	45	167	38	0.89	61	26
Logan, UT-ID	11	9.84	11	280	16	1.56	7	108
Kokomo, IN	12	9.68	28	206	100	-0.23	121	-31
Blacksburg-Christiansburg, VA	13	9.65	6	332	28	1.13	24	56
Monroe, MI	14	9.15	31	198	7	2.78	21	61
Cumberland, MD-WV	15	9.03	34	191	5	2.90	16	74
Dubuque, IA	16	8.68	13	276	6	2.82	5	134
Springfield, OH	17	8.42	23	226	4	4.07	6	112
Decatur, AL	18	8.34	17	248	10	2.20	11	83
Fairbanks, AK	19	8.25	26	217	61	0.47	51	30
Niles, MI	20	8.17	14	273	8	2.45	10	93
Santa Fe, NM	21	8.17	12	279	47	0.71	35	42
Morgantown, WV	22	8.15	9	284	46	0.72	14	76
New Bern, NC	23	8.02	22	232	123	-1.28	123	-56
Elizabethtown-Fort Knox, KY	24	7.63	20	236	27	1.21	26	50
Battle Creek, MI	25	7.63	19	236	11	2.08	19	67
Wichita Falls, TX	26	7.31	21	234	82	0.06	66	24
Sheboygan, WI	27	7.22	18	240	12	2.01	12	81
Pittsfield, MA	28	7.16	16	253	42	0.75	45	32
Missoula, MT	29	6.97	27	209	31	0.98	17	71
Walla Walla, WA	30	6.82	90	108	18	1.53	38	36
Cheyenne, WY	31	6.78	32	191	85	0.00	33	45
Winchester, VA-WV	32	6.77	24	223	24	1.34	13	77
Lawrence, KS	33	6.65	38	178	25	1.28	23	57
Chambersburg-Waynesboro, PA	34	6.57	29	202	26	1.24	22	58
Lawton, OK	35	6.51	39	174	45	0.73	36	42
Manhattan, KS	36	6.42	25	220	104	-0.29	72	19

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC6: Employment of Less Than 75,000 (N=124; continued)</b>		<b>6.47%</b>		<b>\$20,744</b>		<b>0.76</b>		<b>\$4,133</b>
Parkersburg-Vienna, WV	37	6.42	80	117	66	0.37	85	8
Hinesville, GA	38	6.41	78	119	109	-0.48	112	-10
Auburn-Opelika, AL	39	6.38	30	199	40	0.84	18	70
Enid, OK	40	6.37	109	85	95	-0.15	91	5
Pocatello, ID	41	6.30	76	120	43	0.74	58	28
Mount Vernon-Anacortes, WA	42	6.30	35	185	21	1.36	20	65
Muncie, IN	43	6.28	53	154	14	1.68	31	46
Johnstown, PA	44	6.27	43	168	101	-0.24	118	-20
Mankato, MN	45	6.01	37	179	90	-0.08	80	12
Burlington, NC	46	5.98	36	181	30	1.05	30	48
Harrisonburg, VA	47	5.93	33	191	41	0.81	25	53
Anniston-Oxford, AL	48	5.90	63	137	107	-0.43	114	-13
Rocky Mount, NC	49	5.90	46	165	50	0.67	87	7
East Stroudsburg, PA	50	5.86	52	156	102	-0.26	103	-3
Bay City, MI	51	5.83	92	105	94	-0.15	109	-9
Williamsport, PA	52	5.71	58	142	39	0.88	60	27
Pine Bluff, AR	53	5.60	102	93	119	-0.91	122	-32
Flagstaff, AZ	54	5.59	44	167	116	-0.57	70	20
San Angelo, TX	55	5.59	61	139	108	-0.46	84	9
Farmington, NM	56	5.58	66	136	118	-0.72	101	-2
Coeur d'Alene, ID	57	5.52	40	172	83	0.04	28	49
Lima, OH	58	5.51	50	157	36	0.90	55	28
Decatur, IL	59	5.48	55	146	34	0.97	49	31
Casper, WY	60	5.45	83	116	65	0.38	48	31
Danville, IL	61	5.45	107	87	56	0.57	104	-3
Sherman-Denison, TX	62	5.42	70	131	120	-0.93	89	7
Muskegon, MI	63	5.27	41	171	20	1.38	34	44
Mansfield, OH	64	5.18	64	137	88	-0.06	113	-11
Sumter, SC	65	5.17	72	127	60	0.48	76	14
Staunton, VA	66	5.15	68	131	67	0.36	86	7
Yuba City, CA	67	5.14	47	163	97	-0.16	52	29
Kankakee, IL	68	5.08	81	117	17	1.55	29	48
Bloomsburg-Berwick, PA	69	5.07	88	109	49	0.69	63	26
Florence-Muscle Shoals, AL	70	5.07	57	143	52	0.66	43	33

(continued)

	2019				2005-to-2019 Change			
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	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC6: Employment of Less Than 75,000 (N=124; continued)</b>		<b>6.47%</b>		<b>\$20,744</b>		<b>0.76</b>		<b>\$4,133</b>
Altoona, PA	71	5.03	48	159	80	0.11	62	26
Cleveland, TN	72	4.97	82	117	33	0.97	54	29
Lewiston-Auburn, ME	73	4.96	73	125	19	1.44	32	45
Pueblo, CO	74	4.96	42	171	22	1.35	15	76
Victoria, TX	75	4.94	95	103	44	0.73	57	28
Dalton, GA	76	4.92	49	157	124	-2.57	124	-123
Weirton-Steubenville, WV-OH	77	4.90	99	101	64	0.40	97	2
Carbondale-Marion, IL	78	4.88	54	150	68	0.36	94	3
Great Falls, MT	79	4.86	104	93	59	0.50	69	20
Alexandria, LA	80	4.76	59	141	77	0.15	83	10
Grand Forks, ND-MN	81	4.76	56	145	105	-0.31	67	24
St. Joseph, MO-KS	82	4.73	65	136	72	0.33	53	29
Elmira, NY	83	4.69	110	84	112	-0.51	111	-9
Watertown-Fort Drum, NY	84	4.67	67	135	115	-0.55	110	-9
Grand Junction, CO	85	4.67	51	157	79	0.13	39	36
Goldsboro, NC	86	4.66	89	109	89	-0.07	99	0
Longview, WA	87	4.66	96	102	32	0.98	44	32
Valdosta, GA	88	4.63	69	131	23	1.35	37	42
Lewiston, ID-WA	89	4.61	114	66	62	0.41	74	15
Lebanon, PA	90	4.57	84	115	78	0.15	71	19
Glens Falls, NY	91	4.48	77	120	37	0.90	47	31
Albany-Lebanon, OR	92	4.46	86	111	76	0.16	68	21
Michigan City-La Porte, IN	93	4.43	106	91	55	0.59	90	6
Albany, GA	94	4.42	60	140	96	-0.15	108	-7
Rome, GA	95	4.41	103	93	63	0.40	96	3
Wenatchee, WA	96	4.31	75	121	54	0.63	40	36
Owensboro, KY	97	4.28	85	114	48	0.69	46	32
Morristown, TN	98	4.27	93	103	92	-0.12	105	-5
The Villages, FL	99	4.27	121	62	35	0.93	41	34
Dothan, AL	100	4.25	74	124	84	0.02	88	7
Wheeling, WV-OH	101	4.21	62	138	81	0.09	75	15
Madera, CA	102	4.13	79	117	73	0.32	50	31
Brunswick, GA	103	4.09	101	93	71	0.33	78	13
Beckley, WV	104	3.93	108	87	114	-0.55	120	-29

(continued)

	2019				2005-to-2019 Change			
	Share		Value in Millions		Share		Value in Millions	
	Rank	Share	Rank	Dollars	Rank	Share	Rank	Dollars
<b>SC6: Employment of Less Than 75,000 (N=124; continued)</b>		<b>6.47%</b>		<b>\$20,744</b>		<b>0.76</b>		<b>\$4,133</b>
Twin Falls, ID	105	3.93	100	94	51	0.66	42	33
Grants Pass, OR	106	3.92	123	55	111	-0.51	100	-1
Sebastian-Vero Beach, FL	107	3.91	98	101	57	0.56	59	27
Homosassa Springs, FL	108	3.85	117	63	122	-1.24	119	-22
Sebring-Avon Park, FL	109	3.81	124	49	74	0.23	102	-3
Gettysburg, PA	110	3.73	115	66	103	-0.28	98	1
Jonesboro, AR	111	3.61	97	102	69	0.35	64	25
Hot Springs, AR	112	3.60	118	63	53	0.63	79	12
Cape Girardeau, MO-IL	113	3.58	111	79	93	-0.15	117	-15
Hanford-Corcoran, CA	114	3.54	87	111	86	-0.03	65	25
Gadsden, AL	115	3.53	120	62	75	0.17	92	4
El Centro, CA	116	3.51	71	128	106	-0.41	73	17
Texarkana, TX-AR	117	3.48	94	103	98	-0.18	93	4
Hammond, LA	118	3.47	113	74	70	0.35	77	14
Kingston, NY	119	3.42	91	106	117	-0.64	116	-15
Grand Island, NE	120	3.17	116	65	113	-0.54	107	-6
Vineland-Bridgeton, NJ	121	2.96	105	92	110	-0.50	115	-14
Lake Havasu City-Kingman, AZ	122	2.92	112	75	99	-0.20	106	-5
Punta Gorda, FL	123	2.84	119	62	87	-0.04	82	11
Ocean City, NJ	124	2.73	122	56	91	-0.10	95	3

Note: Dollar values are in millions, adjusted for the cost of living and for inflation. The ranks are within the size class.

Sources: Emsi (employment and earnings) and U.S. Department of Commerce, Bureau of Economic Analysis (gross domestic product implicit price deflator and regional price parity). Definition of STEM occupations produced by authors.



# THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

## THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

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