



What is Tech?

Understanding technology-
related economic growth

May 14, 2024

First ...

A few disclaimers



Remember the circular flow

Tech firms and employees spend
money on non-tech stuff



A strong tech sector creates demand in other industries

- Professional services such as accounting, law, and engineering
- Education: workers need training
- Stimulating impact of high-wage tech jobs in Retail Trade, Leisure and Hospitality, etc



Can we call windmills tech?

**What is
Tech?**

“

There is no universally agreed upon definition of STEM

”

Dennis Vilorio. BLS. Occupational Outlook Quarterly. Spring 2014.

Federal statistical agencies have not defined tech or STEM
– partly because technology is constantly changing



Tech is distributed throughout the labor market data world

- Several industry super-sectors have tech employment in them
- Some key NAICS sectors have both tech and non-tech employment
- Tech employment is easier to isolate in SOC taxonomy, but still imperfect

So where do we go from here?

- Adopt a working definition of tech sectors we're most interested in
- Define both industries and occupations of interest
- Look at key CES series
- Use QCEW for more detail
- Look at OEWS wages for key occupations
- Review Projections to see expected growth

Possible NAICS list

- 3254 Pharmaceutical and medicine manufacturing
- 3341 Computer and peripheral equipment manufacturing
- 3342 Communications equipment manufacturing
- 3344 Semiconductor and other electronic component manufacturing
- 3345 Navigational, measuring, electromedical, and control instruments manufacturing
- 3364 Aerospace product and parts manufacturing
- 5132 Software publishers
- 5171 Wired and Wireless Telecommunications (except Satellite)
- 5178 All Other telecommunications
- 5182 Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services
- 5192 Web Search Portals, Libraries, Archives, and Other Information Services
- 5413 Architectural, engineering, and related services
- 5415 Computer systems design and related services
- 5417 Scientific research and development services

Key SOC families

- 15-0000 Computer and Mathematical Occupations
- 17-0000 Architecture and Engineering Occupations
- 19-0000 Life, Physical and Social Science Occupations (esp. 19-1000 and 19-2000)
- Plus 11-3021 Computer and Information Systems Managers, 11-9041 Architectural and Engineering Managers, and 11-9121 Natural Sciences Managers

From the QCEW and CES
programs

Using Industry Data to understand tech employment in Texas

Notes regarding CES

Advantages

- It's a time series
- It's monthly

Limitations

- Some tech-related industries are submerged in broader series

Key Texas CES Tech-Related Series Codes, part I

- 31-334000 (NAICS 334) Computer and Electronic Product Manufacturing
 - 31-3342 Communications Equipment
 - 31-3344 Semiconductor and Other Electronic Component Manufacturing
 - 31-3345 Navigational, Measuring, Electromedical, and Control Instruments
- 31-335000 (NAICS 335) Electrical Equipment, Appliance, and Component Manufacturing
- 31-336400 (NAICS 3364) Aerospace Product and Parts Manufacturing
- 32-325400 (NAICS 3254) Pharmaceutical and Medicine Manufacturing
- 50-000000 (NAICS 51) Information
 - 50-513000 (NAICS 513) Publishing Industries
 - 50-517000 (NAICS 517) Telecommunications
 - 50-518000 (NAICS 518) Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services

Key Texas CES Tech-Related Series Codes, part II

- 60-540000 (NAICS 54) Professional, Scientific, and Technical Services
 - 60-541100 (NAICS 5411) Legal Services
 - 60-541200 (NAICS 5412) Accounting, Tax Preparation, Bookkeeping, and Payroll Services
 - 60-541300 (NAICS 5413) Architectural, Engineering, and Related Services
 - 60-541500 (NAICS 5415) Computer Systems Design and Related Services
 - 60-541600 (NAICS 5416) Management, Scientific, and Technical Consulting Services

Information includes the following:

- Publishing Industries (except Internet) [does include 5132 Software Publishers]
- Motion Picture and Sound Recording Industries
- Broadcasting and Content Providers
- Telecommunications
- Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services
- Web Search Portals, Libraries, Archives, and Other Information Services

Professional, Scientific, and Technical Services includes the following:

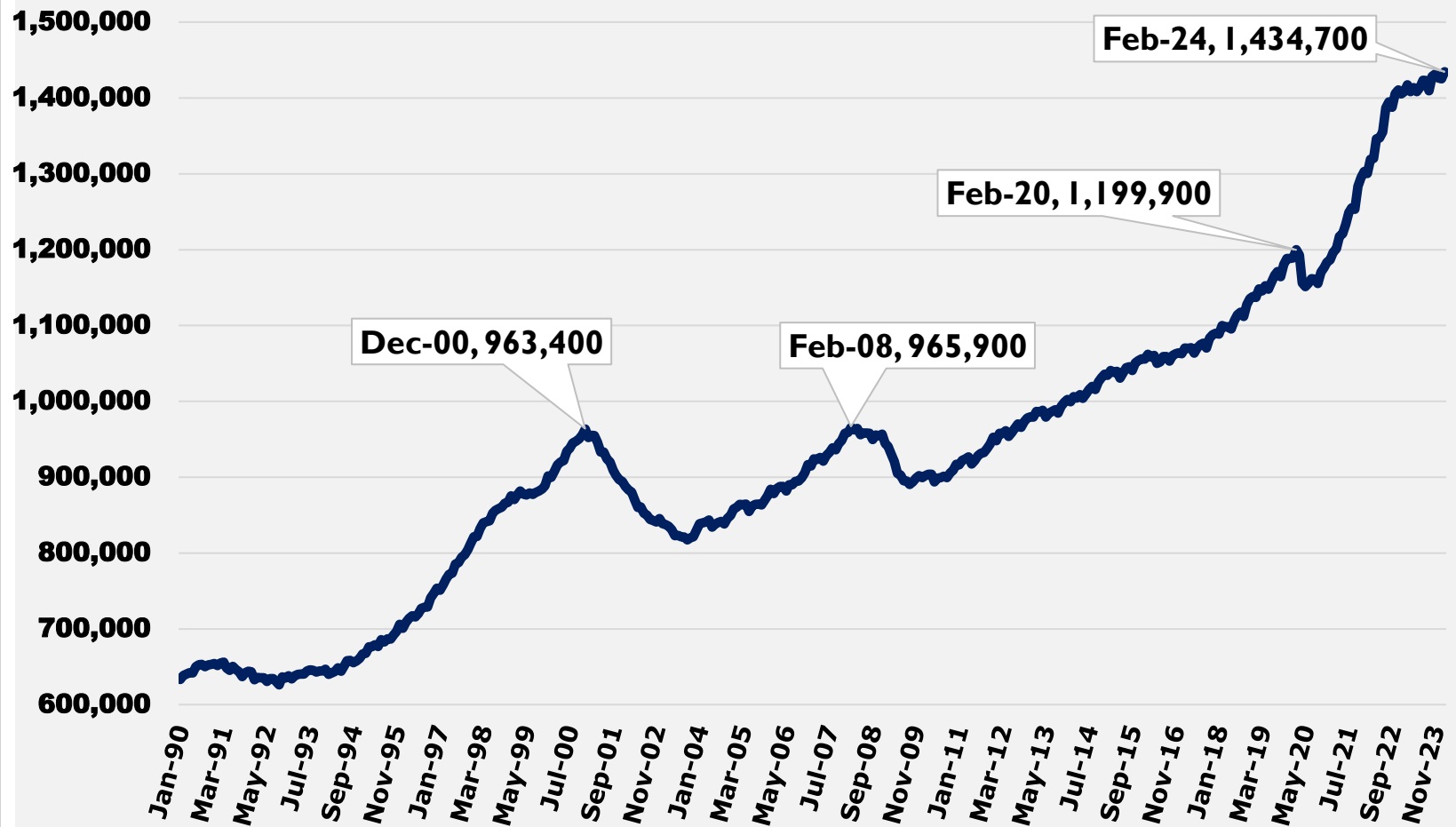
- Legal Services
- Accounting, Tax Preparation, Bookkeeping, and Payroll Services
- Architectural, Engineering, and Related Services
- Specialized Design Services
- Computer Systems Design and Related Services
- Management, Scientific, & Technical Consulting Services
- Scientific Research and Development Services
- Advertising, Public Relations, and Related Services
- Other Professional, Scientific, & Technical Services

Key CES series for technology in Texas

Industry	February 2014 jobs	February 2020 Jobs	February 2024 Jobs	10-Year Growth	Growth since pre-COVID
Total Nonfarm	11,372,800	12,925,500	14,054,800	23.6%	8.7%
Computer and Electronic Product Manufacturing	97,700	95,100	105,200	7.7%	10.6%
Semiconductor and Other Electronic Component Manufacturing	41,600	41,600	50,600	21.6%	21.6%
Telecommunications	85,000	79,900	81,400	-4.2%	1.9%
Architectural, Engineering, and Related Services	149,700	170,400	187,700	25.4%	10.2%
Computer Systems Design and Related Services	142,200	207,500	275,200	93.5%	32.6%

Source: Texas Workforce Commission. Current Employment Statistics.

Key Tech-Related Employment in Texas Over the Years



Source: Texas Workforce Commission. Current Employment Statistics.

Professional, Scientific, and Technical Services in Texas and other states

State	February 2020 Jobs	February 2024 Jobs	Growth rate since pre-COVID
Texas	856,500	1,051,800	22.8%
Colorado	242,500	297,700	22.8%
New Hampshire	39,800	48,500	21.9%
Montana	23,900	29,100	21.8%
Vermont	15,300	18,500	20.9%
Wyoming	9,600	11,600	20.8%
Utah	112,900	132,400	17.3%
Virginia	445,700	475,700	6.7%
Massachusetts	351,000	373,800	6.5%
Maryland	260,800	276,800	6.1%
Michigan	301,500	316,200	4.9%
California	1,359,600	1,418,600	4.3%
New York	701,100	722,700	3.1%

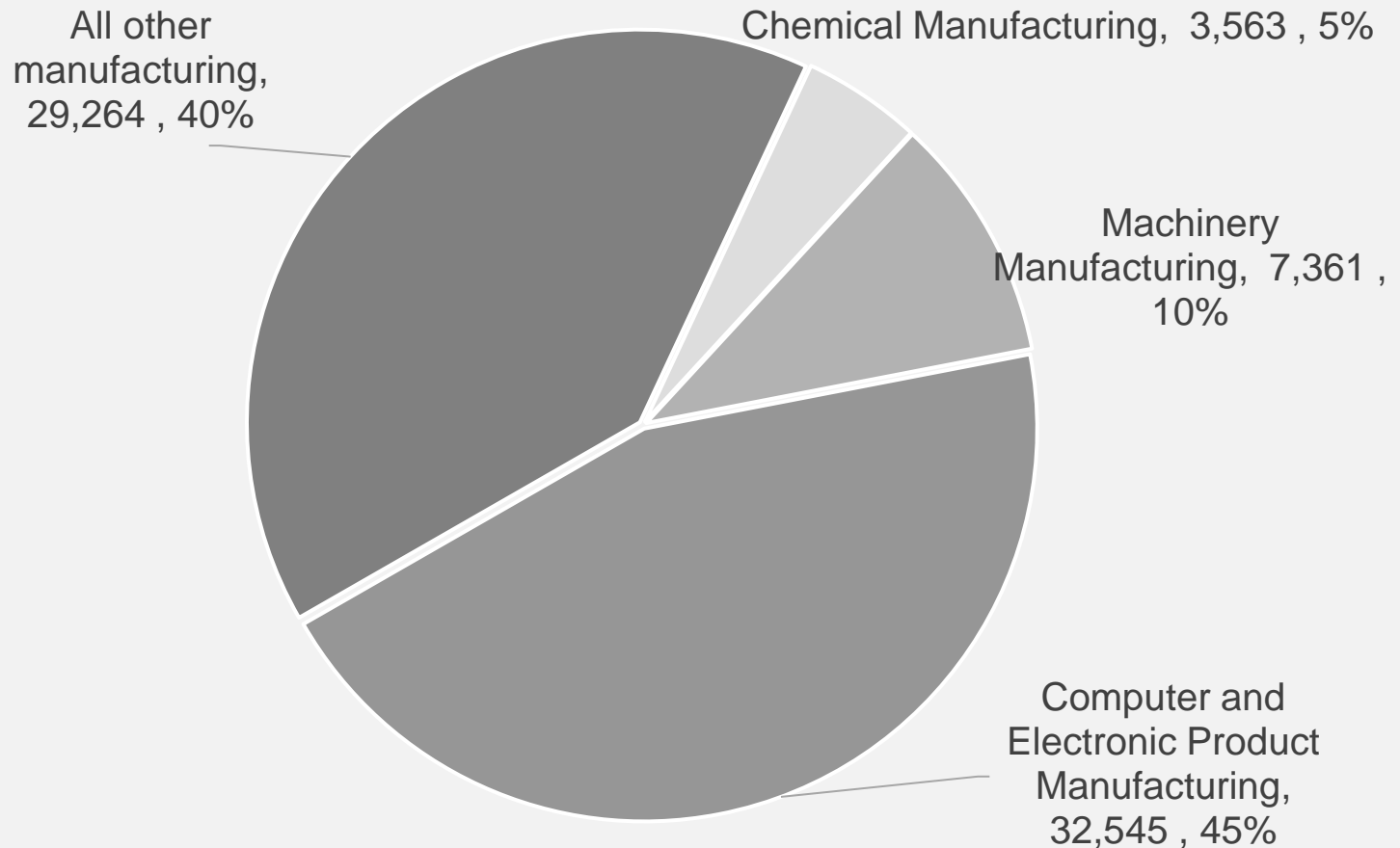
Source: Texas Workforce Commission. Current Employment Statistics.



For a more detailed dive into tech industries, try QCEW

- Much more detailed data industry data available
- Longer delay to publication
- Not a time series – changes made prospectively, not retroactively
- QCEW wages include bonuses and overtime

Manufacturing employment in Austin-Round Rock: 3rd Quarter 2023



Source: Texas Workforce Commission. Quarterly Census of Employment and Wages.

Information employment in Dallas-Plano-Irving MD: 3rd Quarter 2023

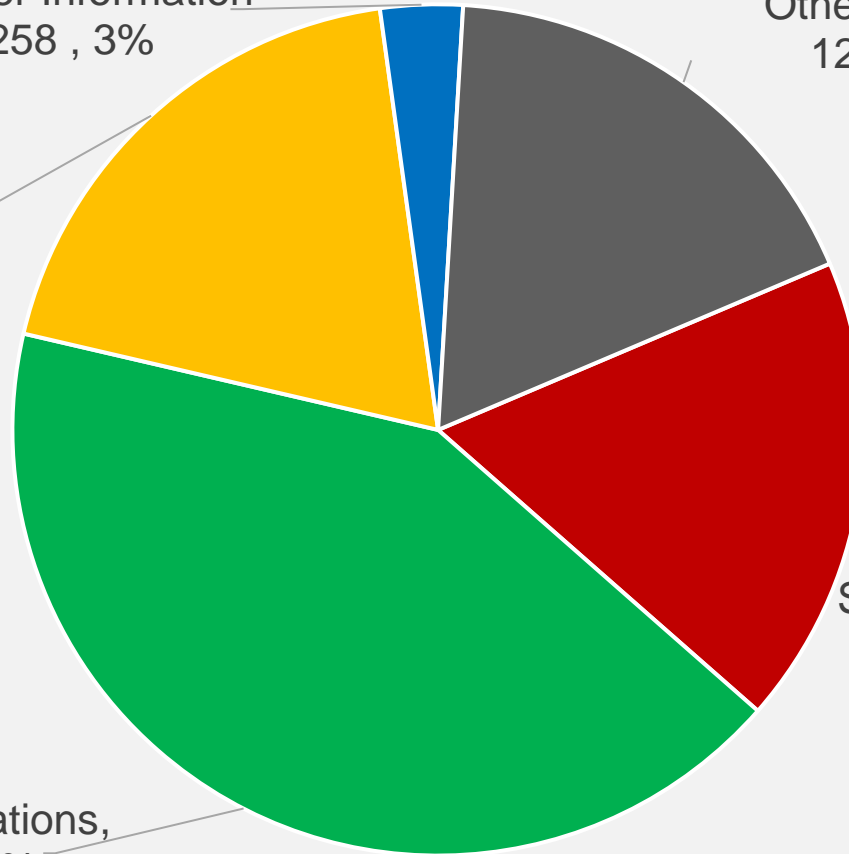
Web Search Portals, Libraries, Archives, and Other Information Services, 2,258 , 3%

Other Information, 12,753 , 18%

Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services, 13,841 , 19%

Software Publishers, 12,891 , 18%

Telecommunications, 30,431 , 42%



Components of Professional, Scientific, and Technical Services: 3rd Quarter 2023

Industry Code	Industry	Average Employment	Percent Share
54	Professional, Scientific, and Technical Services	1,043,148	100.0%
5411	Legal Services	101,077	9.7%
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	104,216	10.0%
5413	Architectural, Engineering, and Related Services	190,349	18.2%
5414	Specialized Design Services	11,085	1.1%
5415	Computer Systems Design and Related Services	281,906	27.0%
5416	Management, Scientific, and Technical Consulting Services	204,524	19.6%
5417	Scientific Research and Development Services	40,625	3.9%
5418	Advertising, Public Relations, and Related Services	34,726	3.3%
5419	Other Professional, Scientific, and Technical Services	74,638	7.2%

A look at key occupations in tech

Occupational data

Preliminary notes

- Occupational data easier to find – SOC families helpful
- Wages are often above average but do not include bonuses and overtime
- Texas Labor Analysis has some STEM occupation information

Median Annual Wages: Houston- The Woodlands-Sugar Land MSA: 2022 OEWS

All Occupations \$45,610	15-0000 Computer and Mathematical Occupations \$93,705	17-0000 Architecture and Engineering Occupations \$93,093
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Source: Bureau of Labor Statistics. Occupational Employment and Wage Statistics.

Estimated Employment: Houston-The Woodlands-Sugar Land MSA: 2022 OEWS

All Occupations 3,054,460	15-0000 Computer and Mathematical Occupation 81,830	17-0000 Architecture and Engineering Occupations 70,450
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Source: Bureau of Labor Statistics. Occupational Employment and Wage Statistics

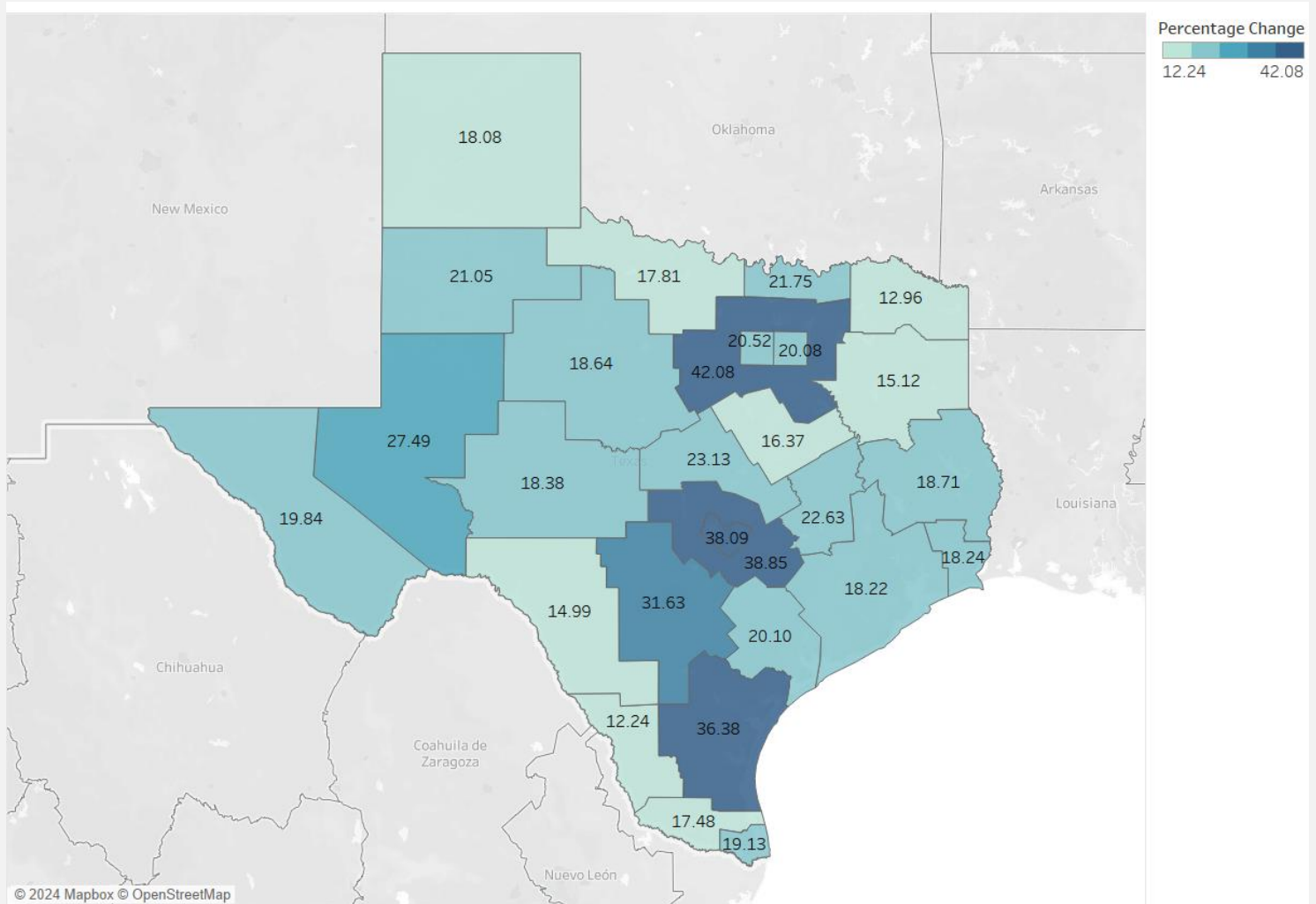
Employment projections

- Primary purpose of projections is to assist workforce boards. Therefore, it's WDA-based.
- Key input is past employment data
- Keep in mind multiple WDAs can share different geographical parts of an MSA. The exact county of business activities can play a big role in projections.
 - Examples: DFW metroplex and the greater Austin area.

Projected Employment: Computer and Mathematical Occupations (All Industries)

Area	Estimated Employment (2020)	Projected Employment (2030)	Change In Employment	Percentage Change
North Central	52,260	74,252	21,992	42.1%
Tarrant County	26,044	31,388	5,344	20.5%
Dallas	96,285	115,618	19,333	20.1%
Capital Area	62,336	86,081	23,745	38.1%
Rural Capital	11,031	15,317	4,286	38.9%

Projected Percent Growth of Computer and Mathematical Occupations



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Percentage Change. Details are shown for Areaname.

All this and more at TexasLMI.com!



- LAUS
- CES
- QCEW
- OEWS
- Projections
- Staffing Patterns

Texas Labor Market Highlights – FEBRUAR			Annual Growth Rate
Unemployment Rate*	Total Non-Farm Employment*	Jobs Chang	2.1%
3.9%	14,103,700	29	
* Seasonally Adjusted			

LMI by Category

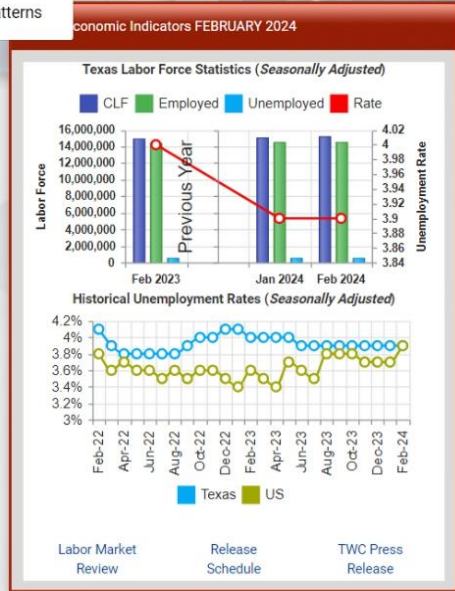
- Local Area Unemployment Statistics (LAUS)**
View monthly and annual civilian labor force, employment, unemployment, and unemployment rate estimates by state, county, metropolitan area, workforce development area and many cities, by place of residence. [Watch Video](#)
- Current Employment Statistics (CES)**
Generate a report for monthly and annual nonagricultural employment data by industry for Texas and metropolitan areas. [Watch Video](#)
- Quarterly Census of Employment and Wages (QCEW)**
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- Occupational Employment & Wage Statistics (OEWS)**
Provides current annual and hourly wage estimates for up to 800 detailed occupations by state, metropolitan and workforce development area, and industry. [Watch Video](#)
- Projections**
View and generate a 10-year forecast for employment by industry and occupation for the state of Texas and each of the 28 workforce development areas. [Watch Video](#)
- Staffing Patterns**
View the specific occupations and employment that make up each industry within Texas and each of the 28 workforce development areas.

Economic Profiles

- Workforce Development Area (WDA) Profiles**
A compilation of selected economic data including LAUS and quarterly industry data by Texas' 28 local workforce development areas.
- Metropolitan Statistical Area (MSA) Profiles**
A compilation of selected economic data including industry composition, current employment statistics by industry, and unemployment information for Texas' metropolitan areas.
- Industry Profiles**
An economic profile of Texas industry by category to assist in better understanding Texas regional industry dynamics.
- Texas Economic Profile**
Economic Profile for Texas and US industry data to assist in better understanding Texas industry dynamics.

Popular Downloads

Popular Downloads and Resources
A categorized collection of popular files available for download and various resource links.



All this and more at TexasLMI.com!



- LAUS
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Texas Labor Market Highlights – FEBRUARY 2024

Unemployment Rate* 3.9%	Total Non-Farm Employment* 14,103,700	Jobs Change 29	Annual Growth Rate 2.1%
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* Seasonally Adjusted

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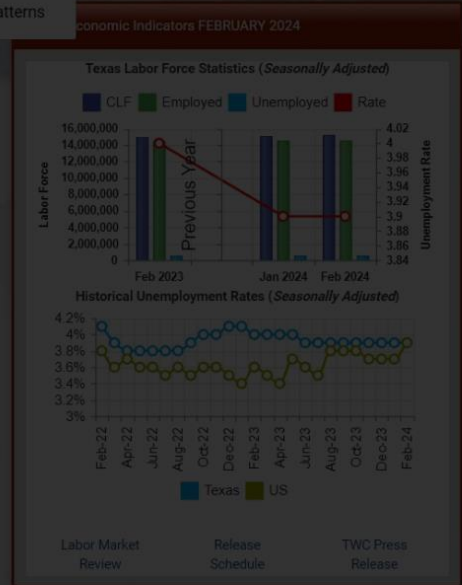
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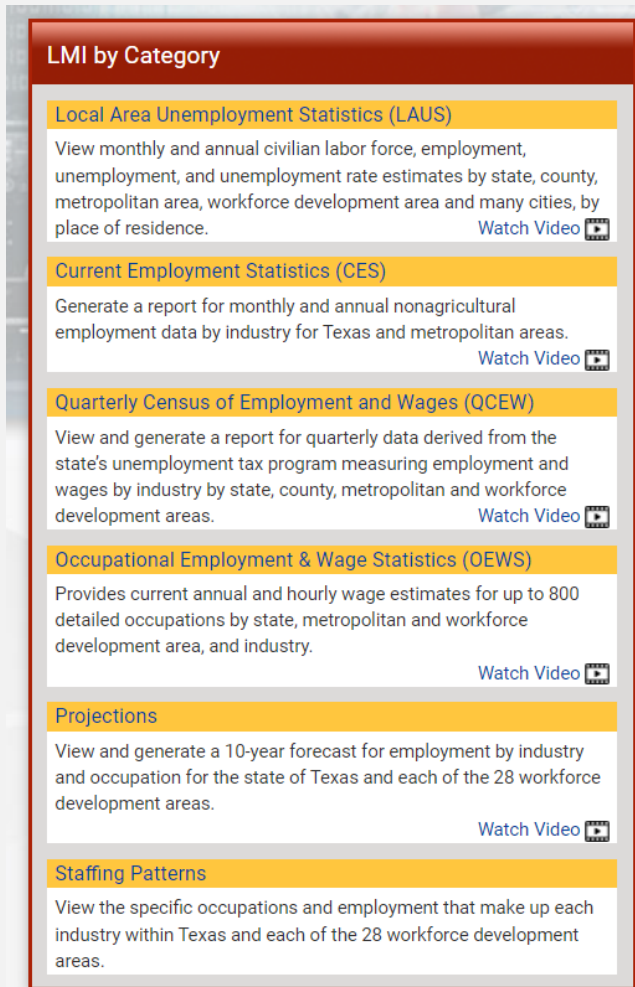
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Popular Downloads and Resources
A categorized collection of popular files available for download and various resource links.



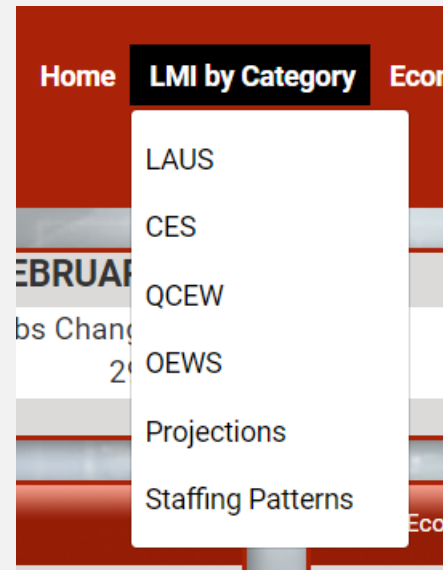
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Home **LMI by Category** **Econ**

- LAUS
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HWOL can help

- Help Wanted Online is a subset of available jobs – compiling those that are advertised
- Not all vacancies are advertised and turnover can vary
- In combination with other information, may help workforce professionals identify some needs

TexasLaborAnalysis.com

- Site designed to provide helpful data to workforce professionals
- Combines OEWS wage data with projections
- Can select “STEM” occupations
- Must select an Achieve Texas career cluster for demand report
- Wage data only available for single WDA at a time – other data can combine WDAs

Texas Labor Analysis can provide data on STEM occupations



- Home
- Reports
- Location Quotients
- FAQs
- Glossary

Demand Analysis

Build a custom report to view Demand information for an Industry/Occupation.

Select Report Type

Occupation Detail

Region(s)

How would you like to include regions in the report? You can choose one or multiple. When 2 or more regions are selected, the data presented in the report is aggregated.

Select from List

Select from Map

Capital Area

Occupation

How would you like to include occupations in the report? If you know which occupations you want to view, Select from List. Otherwise, Select by Category.

Select from List

Select by Category

Achieve Texas Career Cluster

Information Technology

Industry

Select an Occupation by Industry

STEM Only



Re-run Report

Texas Labor Analysis demand report output

Occupation Detail Report Results

Selected Region(s): Capital Area

Customize the report/Help with Accessibility

Add To List

Export to Excel

Reset

Drag a column header and drop it here to group by that column

SOC Code	SOC Title	Current Employment (2020)	Education	Entry Level Wage (as of 2020)	Experienced Level Wage (as of 2020)	Employment - Base year 2018	Employment - Projected year 2028	Change in employment 2028 - 2018	Percentage Change	Cha Emp Gro
11-3021	Computer and Information Systems Managers	4,200	Bachelor's Degree	\$104,466	\$190,646	2,608	3,098	490	18.79	
15-1211	Computer Systems Analysts	7,260	Bachelor's Degree	\$59,484	\$98,465	7,643	8,745	1,102	14.42	
15-1212	Information Security Analysts	1,720	Bachelor's Degree	\$73,112	\$134,030	751	1,019	268	35.69	
15-1221	Computer and Information Research Scientists	280	Master's Degree	\$79,245	\$135,182	391	491	100	25.58	
15-1231	Computer Network Support Specialists	2,620	Associate's Degree	\$41,817	\$73,713	2,025	2,385	360	17.78	
15-1241	Computer Network Architects	2,370	Bachelor's Degree	\$75,581	\$169,990	1,553	1,743	190	12.23	
15-1244	Network and Computer Systems Administrators	4,340	Bachelor's Degree	\$60,001	\$100,312	3,901	4,460	559	14.33	
15-1245	Database Administrators and Architects	1,890	Bachelor's Degree	\$69,382	\$135,200	1,533	1,845	312	20.35	
15-1251	Computer Programmers	2,020	Bachelor's Degree	\$53,606	\$115,117	2,853	2,704	-149	-5.22	
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	21,600	Bachelor's Degree	\$70,861	\$127,181	11,287	14,840	3,553	31.48	
15-1257	Web Developers and Digital Interface Designers	1,860	Associate's Degree	\$54,884	\$91,544	1,433	1,693	260	18.14	
15-1299	Computer Occupations, All Other	3,810	Bachelor's Degree	\$50,004	\$110,028	3,360	4,009	649	19.32	

20 Items per page

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**Thank you!
Mariana Vega
and
Mark
Lavergne,
TWC-LMI**

Questions? LFS@twc.texas.gov