



COMMONWEALTH
CORPORATION

STEM BRIEF 2021

SEE WHAT YOU CAN DO IN STEM



Here are the things to know about Science, Technology, Engineering, and Mathematics industries and careers in Massachusetts in 2021. The opportunity is greater than ever.

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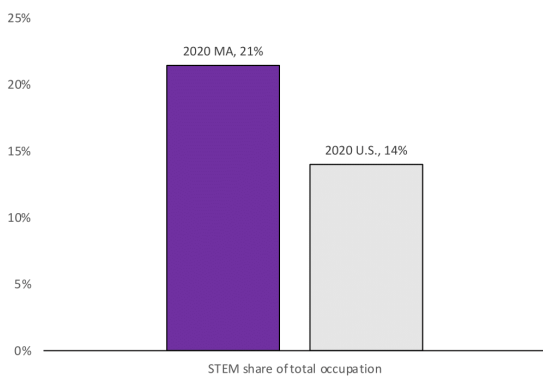
The Need is Growing

P11**THEME 4**

Massachusetts is Making Investment
Today to Prepare for the Future of STEM

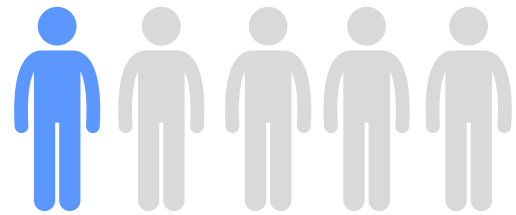


THEME 1

STEM JOBS ARE VITAL
TO THE ECONOMYSTEM JOBS AS A SHARE OF TOTAL NUMBER OF JOBS
MASSACHUSETTS VS. NATIONAL AVERAGE, 2020

Source: Commonwealth Corporation analysis of Occupational Employment Statistics (OES) U.S. Department of Labor Bureau of Labor Statistics; Massachusetts Economic Research department, Office of Labor and Workforce Development

Massachusetts outpaces the U.S. average in concentration of STEM jobs. According to employment estimates from the U.S. Bureau of Labor Statistics, about 600,000 people work in STEM occupations in Massachusetts. STEM workers make up one-fifth (21%) of the Commonwealth's labor force, higher than the U.S. average of 14%.



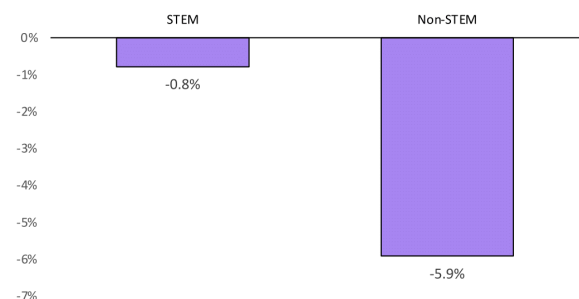
1 IN 5 WORKERS IN MASSACHUSETTS WORKS IN STEM

STEM jobs are resilient in the labor market.

Between 2018 and 2020, the number of Massachusetts STEM jobs have contracted much slower than non-STEM jobs. This suggests that STEM occupations are better able to withstand economic shocks.

CHANGE IN NUMBER OF JOBS BETWEEN 2018 AND 2020

STEM vs. NON - STEM



Source: Commonwealth Corporation analysis of Occupational Employment Statistics (OES) U.S. Department of Labor Bureau of Labor Statistics; Massachusetts Economic Research department, Office of Labor and Workforce Development

WHAT ARE STEM JOBS?

Science, technology, engineering, and math (STEM) occupations include computer and mathematical, architecture and engineering, healthcare, and life and physical science occupations, as well as managerial and postsecondary teaching occupations related to these functional areas and sales occupations requiring scientific or technical knowledge at the postsecondary level.

THEME 1 CONTINUED

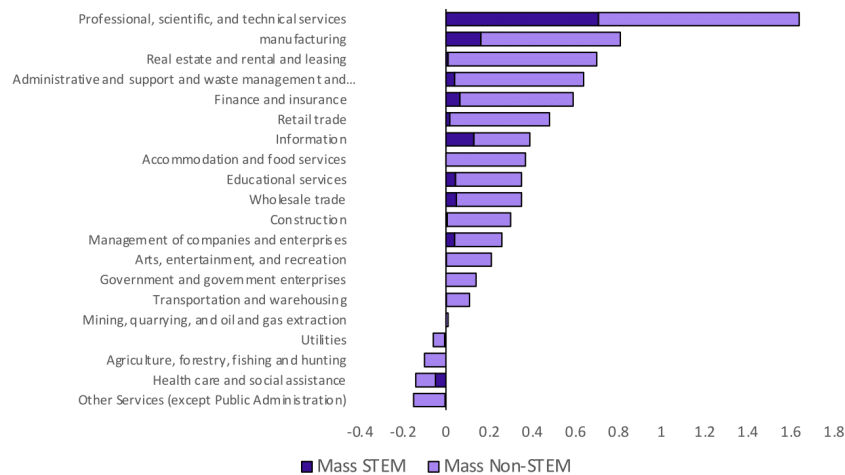
STEM-heavy industries are driving Massachusetts' recent economic growth during the pandemic.

Massachusetts's economy grew by 6.9 percent from 4Q 2020 through 1Q 2021 (October – March), as measured by the increase to Growth Domestic Product (GDP). This growth was led by the professional, scientific, and services industry, which has the highest concentration of STEM jobs across all industries. A breakdown of sector-level contribution to GDP growth suggests that STEM activities account for one-fifth (18%) of Massachusetts' recent economic growth.

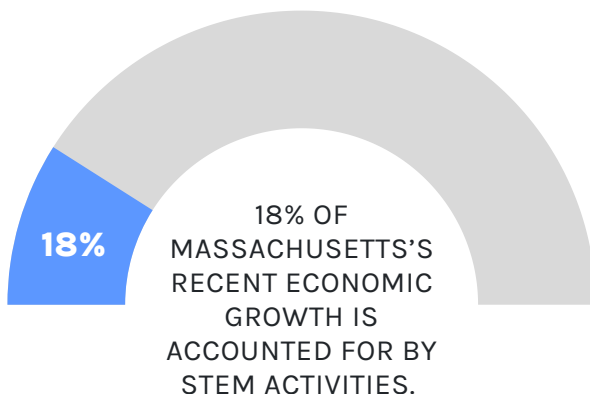
CONTRIBUTION TO MASSACHUSETTS ECONOMIC GROWTH BY INDUSTRY

PERCENTAGE POINTS, GDP GROWTH 4Q2020 – 1Q2021

Note: Size of industry (in \$) not graphed



Source: Commonwealth Corporation analysis of U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts. Notes: STEM jobs are identified through occupational codes and transformed to industry groupings (NAICS 2-digit codes) to estimate STEM contribution to GDP. Assume uniform impact on economy for each given job.



WHAT IS GDP?

The Growth Domestic Product (GDP) is an estimate of the economy's total value for a given time. It estimates the value-add to the economy by aggregating the monetary or market value of all finished goods and services produced. Economists measure the health of the economy by looking at changes to GDP. A fast-growing GDP is generally good, as long as it does not overheat the economy and raise inflation.

THEME 2

THESE ARE GOOD JOBS AND MORE ACCESSIBLE THAN YOU THINK

STEM occupations are found in almost every industry in Massachusetts.

Though often associated with science and technology, STEM jobs encompass a broad range of industry sectors. For example, one in five manufacturing jobs in Massachusetts is a STEM job; one in seven management jobs is STEM; and one out of every seven post-secondary teaching jobs is a STEM job.

STEM OCCUPATIONS BY INDUSTRY SECTOR IN MASSACHUSETTS 2020

| Industry Sector | STEM Employment Count | Total Sector Employment Count | STEM Jobs as % of Sector |
|--|-----------------------|-------------------------------|--------------------------|
| Professional, Scientific, and Technical Services | 148,900 | 344,910 | 43% |
| Health Care and Social Assistance | 212,340 | 605,940 | 35% |
| Information | 30,180 | 91,050 | 33% |
| Manufacturing | 46,300 | 230,910 | 20% |
| Management of Companies and Enterprises | 10,780 | 70,570 | 15% |
| Wholesale Trade | 16,410 | 117,380 | 14% |
| Public Administration | 25,080 | 190,880 | 13% |
| Educational Services | 46,590 | 362,900 | 13% |
| Finance and Insurance | 18,300 | 167,280 | 11% |
| Utilities | 1,260 | 11,590 | 11% |
| Administrative and Support and Waste Management and Remediation Services | 11,260 | 174,370 | 6% |
| Retail Trade | 12,150 | 311,630 | 4% |
| Other Services (except Public Administration) | 2,130 | 92,310 | 2% |
| Construction | 2,790 | 150,120 | 2% |
| Real Estate and Rental and Leasing | 650 | 45,450 | 1% |
| Arts, Entertainment, and Recreation | 520 | 41,380 | 1% |
| Transportation and Warehousing | 1,010 | 105,120 | 1% |
| Accommodation and Food Services | 90 | 234,400 | 0% |
| Mining, Quarrying, and Oil and Gas Extraction | 0 | 1,010 | 0% |
| TOTAL, ALL INDUSTRIES | 586,740 | 3,349,200 | |

WHICH INDUSTRIES EMPLOY THE MOST STEM WORKERS IN MASSACHUSETTS?

Healthcare sector holds the greatest number of STEM jobs at 212,340, while the Professional, Scientific and Technical Services sector has the highest concentration of STEM jobs (43% of the sector is STEM).

Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Employment Statistics Industry Staffing Pattern

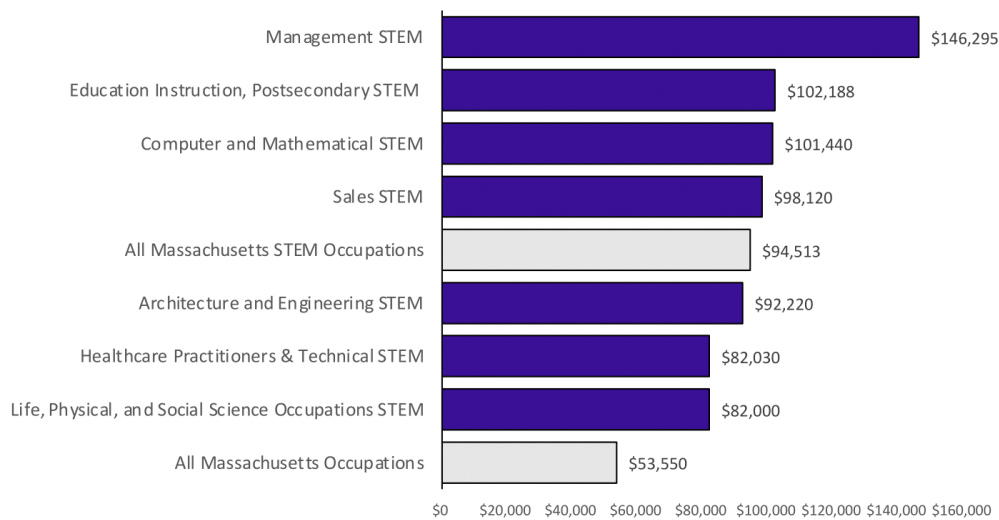
THEME 2 CONTINUED

Massachusetts STEM occupations are good-paying jobs.

STEM jobs on average earn \$30,000 more than the average pay for a typical job in Massachusetts. Every industry sector within STEM outperforms the median annual wage of the workforce as a whole. Management-track STEM jobs earn the most.

MEDIAN WAGE FOR STEM OCCUPATIONS IN MASSACHUSETTS

INDUSTRY AVERAGE, 2020



Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Employment Statistics

\$30,000 +

A worker in STEM occupations earns on average \$30,000 more than the average annual pay across all industries in Massachusetts.

WHAT IS THE TREND IN EARNING PROGRESSION FROM ENTRY TO EXPERIENCED LEVEL?

STEM earning potential increases over time. The median annual pay for STEM jobs at the entry-level is \$28,000 higher than the average across all industries. This premium increases to almost \$40,000 among experienced workers. Hourly, STEM median pay is at \$50/hour, compared to \$33/hour, averaging across all industries.

THEME 2 CONTINUED

Not all good STEM jobs require a high level of education but getting a college degree helps.

Roughly one-fifth of entry-level STEM jobs do not require a bachelor's degree. Around 10% of jobs are available to those with post-secondary credentials, which can be earned in a short-term training program. The median annual wage for an Associate's degree is ~\$65,000, whereas the median wage for Bachelor's degree is ~\$95,000. There is a noticeable improvement in earning potential by getting a college degree.

20%

of entry-level STEM jobs do not require more than an associate's degree or post-secondary credentials.

STEM OCCUPATIONS BY TYPICAL EDUCATION LEVEL NEEDED

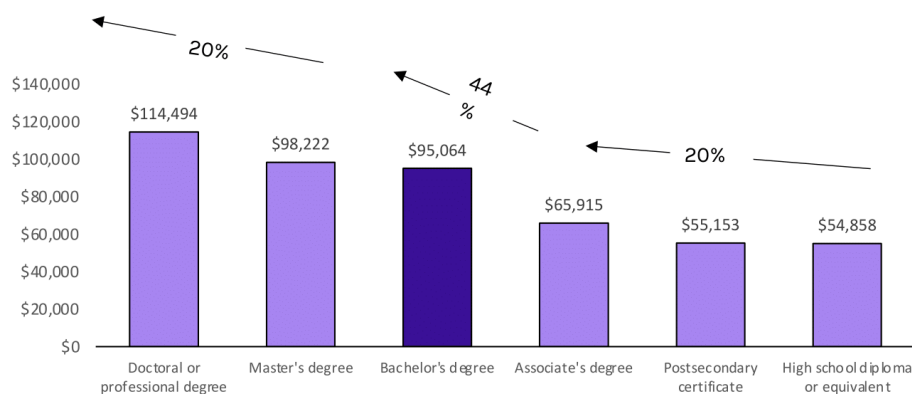
AVERAGES, 2020

| Education Level | # STEM Jobs | % of STEM Total | Median Wage | Entry Wage |
|-----------------------------------|-------------|-----------------|-------------|------------|
| Doctoral or professional degree | 87,850 | 15% | \$114,494 | \$76,336 |
| Master's degree | 29,130 | 5% | \$98,222 | \$68,820 |
| Bachelor's degree | 348,520 | 59% | \$95,064 | \$64,786 |
| Associate's degree | 57,320 | 10% | \$65,915 | \$48,053 |
| Postsecondary certificate | 57,310 | 10% | \$55,153 | \$41,648 |
| High school diploma or equivalent | 10,470 | 2% | \$54,858 | \$38,936 |

Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Employment Statistics

CHANGE IN MEDIAN WAGE BY EDUCATION LEVEL

AVERAGES, 2020



Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Employment Statistics

THEME 3

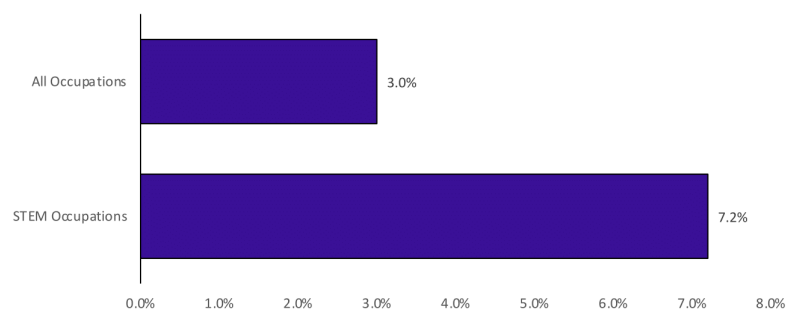
THE NEED IS GROWING

The demand for STEM jobs will grow in the near future, relative to other types of jobs.

Growth in STEM jobs will outpace average job growth – and is expected to account for 40% of increase in total employment in the Commonwealth. This means that STEM will only become more important to the Massachusetts economy.

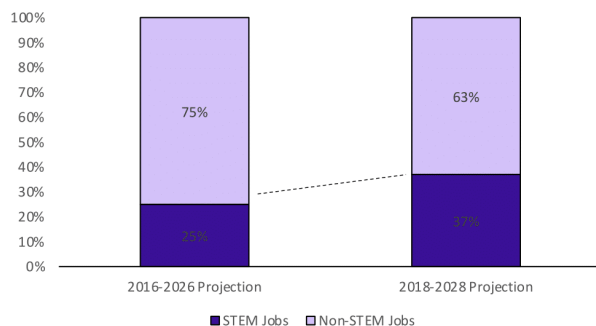
According to the 2018-2028 job growth projections, STEM occupations will grow at 7.2% vs. 3% across all occupations. Furthermore, the speed at which STEM jobs will increase has increased with each successive projection. However, the aggregate size of the labor force is projected to contract slightly.

GROWTH RATE OF JOBS: ALL OCCUPATION VS. STEM ONLY 2018-2028 PROJECTIONS



Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Projections.

STEM SHARE OF TOTAL EMPLOYMENT 2016-2026 vs. 2018-2028 PROJECTIONS



Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Projections.

STEM jobs account for

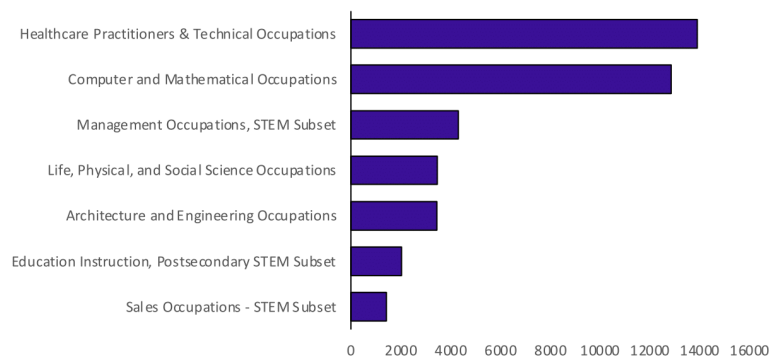
40%

of the increase in total employment through 2028 in MA.

THEME 3 CONTINUED

Massachusetts in-demand STEM occupations span healthcare and computer occupations. Both groups are estimated to add ~27,000 jobs according to the 2018-2028 projection. In addition, these jobs take the longest time to fill an empty job posting. Massachusetts is among the states with the highest demand for STEM occupations, adjusted for Population across the U.S.

ESTIMATED NUMBER OF ADDITIONAL JOBS IN 10-YEAR PROJECTION 2018-2028 PROJECTION



Source: Commonwealth Corporation analysis of Massachusetts Economic Research Department, Executive Office of Labor and Workforce Development, Occupational Projections.

NUMBER OF JOB POSTINGS: BY STEM OCCUPATION

RANKED BY NUMBER OF JOB POSTINGS 9/1/2020 – 8/31/2021

| Occupation | # of Job Postings |
|---|-------------------|
| Registered Nurses | 43,984 |
| Software Developers, Applications | 32,353 |
| Medical and Health Services Managers | 18,135 |
| Licensed Practical and Licensed Vocational Nurses | 10,098 |
| Operations Research Analysts | 9,006 |
| Computer User Support Specialists | 8,234 |
| Computer Systems Engineers/Architects | 8,027 |
| Information Technology Project Managers | 6,957 |

Source: Commonwealth Corporation analysis of Burning Glass Technologies Labor Insight, STEM Job Postings: Sept 2020-Aug 2021.

Massachusetts is among the states with the highest demand for STEM occupations, adjusted for population.

THEME 3 CONTINUED

Winning in STEM requires attention to gender and racial gaps in occupational outcomes. Though STEM jobs appear evenly distributed among men and women, when excluding healthcare, women hold 29% of STEM occupations. What this means is that there are roughly 3 men to every woman in STEM jobs outside of healthcare.

Women tend to work in lower-paying STEM industries, despite overall parity in number employed. Gender representation in Massachusetts STEM jobs splits at 48.8 % women, 51.2% men. Taking stock of the four leading STEM industry sectors paints a different picture of gender concentration. While women make up 78% of Health Care Practitioner & Technician occupations, they only account for 50% of Life, Physical & Social Sciences, 28% of Computer & Mathematical, and 18% of Architecture & Engineering. The sectors that have the bigger gender imbalance are the higher-paying ones.

GENDER BREAKDOWN OF LEADING STEM INDUSTRY SECTORS

ACS PUMS 2019 DATA

| Leading STEM Sectors | # STEM Jobs | % Women | Median Wage |
|---------------------------------------|-------------|---------|-------------|
| Health Care Practitioner & Technician | 231,400 | 78% | \$82,030 |
| Life, Physical & Social Sciences | 55,850 | 50% | \$82,000 |
| Computer & Mathematics | 147,710 | 28% | \$101,440 |
| Architecture & Engineering | 71,040 | 18% | \$92,220 |

Source: Commonwealth Corporation analysis of U.S. Census Bureau American Community Survey (ACS), Five-Year Public Use Microdata Sample (PUMS) 2019. Note, ACS estimates are not directly comparable to Bureau of Labor Statistics Occupational Employment Statistics.

Racial minority representation in STEM continues to be low.

2020 data estimates that 27% of STEM workers are non-white, compared to the 2018 report of 24%. Black/African Americans make up 5% of the Massachusetts STEM workforce, most concentrated in healthcare. Hispanic/Latinx workers compose 6% of the STEM workforce. Asians are over-represented in STEM occupations with 15% of the Asian workforce working in STEM.



THEME 4

MA IS MAKING INVESTMENT TODAY TO PREPARE FOR THE FUTURE OF STEM

The Commonwealth invests in STEM throughout the workforce journey – including education, career pathways, and on-the-job training. Leveraging the state-wide education and workforce infrastructure, Massachusetts has supported worker development in STEM through its longstanding programs. Find below some stories and statistics about our programs.

SELECT WORKFORCE PROGRAMS IN THE COMMONWEALTH

| State-Wide Programs | Description | 2021 Investment & Impact | Administrator |
|---|--|------------------------------------|--------------------------|
| Youthworks | Youth employment program supporting skills-training to help young people earn credentials in areas including STEM fields, building stronger pipelines to high-quality careers. | \$15.5 M to support 5000+ students | Commonwealth Corporation |
| Career Technical Initiative | Targeted vocational support to unemployed and underemployed individuals in priority technical occupations. | \$4 M to support 700+ workers | Commonwealth Corporation |
| Workforce Competitiveness Trust Fund (WCTF) | Demand-driven program that train and place unemployed and underemployed workers in jobs while providing targeted support to succeed in employment. | \$10 M to support 1,2000+ workers | Commonwealth Corporation |
| Workforce Training Fund Program (WTFP) | Training program that provides grants to Massachusetts businesses to upgrade the skills of their workers and support their competitiveness. | \$ 20 M to support 16,000+ workers | Commonwealth Corporation |
| Massachusetts Apprenticeship Programs | Work-based training programs that provide hands-on experience, supplemented by classroom instruction, to enable apprentices to earn while they learn. | 500+ apprenticeship programs | MassHire Career Center |

Source: Commonwealth Corporation, Executive Office of Labor and Workforce Development

In particular, the Commonwealth prioritizes targeted support worker populations to ensure upward mobility for all.

The Massachusetts workforce must react to changing work patterns while managing displacements due to the pandemic. As a result, the Commonwealth has funneled resources to address pressing workforce challenges in priority sectors such as healthcare, and for targeted worker population groups such as at-risk youth, and ESOL.

THEME 4 CONTINUED

RECENT SNAPSHOTS



Commonwealth Corporation recently hosted the first convening of the Healthcare Workforce Hub, bringing together 7 regional partnerships to support training programs for priority healthcare occupations such as Certified Nursing Assistant.



YouthWorks, in its recent grant cycle, supported youth placements in STEM jobs across Information Technology, Healthcare, Manufacturing, Science, and Engineering.

A sample employer placement includes Bridgewater State University, Machado Consulting, Ben Franklin Manufacturing Company, Peerless Precision Inc., Wayne Alarm Systems, A Baby Center, Humanity Boutique, New Balance Factory Store Merrimack, Chocolate Therapy, Yesteryear Cyclery Inc., Boston Building Resources.

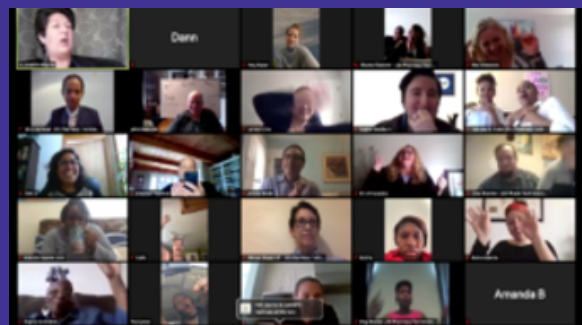
Massachusetts Apprenticeship Programs, in partnership with Apprenti, offers 10+ apprenticeships in Tech Occupations, including IT Business Analyst, Systems Analyst, Software Developer, Cybersecurity Analyst, and IT Support Professionals. Since 2019, 36 apprentices have successfully completed their apprenticeship. 28 of those 36 were hired or hired early by their original company (78%).

LEARN MORE ABOUT TRAINING PROGRAMS



CommCorp |

Workforce Training Fund (WTFP) supported Insulet Corporation, an innovative medical device company specializing in diabetes, in training on Continuous Improvement/ Six Sigma. Leadership, Root Cause Analysis, Technical Writing, Risk Management, and Auditing. During this period, Insulet reduced manufacturing costs by \$0.50 per pod and added 30% more full-time employees by end of the grant.



The Workforce Competitiveness Trust Fund (WCTF) graduated its first remote cohort of 15 new pharmacy technicians, in partnership with JVS Boston. In response to the pandemic, the training adapted to a virtual format that continued to enable guaranteed externship placement at one of the participating employer partners, including Israel Deaconess Medical Center, Boston Children's Hospital, CVS, Dana Farber Cancer Institute, South Shore Hospital, Tufts Medical Center, and Walgreens.



MassHire Berkshire Workforce Board has been involved with STEM for the past few years, bringing together employers, the K-12 system, and employees. MassHire created videos that were published on PCTV public TV, hosted a STEM/Manufacturing Job Fair, and provided training to employees with 4 companies.