



SEE YOURSELF IN STEM

Massachusetts careers are rapidly growing in science, technology, engineering and math, but the career doors opened by STEM education don't end there.

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**MASS
STEM
WEEK**
OCT 21-25, 2019

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Contents

3	Why STEM Week?
4	What are STEM Jobs?
6	Wages and Entry-Level Opportunities
8	Growing Demand
10	Gender
12	Race, Ethnicity and Nationality
17	Age
18	Footnotes

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WHY HOLD AN ANNUAL STEM WEEK?

Science, technology, math and engineering jobs are a large share of the jobs available in Massachusetts and only expected to grow. Yet several subgroups remain underrepresented in STEM occupations and STEM degree attainment, despite it opening a wide array of opportunities.



Massachusetts STEM Week 2019 takes place from October 21-25 and is organized by the Executive Office of Education and the STEM Advisory Council in partnership with the state's 9 Regional STEM Networks. It is a statewide effort to boost the interest, awareness and ability for all learners to envision themselves in STEM education and employment opportunities, and complement the formal instruction happening in the Commonwealth beyond STEM week.

The theme for the second annual statewide STEM Week is "See Yourself in STEM." Women and people of color are underrepresented in STEM careers and make up an increasing portion of the overall workforce, but the demographics of STEM fields have remained largely the same. We need more young people to see themselves in STEM.

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WHAT ARE STEM JOBS?

STEM workers represent 17% of the total Massachusetts workforce—over 600,000 of a total 3.6 million workers—about one-third higher than the U.S. average of about 13%.¹

Adjusted for population, Mass. has more demand for STEM jobs than almost every other state.²



Computer and Mathematical

- Computer Analysts
- Software Developers
- Database Administrators
- Network Architects
- User Support
- Mathematicians
- Statisticians
- Actuaries
- Operations Research

Health Care Practitioners and Technologists

- Physicians, Surgeons, Dentists
- Therapists – Physical, Occupational, Radiation, Respiratory
- Nurses, Nurse Practitioners, Physician Assistants

Engineering and Architecture

- Architects
- Surveyors
- Engineers – Biomedical, Civil, Electrical, Electronic, Environmental, Industrial, Mechanical
- Drafters and Engineering Technicians

Life, Physical and Social Science

- Biological, Conservation and Medical Scientists
- Physical Scientists – Astronomers, Physicists, Chemists, Environmental
- Social Scientists – Psychologists, Urban Planners, Geographers

STATE	Job Postings Per 10K Employed	Level of STEM Job Demand
Colorado	1,060	Higher than average
Arizona	986	Higher than average
Virginia	978	Higher than average
California	973	Higher than average
Massachusetts	944	Higher than average
Washington	851	Average
North Carolina	830	Average
Maryland	810	Average
New Mexico	799	Average

* Includes managers, technical sales and postsecondary teachers related to these four categories of occupations.³

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MORE THAN HEALTH CARE AND IT

It's not only health care, science, computers and engineering: STEM jobs are an important part of almost every industry in Massachusetts.⁴

INDUSTRY	TOTAL SECTOR EMPLOYMENT	STEM JOBS AS % OF SECTOR
Professional and Technical Services	317,530	43%
Information	90,860	36%
Health Care and Social Assistance	628,190	35%
Manufacturing	244,100	20%
Educational Services	374,340	13%
Public Administration	190,900	13%
Business and Admin. Services	256,060	10%
Finance, Insurance, Real Estate	212,780	8%
Trade, Wholesale and Retail	482,110	6%



MANUFACTURING



20%

More than 20% of manufacturing jobs in Massachusetts have become STEM jobs.

POSTSECONDARY TEACHING



1 out of 7

One out of every seven postsecondary teaching jobs in Massachusetts is a STEM job.

RETAIL, FINANCE, BUSINESS



70,000

Business services, financial activities and the wholesale/retail sectors employ more than 70,000 workers in STEM occupations.

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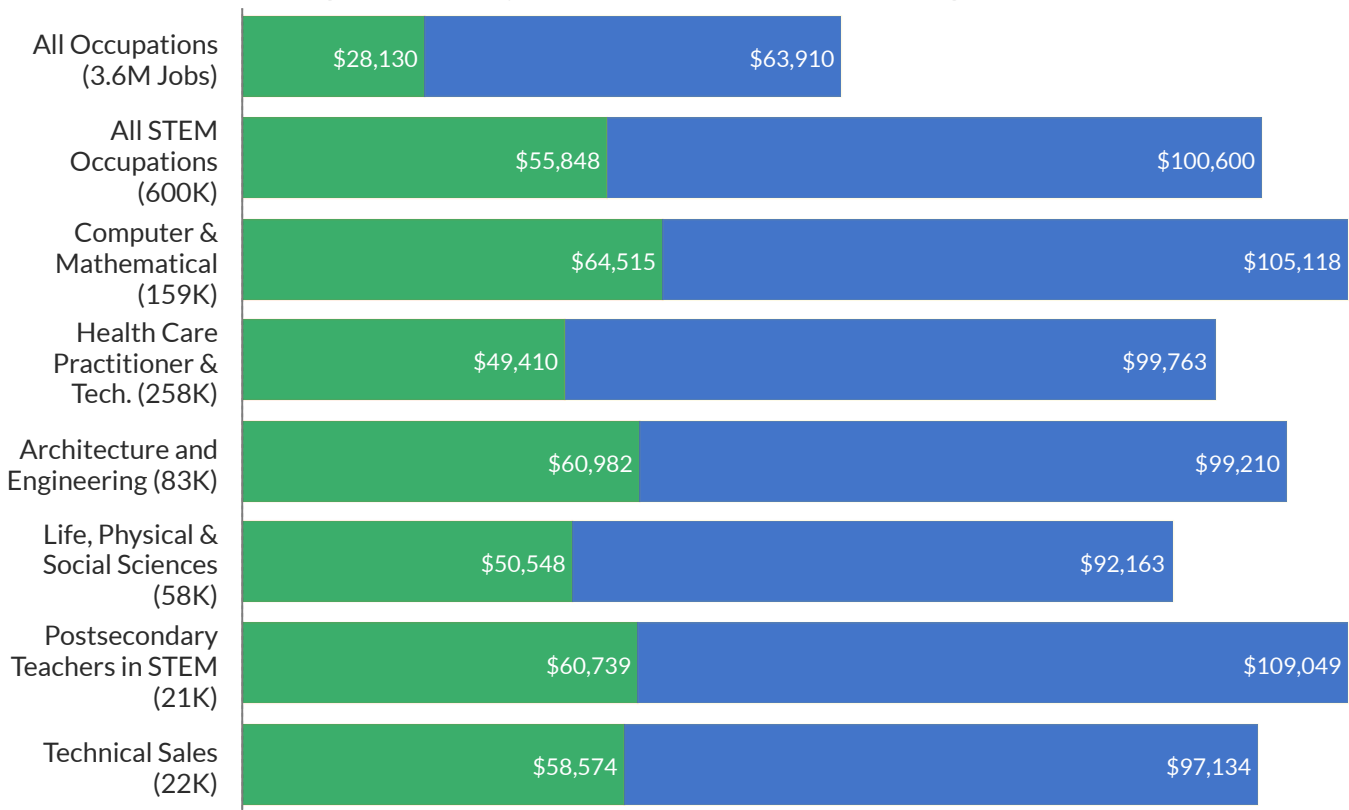
HIGHER PAYING JOBS, ENTRY-LEVEL OPPORTUNITIES

Entry-level wages for STEM careers are twice that for all Massachusetts occupations, and 1 out of 5 STEM jobs only require a postsecondary certificate or associate's degree.

Massachusetts workers in STEM careers have an average annual wage of over \$100,000, compared to the average annual wage of about \$64,000 for all Massachusetts workers. Entry-level wages for STEM are strong, too—about \$56,000 on average, about twice that of the \$28,000 average for all entry-level Massachusetts workers. That works out to an hourly wage of \$26.85 for STEM workers compared to \$13.50 for all entry-level workers.¹

What's more, good STEM jobs in Massachusetts are available to people who don't have a high level of education. To be sure, 78% of entry-level STEM jobs in Massachusetts typically require at least a bachelor's degree. However, 22% of entry-level STEM jobs don't require more than an associate's degree, or simply a postsecondary credential—the kind that can be earned in a short-term education or training program.⁵

STEM Average Entry And Annual Wages



■ Average Entry Wage

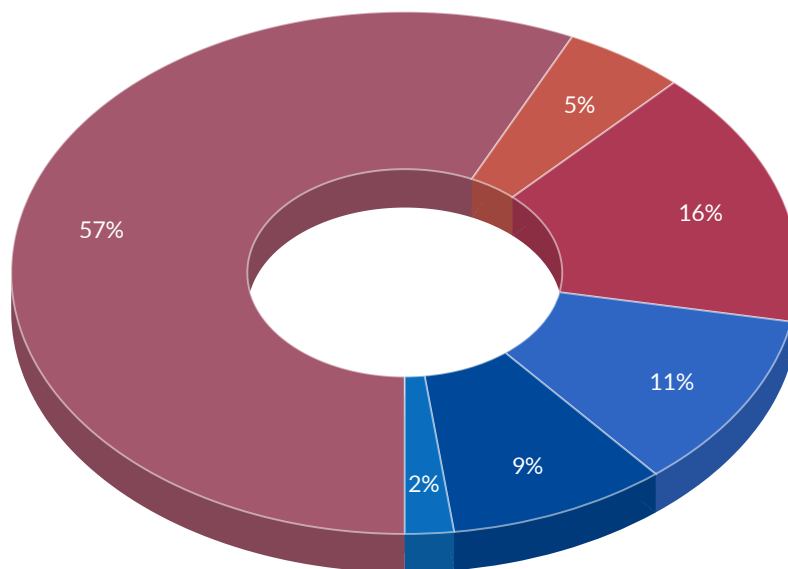
■ Average Annual Wage

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These jobs are also good jobs: on average, their entry-level and median wages are significantly above those for Massachusetts jobs in general. Indeed, even the small number of STEM jobs in Massachusetts that require no more than a high school diploma have an average starting wage that is higher than the entry-level wage for all Massachusetts jobs.

STEM Occupations by Typical Education Level Needed for Entry



● Bachelor's degree	57%	● Master's degree	5%
● Doctoral or professional degree	16%	● Associate's degree	11%
● Postsecondary Certificate	9%	● High School Diploma	2%

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IN DEMAND AND GROWING

High-demand STEM occupations in Massachusetts can take as long as 70 days to fill, and the number of those jobs are projected to grow faster than the overall number of jobs in the Commonwealth.

As much as Massachusetts leads in STEM, employers still have great unmet need for more STEM employees. For example, job openings in many high-demand STEM occupations—especially in the health care and computer/IT sectors—can take 40 to 70 days to fill and take much effort to fill.⁶

Figures like these shine a spotlight on the need for additional postsecondary education and training approaches to help Massachusetts residents gain the skills they need to obtain, or be promoted into, these good jobs.

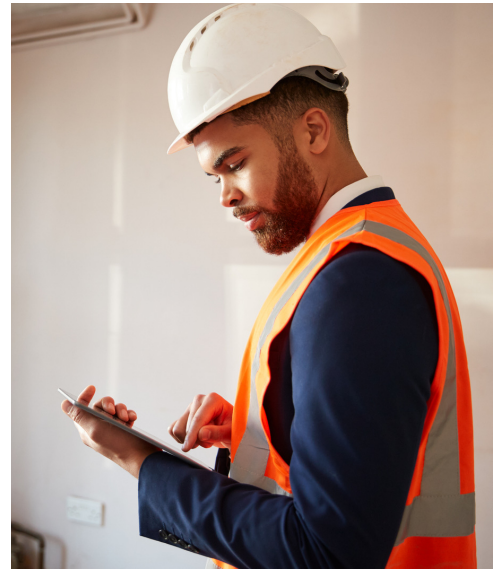


Occupation	Days to Fill	Estimated Average Salary
Speech Language Pathologist	68	\$63,330
Physician	64	\$119,612
Nurse Practitioner	60	\$104,414
Physical Therapist	54	\$78,650
IT Project Manager	53	\$103,310
Electrical Engineer	52	\$98,845
Computer Systems Engineer	50	\$112,835
Mechanical Engineer	50	\$98,286
Engineering Manager	50	\$111,954
Network Engineer/Architect	48	\$109,020
UI / UX Designer/Developer	48	\$97,328
Cyber/Info Security Engineer	47	\$97,389
Software Developer/ Engineer	46	\$113,335
Web Developer	46	\$111,816
Intensive/Critical Care Nurse	46	\$56,988

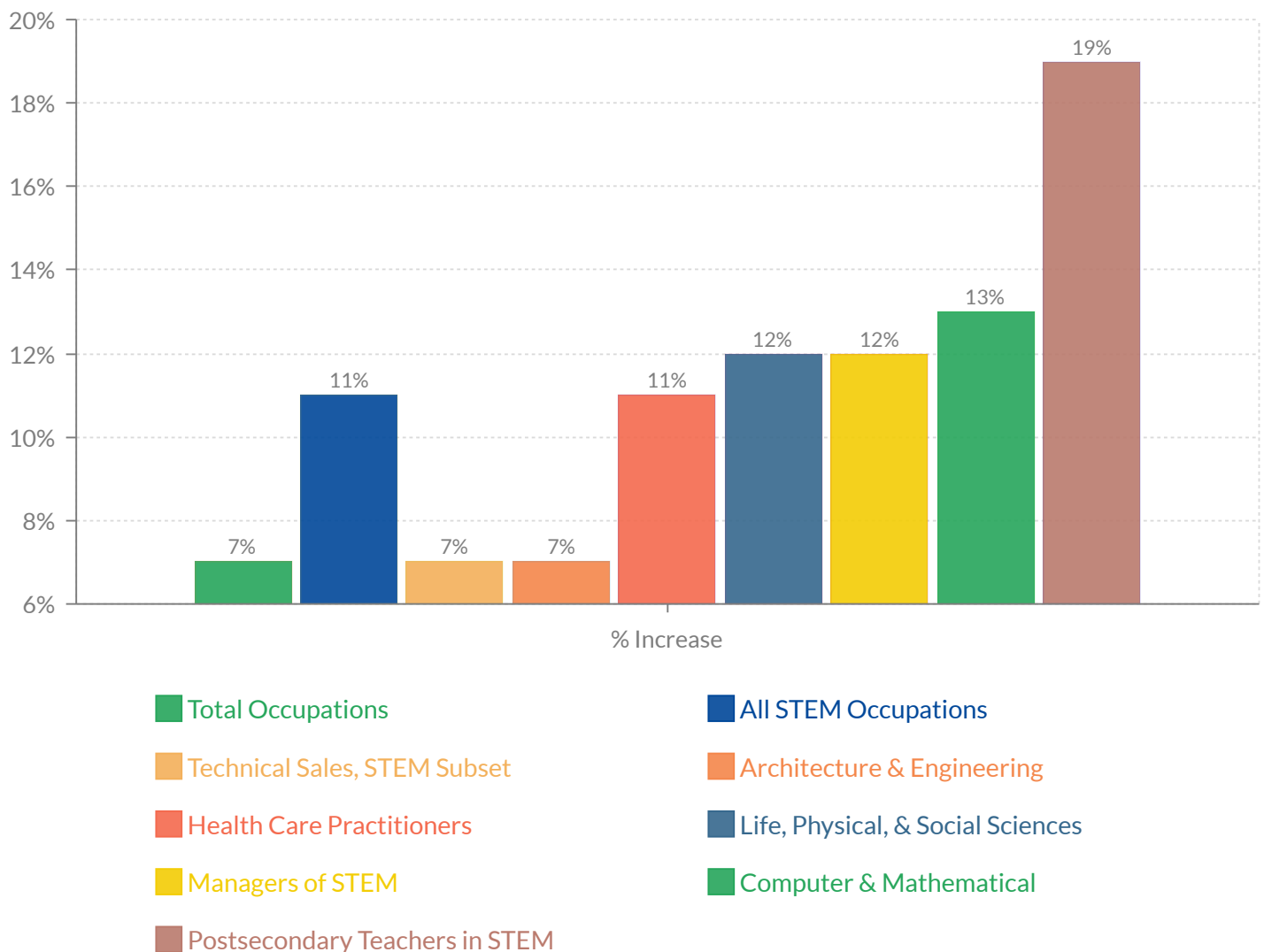
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Employment analyses predict that STEM will only become even more important to Massachusetts in the future. Based on projections to 2026, the number of jobs in Massachusetts is expected to increase by 270,000 or 7.4%, but STEM jobs are expected to increase by over 11%. STEM jobs are expected to account for 25% of the total employment growth in the Commonwealth over the next decade. Between new jobs created and the replacement needs for positions as workers change jobs, the STEM workforce is estimated to have almost 50,000 annual job openings.⁵

*Note: Annual openings are the projected number of annual openings for workers entering an occupation, both new jobs and replacing workers who have left jobs. The net employment increase accounts for both projected openings and projected separations (transfers to another occupation and exits from the labor force).



Massachusetts Projections for Increase in Annual Job Openings by Occupation, 2016-2026

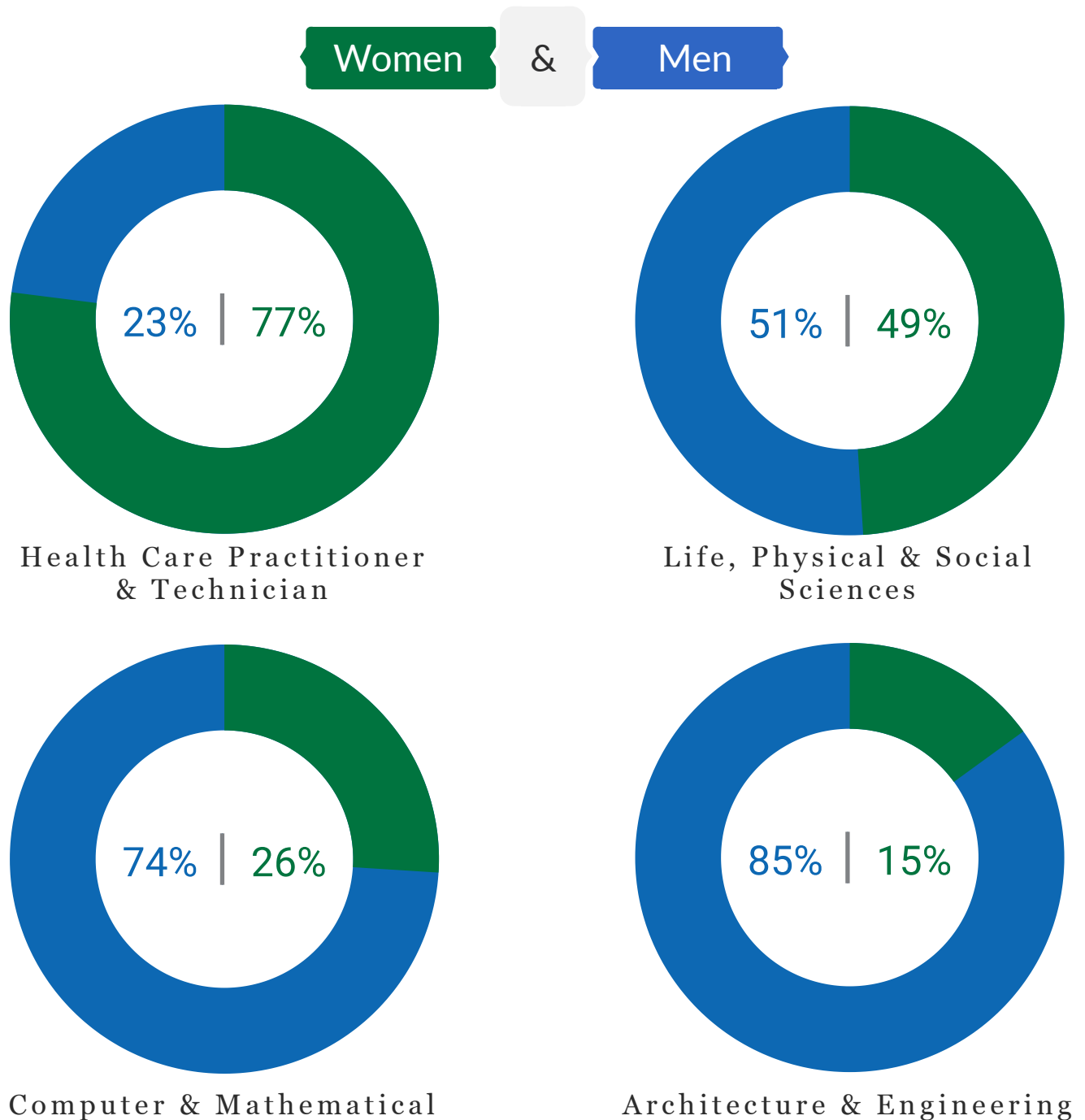


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OVERALL DIVERSITY, OCCUPATIONAL SIMILARITIES

GENDER

Women are 48.6% of the overall workforce (age 25 years or older) in Massachusetts, and men are 51.4%. Gender representation in Massachusetts STEM jobs is just about equal (49.5% women, 50.5% men), but this masks large differences within the four occupational categories.⁷

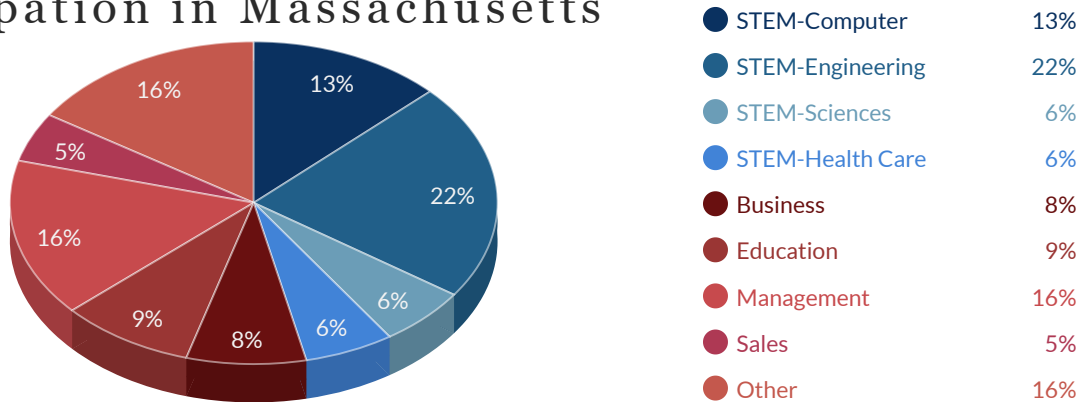


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In Massachusetts, 49% of all workers age 25 years and older have a bachelor's degree—51% of women and 47% of men. In the STEM workforce, 75% of workers have at least a bachelor's degree, with 71% of women and 79% of men with at least a four-year degree. This variation is explained in part by women having 75% of the health care occupation category that has more middle skills jobs and an overall 68% with bachelor's degrees.

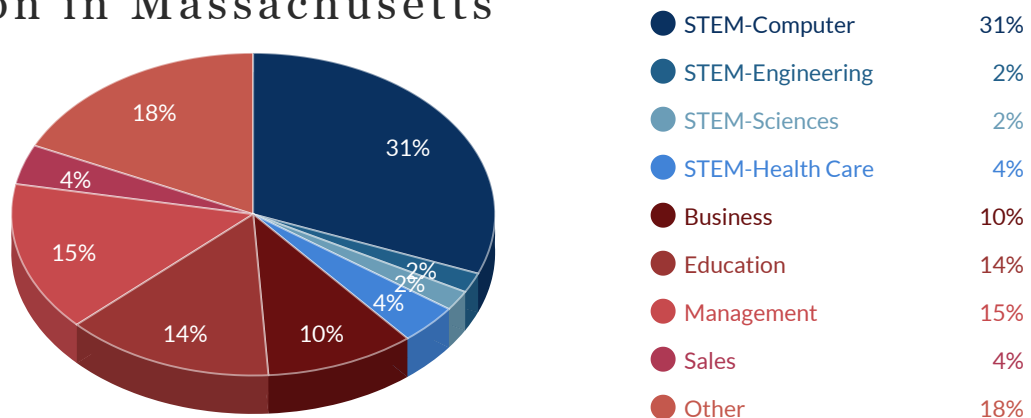
Another way to explore this issue is to review gender differences in the specific majors of attained degrees. For example, women have only 18% of the total engineering/architecture degrees and even fewer pursue jobs in those occupations after attaining such a degree. Women with engineering degrees are somewhat less likely than men — 35% versus 47% — to go into an engineering or computing job, with some more likely going to other STEM occupations and non-STEM jobs in business and education. While it is positive that STEM degrees provide women and men with a wide range of potential occupations, there is work to be done to attract and retain women in STEM degrees and jobs.

Women with Engineering and Architecture Degrees by Occupation in Massachusetts



As with engineering, fewer women are receiving computing degrees and then fewer are pursuing computing jobs after attaining such a degree. Women hold only 30% of the total computing degrees in Massachusetts. Those women are less likely than men to have computing jobs (31% vs. 49% for men) and thus also less likely to have STEM jobs in total (40% vs. 58% for men). While these women have many opportunities in business, education and management, the gender gap in this important segment of Massachusetts economy is of some concern.

Women with Computer and Math Degrees by Occupation in Massachusetts



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RACE, ETHNICITY AND NATIONALITY

BLACK / AFRICAN AMERICAN

6% MA, 5% STEM

A little more than 6% of Massachusetts workers are black or African Americans and overall 5% of STEM workers are, but health care employs black workers at over 7% and the other three STEM categories have less than 3% black workers.

HISPANIC / LATINX

9% MA, 4.4% STEM

Almost 9% of Massachusetts workers are Hispanic/Latinx and only half that rate is in STEM at 4.4%. This is consistent across all four groups including health care.

ASIAN

6.5% MA, 13% STEM

13% of STEM workers are Asian, far exceeding the 6.5% in all Massachusetts jobs. These patterns are similar to the overall U.S. STEM jobs. Asian workers have 20% of STEM computer jobs and 22% of STEM science jobs.

WHITE

77% MA, 76% STEM

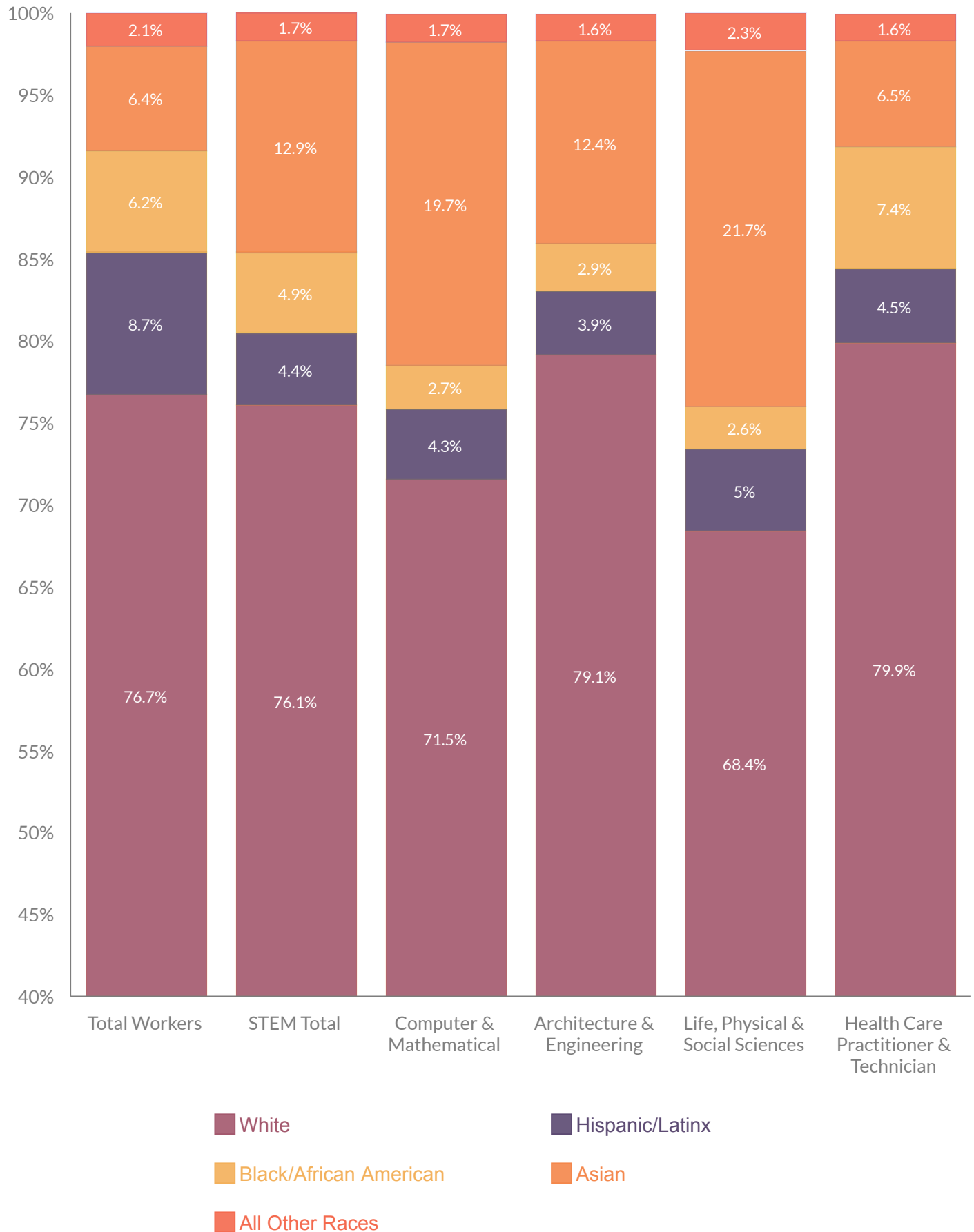


Overall 76% of STEM workers are white, close to the overall Massachusetts job average of 77%, but like the data around gender, this again masks other differences.

Hispanic/Latinx are underrepresented in all STEM occupations, black/African Americans are underrepresented in non-health care occupations, and Asians are overrepresented in the non-health care occupations.

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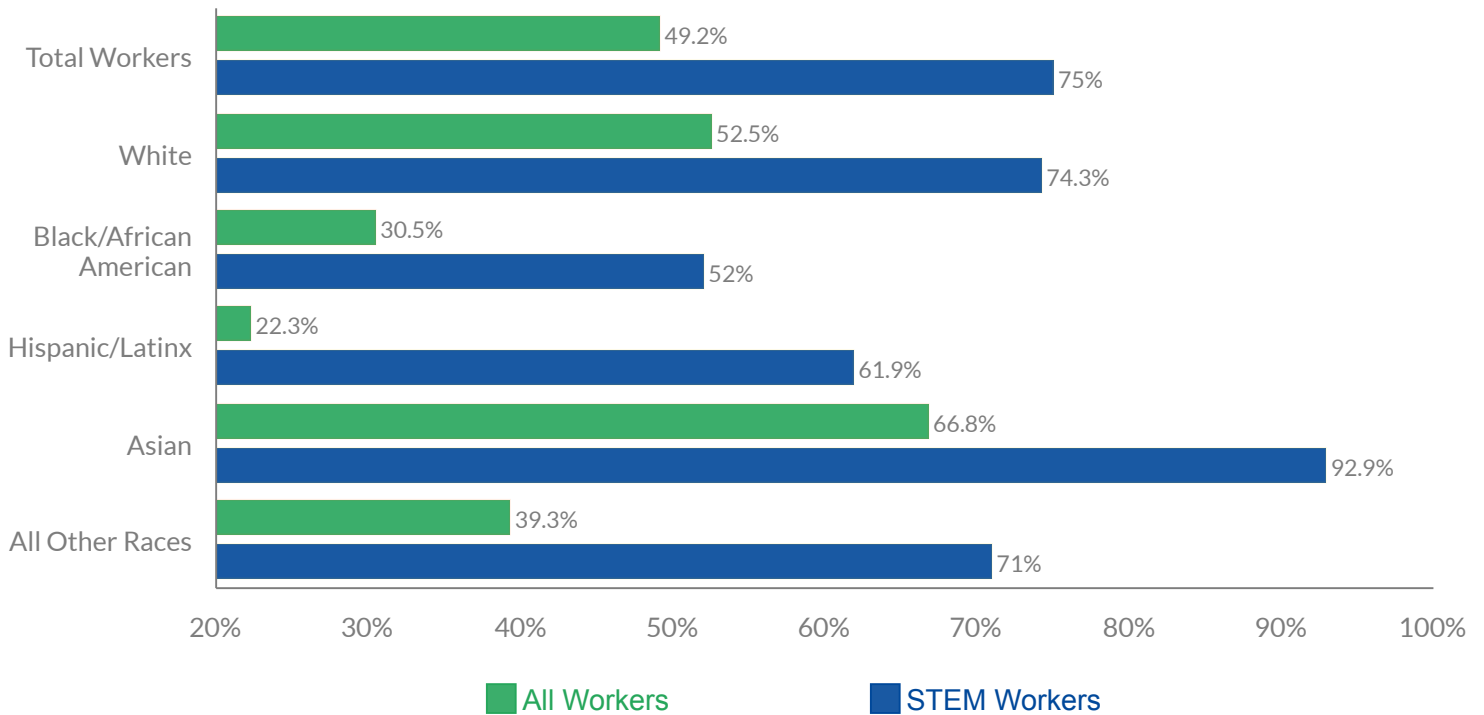
Massachusetts Workers By Race/Ethnicity



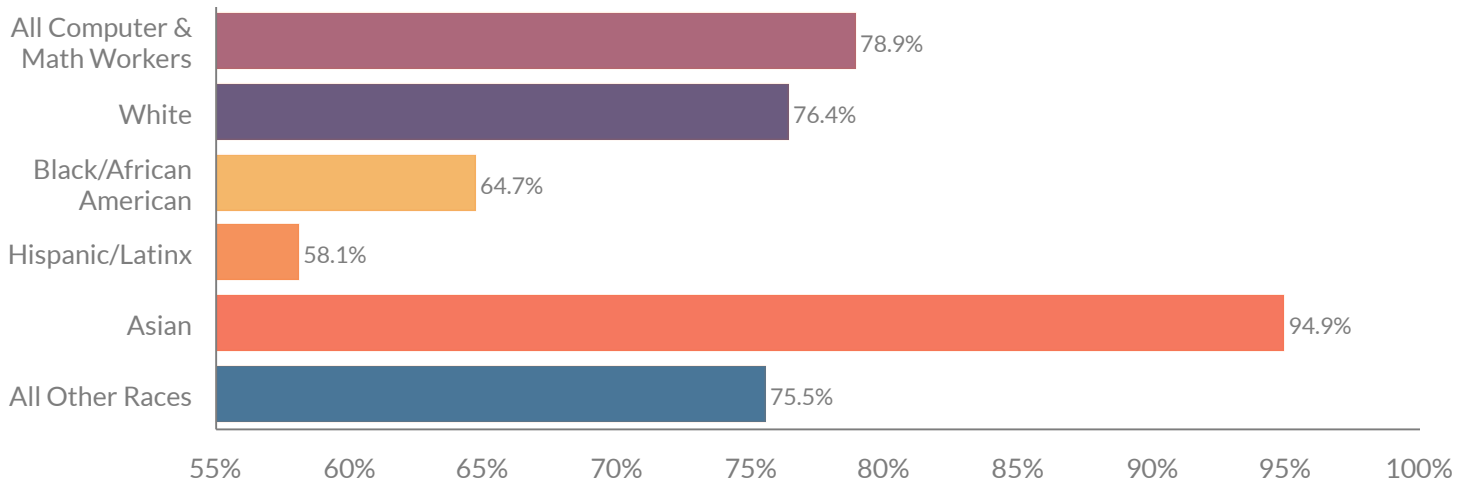
With 75% of STEM workers having a bachelor's degree or higher, differences in educational attainment impacts racial/ethnic representation in STEM. In the overall worker population, only 31% of black/African Americans workers and 22% of Hispanic/Latinx workers have a bachelor's degree or higher, whereas 67% of Asians do. Even for those black/African Americans and Hispanic/Latinx in STEM jobs, fewer have bachelor's than their white and Asian counterparts, impacting their choice of entry jobs and subsequent career progress.

As with women, looking at specific STEM degree majors, the overall picture for black/African Americans and Hispanic/Latinx workers is that they tend to have smaller shares of STEM-related degrees and even when they have such degrees, they are less likely to have related STEM jobs.

Percentages of Massachusetts Workers by Race/Ethnicity with Bachelor's Degree or Higher

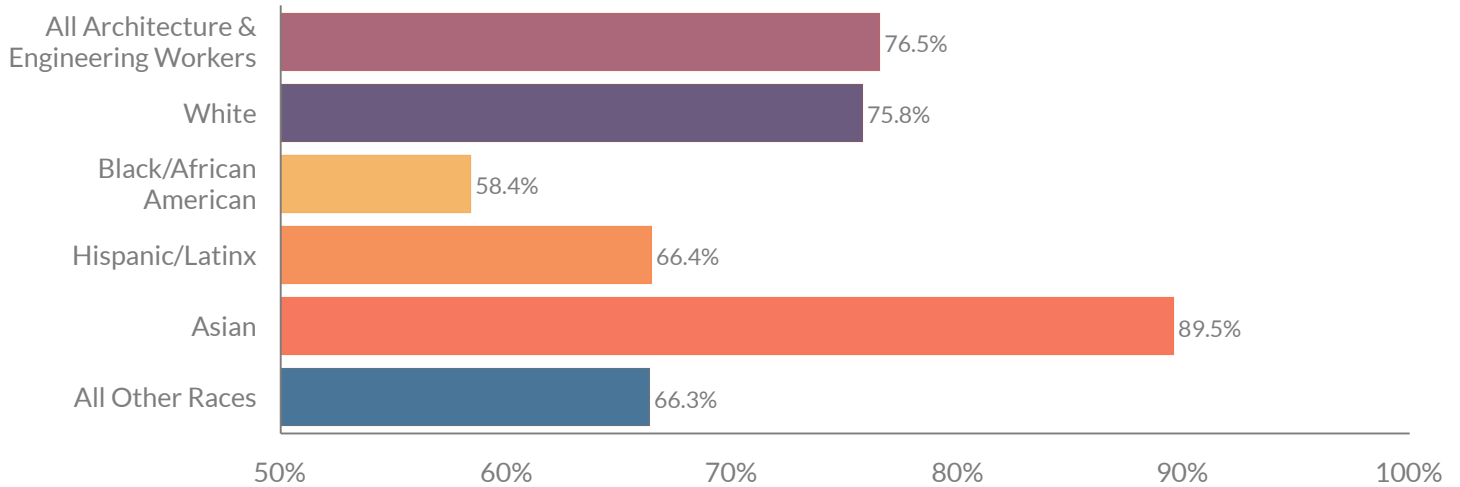


Computer & Math Workers with Bachelor's or Higher

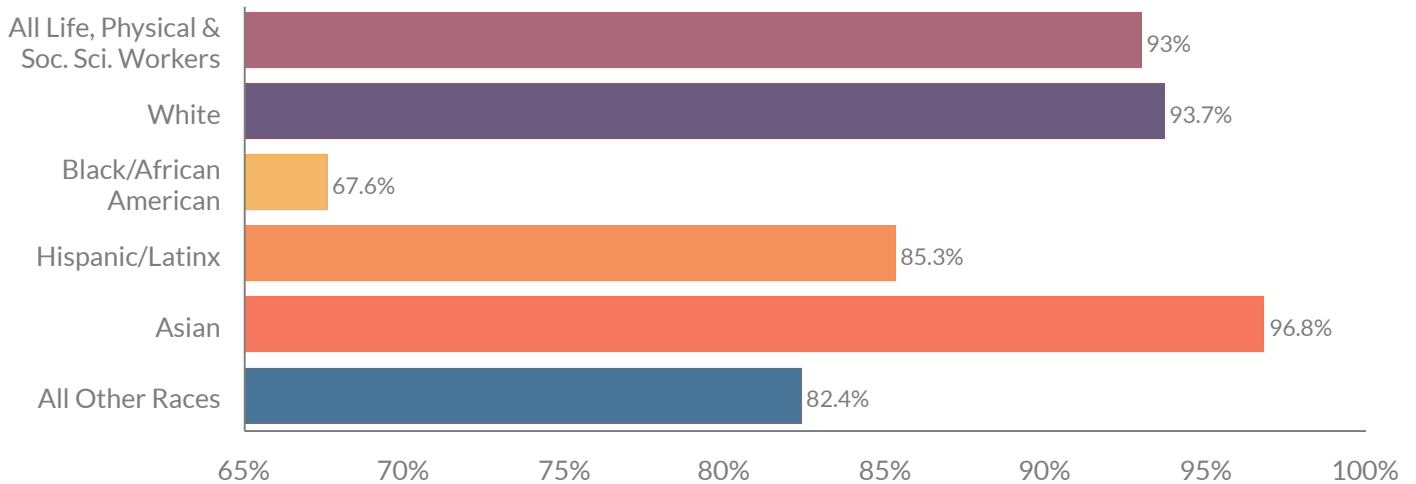


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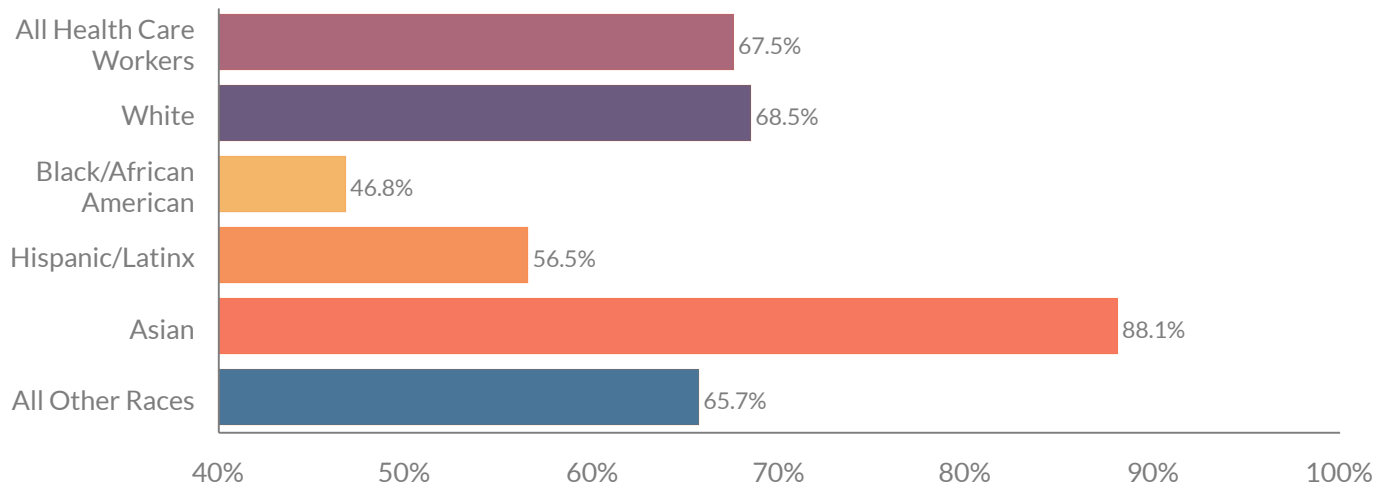
Architecture & Engineering with Bachelor's or Higher



Life, Physical & Social Science with Bachelor's or Higher



Health Care with Bachelor's or Higher



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FOREIGN-BORN MASS. STEM WORKERS


23.3%

of 528,983 workers

COMPUTER & MATHEMATICAL


28.8%

of 149,366 workers

ARCHITECTURE & ENGINEERING


22.2%

of 82,647 workers

LIFE, PHYSICAL & SOCIAL SCIENCES


37.9%

of 52,289 workers

HEALTH CARE PRACTITIONER & TECHS


17.1%

of 237,681 workers

FOREIGN-BORN & IMMIGRANT WORKERS

Immigrant/foreign-born workers⁸ are an important part of the workforce, both in Massachusetts (20.5%) and in U.S. (18.3%). Immigrants are even more important in STEM jobs: almost one-quarter of Massachusetts STEM workers are foreign-born, compared to 19% for the U.S.

This is particularly relevant in the non-health care STEM jobs of computer, math, engineering and sciences, where about 29% of workers are immigrants. Hispanic immigrants are somewhat higher in STEM than overall at 27% vs. 22% and Asian immigrants much more at 46% vs. 26%.

Foreign-born workers/immigrants are an important source to meet the demand for STEM jobs and to add to the diversity of the Massachusetts workforce. Compared to overall Massachusetts workers at 77% white and 23% people of color, foreign-born workers, overall and in STEM, are about 32% white and 68% people of color. There may need to be additional strategies for recruitment of STEM workers if the flow of international students and foreign-born temporary workers decreases.



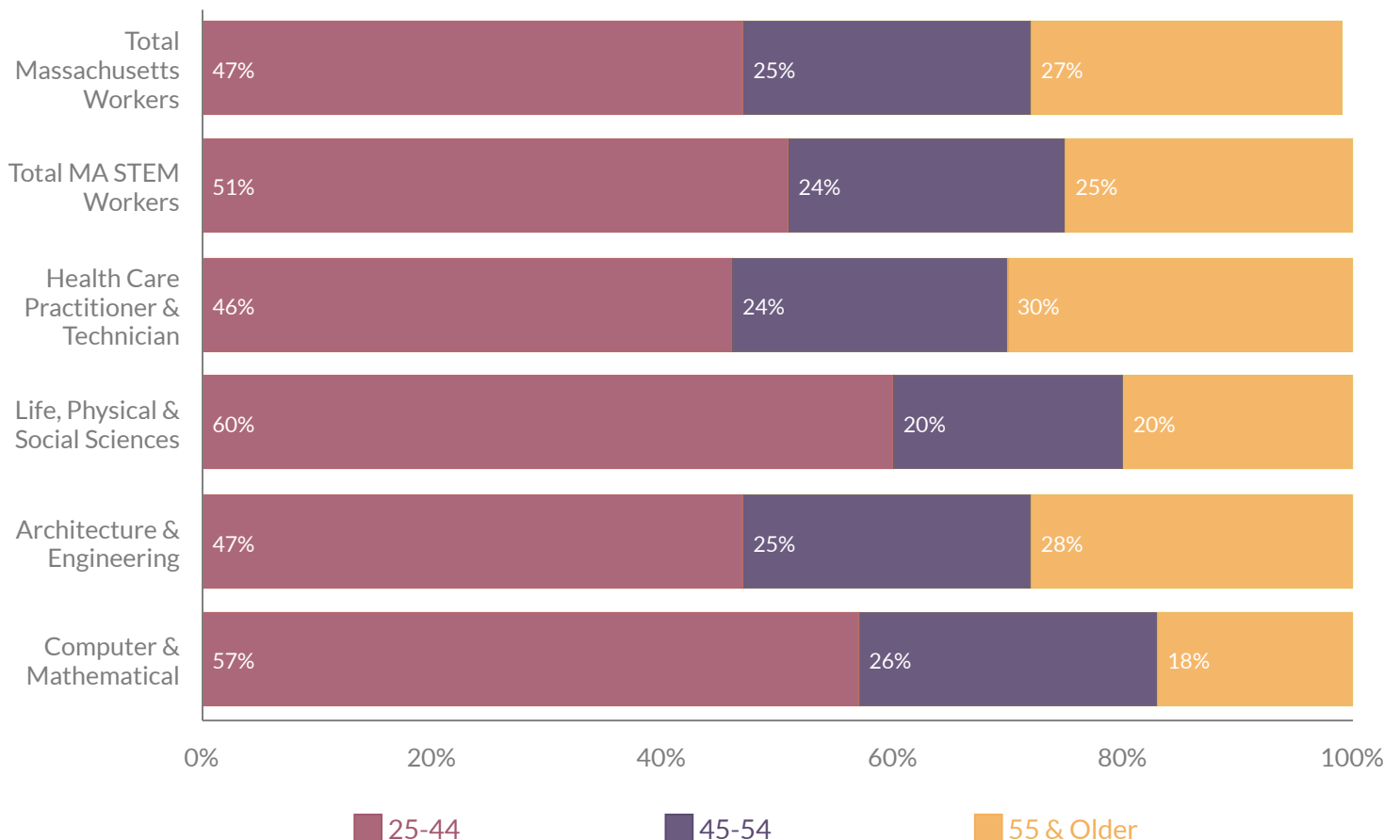
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AGE

STEM workers are slightly younger than overall workers, with 51% younger than 45 years old versus 47% for the overall worker population; the median age in STEM is 44 years old versus 46 years old for all workers. For computer jobs, 57% are younger than 45 and 59% of workers in life, physical and social sciences are younger than 45 years old. These numbers show great opportunities for recent graduates but present some challenges for mature workers changing careers.



Massachusetts STEM Workers by Age Groups



FOOTNOTES

1. Commonwealth Corporation analysis of Occupational Employment Statistics (OES) 2019, Massachusetts Department of Unemployment Assistance, Economic Research Department, accessed at http://lmi2.detma.org/lmi/lmi_oes_a.asp, and U.S. Department of Labor, Bureau of Labor Statistics, accessed at <https://www.bls.gov/oes/home.htm>. Note: The OES program conducts a semiannual survey of a sample of business establishments to produce estimates of employment and wages for about 800 specific occupations. The semiannual surveys are combined over a three-year period to collect a complete sample.
2. Labor Insight Jobs, Burning Glass Technologies: Report on Job Postings (updated 09/01/2018 - 08/31/2019).
3. The STEM categories and occupations are from the Bureau of Labor Statistics, based on the recommendations of the Standard Occupational Classification (SOC) Policy Committee.
4. Commonwealth Corporation analysis of Massachusetts Department of Unemployment Assistance, Economic Research Department, Occupational Employment Statistics, Industry Staffing Pattern, accessed at http://lmi2.detma.org/lmi/lmi_oes_a_all_ind_Occ2.asp.
5. Commonwealth Corporation analysis of Massachusetts Department of Unemployment Assistance, Economic Research Department, Occupational Projections 2016-2026.
6. Labor Insight Jobs, Burning Glass Technologies, STEM Job Postings: Sept. 2018 to August 2019. Note: Occupations are ranked by the average number of days a job was posted before being filled.
7. Source: Commonwealth Corporation analyses of U.S. Census Bureau: American Community Survey (ACS), Five-Year Public Use Microdata Sample (PUMS), 2013-2017. The ACS is a nationwide survey that collects social, economic and demographic characteristics from a sample of U.S. households. ACS estimates are not directly comparable to the BLS Occupational Employment Statistics (OES).
8. The American Community Survey defines foreign-born to include immigrants who are naturalized citizens or lawful permanent residents, as well as refugees and asylees, students and workers on temporary visas and permits, and any other migrants.

