

THREAD CATEGORY: Talent & Inclusion

QUESTION: How can we raise, recruit, and retain more women in engineering, tech, and STEM careers in Miami?

VISION

SOURCES: Census, Pew Research, University of Milwaukee-Wisconsin, Catalyst Work Places that Work for Women, Girl Scouts of Tropical Florida, Girl Scouts of the USA

Most of the [jobs for 2030](#) have yet to be invented. Imagine what a decade later could look like. By 2040, [professions that bridge technology](#) like AI-enhanced teacherbot engineers, mixed reality experience builders, asteroid mining bot operators, digital house architects and aerial security teams are going to be some of the most common jobs. How did we get here?

The STEM workforce (science, technology, engineering, and math) has grown rapidly in recent decades – [STEM jobs account for nearly 7% of all U.S. occupations](#) in 2019. STEM occupations are expected to continue to experience rapid growth in the coming decades – and at a [higher rate](#) and with a higher median wage than non-STEM jobs.

Yet, [the representation of women varies across the job clusters](#) that make up the STEM workforce. While in health-related jobs, women are overrepresented compared with their nearly half share of the overall workforce, they remain underrepresented in computing and engineering jobs. Women comprise 48% of all workers in the life sciences (such as the biological or agricultural sciences), up from 34% in 1990. The share of women in the physical sciences (such as astronomy, physics, or chemistry) has also risen, from 22% in 1990 to 40% as of 2019. However, in engineering, women's representation has inched up, from 12% in 1990 to 15% today. It's [not about ability or lack of interest](#). Rather, [lack of encouragement, discouragement, lack of role models, peer pressure, and harassment](#) in the workplace all play a role. Moreover, [women who do pursue STEM jobs end up leaving](#) at disproportionately higher rates than men.

STEM workers are society's problem solvers and solutions finders. Yet, with women missing at the table, key insights and innovations may be missed. To be effective and long-lasting – and inclusive – [STEM engagement with girls needs to start early](#).

WHY IT MATTERS

SOURCES: American Progress, WE Forum, Obama White House, Pew Research, Girl Scouts of the USA

If technology is designed by only half of the population that's male, we're missing out on the innovations, solutions, and creations that women could be bringing to the table.

Ultimately, diverse teams perform better.

- [Diversity is a key ingredient to growing a strong and inclusive economy](#) that's built to last.
- Individuals from different genders, races, backgrounds, and experiences bring [different perspectives](#) that can lead to innovative solutions.
- To be competitive in the global market, [over the next decade the U.S. will need an astounding one million more STEM professionals](#) than it is currently on track to produce.
- An [early start puts all kids on a level playing field](#) and starts to prepare both girls and boys for the jobs of the future.
- [Girls are interested in STEM!](#) Girls interested in STEM like to understand how things work, solve problems, do hands-on activities and ask questions. Yet, negative associations with STEM careers and stereotypes create barriers that keep these same girls from making STEM careers their top choices.
- [STEM workers typically earn more](#) than those in other, non-STEM occupations. In 2019, median earnings for full-time, year-round workers ages 25 and older in a STEM job were about \$77,400. The comparable median for workers in other, non-STEM occupations was \$46,900.

WHERE WE ARE NOW

SOURCES: Catalyst Work Places that Work for Women, Girl Scouts of the USA, Census, Miami-Dade County Public Schools, Girls Who Code, Miami-Dade County Office of the Commission Auditor, Florida International University Jorge M. Pérez Metropolitan Center, Florida International University College of Engineering and Computing, University of Miami College of Engineering

While women make up nearly half of the U.S. workforce, women remain underrepresented in the science, technology, engineering, and math (STEM) workforce. Women who do pursue a career in STEM are [paid less than their male co-workers](#), and experience isolation, discrimination, and hostile work environments in their male-dominated workplaces. And, ultimately, women [leave STEM careers at disproportionately higher rates](#) than men, particularly those who are working parents.

United States

- Kindergarten-aged boys and girls show equal interest in STEM activities, yet [by the third-grade girls begin opting out of STEM](#) saying that it's "for boys."
- The [percentage of women in STEM jobs made gains](#) – from 8% of STEM workers in 1970 to 27% in 2019. Men still led the field, making up 52% of all U.S. workers and 73% of all STEM workers.
- Women working in engineering occupations, specifically, [increased from 3% in 1970 to 15% in 2019](#). While the percentage of women in computer occupations is higher than in 1970, it decreased between 1990 and 2019.
- Women employed full-time, year-round in STEM occupations earned more than their non-STEM counterparts; however, the [gender earnings gap persisted](#) within STEM occupations. Among the 70 detailed STEM occupations the Census Bureau reports on, women earned more than men in one STEM occupation – computer network architects (women represented 8% of those in this occupation).

Miami-Dade

- As of the 2020-2021 school year, there were more than [110 Miami Dade County Public Schools designated](#) as either STEM (science, technology, engineering, math) or STEAM (science, technology, engineering, art, math).
- A handful of local [Girl Who Code Clubs](#) specifically target girls and STEAM careers.
- In Miami, [women were the majority in educational services, and health care and social assistance](#) in which 71% of the full-time workforce, or almost 152,000 sector employees were women.

- A [2021 survey showed two advancements to women's opportunities](#): 1) two in three women who had left the workforce indicated they planned to return in the future and 2) 56% of women were considering a career change as a result of the pandemic – 8 in 10 women showed interest in transitioning to the STEM field.
- In 2019, [women in Miami-Dade County earned more than men in only two occupations](#): computer and mathematical occupations, as well as architectural and mathematical occupations. Albeit the gap was small at 0.3 percent and 0.2 percent. Researchers note that one year is not sufficient time to determine a trend.
- In 2019, there were close to 600,000 persons in the 25 and over age group in Miami-Dade who had bachelor's degrees. Of these, [23.4% of female bachelor's degree holders have science and engineering degrees](#).
- At Florida International University College of Engineering and Computing, in the 2019 academic year, [women earned 20% of bachelor's degrees](#), 30% of master's degrees, and 28% of doctoral degrees.
- At the University of Miami College of Engineering, in 2018, [31% of the undergraduate student body was female](#), the College welcomed its first woman Chair of Mechanical and Aerospace Engineering and two of the associate deans were women. However, the College recognizes that there is much work to do to support women students and women in engineering professions.
- The following table displays the top ten occupations, from 2019 data, where women working full time were paid the highest. Women are still only a small percentage of the workforce in these occupations (20.3% in computer and 15.5% in architecture and engineering), and the small sample for these estimates might not be indicative of a trend. The gaps in 2018 were in favor of men. The pay gaps for these same occupations in 2019 were more than 10 percent at the state and national levels.

SOURCE:

<https://www.miamidade.gov/auditor/library/women-in-miami-dade-2021.pdf>

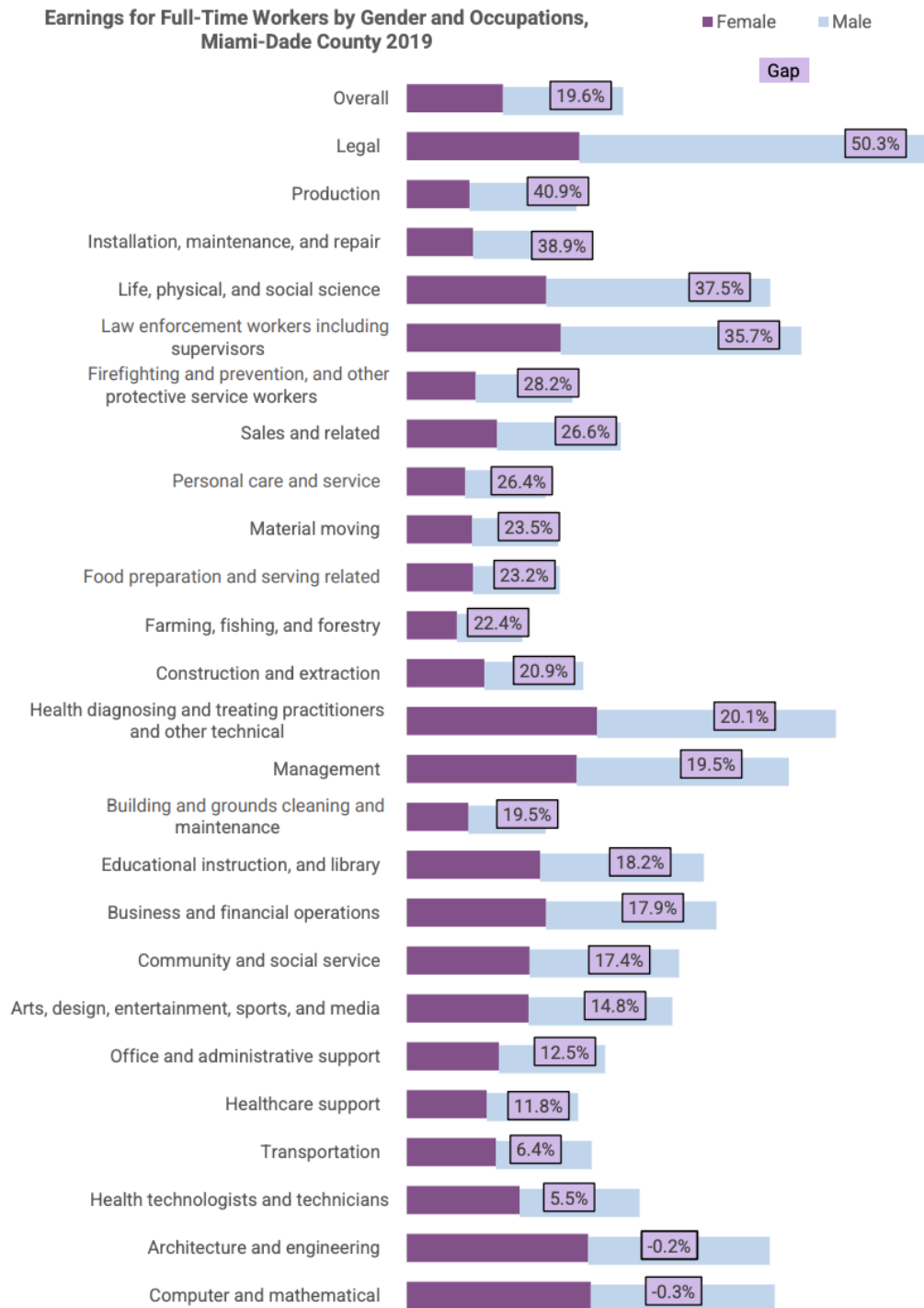
Below chart is on page 22 of the report in link above.

Highest Earning Occupations of Women, 2019

	Miami-Dade	Miami-Dade Gap	Florida Gap	U.S. Gap
Health diagnosing and treating practitioners	\$64,046	20.1%	33.4%	35.2%
Computer and mathematical	\$61,954	-0.3%	17.1	15.3%
Architecture and engineering	\$61,079	-0.2%	14.6%	12.7%
Legal	\$58,141	50.3%	47.9%	45.2%
Management	\$57,251	19.5%	21.3%	23.9%
Law enforcement workers including supervisors	\$51,907	35.7%	14.0%	21.5%
Life, physical, and social science	\$47,005	37.5%	18.4%	11.7%
Business and financial operations	\$46,955	17.9%	15.7%	22.0%
Educational instruction, and library	\$44,934	18.2%	16.0%	19.4%
Community and social service	\$41,420	17.4%	16.9%	5.3%

U.S. Census Bureau, 2019 American Community Survey 1-year estimates.

Below chart is on page 23 of the report in link above.



Source: U.S. Census Bureau, 2019 American Community Survey 1-year estimates.

PERSPECTIVES

SOURCES: Rebekah Monson, Chelsea Wilkerson, Amy Renshaw, Amaka Amalu, Reshma Saujani

To be competitive in the global market, the [U.S. will need more STEM professionals](#) than it is currently on track to produce. This tech talent gap is expected to continue to grow. Deepening the talent gap is the underrepresentation of women in STEM. This problem will not fix itself.

- “The best thing we can do to make tech serve everyone better is to get more diverse people involved in making tech.”
-Rebekah Monson, Co-Founder, and COO of Letterhead
- How can we support more girls to increase participation in STEM fields? Help her access STEM opportunities. The hands-on experience girls get in STEM clubs and activities stoke their interest. Through Girl Scouts, for example, girls can earn badges in cybersecurity, space science, and computer coding. Local nonprofits like Code/Art, Dibia Dream, and Girls Who Code host STEM activities and workshops year-round. During spring breaks, Miami-Dade County Parks, Recreation and Open Spaces, Frost Science, and Florida International University offer eco-adventures, science and STEM mini-camps.”
-Chelsea Wilkerson, CEO of Girl Scouts of Tropical Florida
- “Many girls never even try coding because they think it’s purely computational and not something where they can be creative. By infusing art into all of our coding lessons, we show them coding can be creative. That’s where Code/Art really stands out.”
-Amy Renshaw, CEO & Founder of Code/Art
- Our goal is to introduce girls from underserved communities in Miami to dynamic STEM experiences and ensure they are included in this growing field, where 93% of the positions have wages above the national average and annual salaries start around \$66,000.”
-Amaka Amalu, Founder of Tech Girl Power
- “Girls think about computer science, and that job looks and feels isolating—it doesn’t look like you’re working on things that are important. And when they turn on the TV or open up a magazine they don’t see coders who look like them,” Saujani said. “We want to create inspirational stories that they can see themselves in.”
-Reshma Saujani, Founder of Girls Who Code & [author of “Girls Who Code” books](#)

RESEARCH

SOURCES: National Sciences Foundation, MSCI, Credit Suisse, Proceedings of the National Academy of Sciences, Pew Research Center, Society of Women Engineers, Sociology of Education, National Girls Collaborative Project, Girl Scouts of the USA

Dive into some of the latest local, national, and international research about girls and women in engineering and STEM careers.

For perspectives on girls and STEM, look here:

- Girls' and young women's [achievement in mathematics and science is on par](#) with that of boys and young men.
- [Among high school seniors](#), 13% of girls cite plans for a career in a STEM field, compared to 26% of boys.

For data on college women and STEM, look here:

- [Women who enter college](#) planning to major in STEM fields change to non-STEM majors at a rate of 49.2%, whereas 32.5% of men do the same.
- [Perceived gender barriers](#) are still high for girls and may help explain why STEM fields aren't their top career choices.

For reports on women in the STEM workforce, look here:

- Women comprise [29% of the STEM workforce](#) and 52% of the college-educated workforce.
- On average, [starting salaries of women engineering graduates](#) were less than \$61,000 while those of men were more than \$65,000.
- The [median annual wage for architecture and engineering occupations](#) was \$79,840 in May 2021, which was higher than the median annual wage for all occupations of \$45,760.
- 50% of women in STEM jobs have faced [gender discrimination in the workplace](#), compared to 41% of women in all occupations.
- 30% of women who earn bachelor's degrees in engineering [are still working](#) in engineering 20 years later.
- 30% of women who have left the engineering profession cite [organizational climate](#) as the reason.
- Women make up [3% of STEM industry CEOs](#).
- The number of [women in board positions in STEM-related industries](#) in 2020 was 19.2%, an 18.3% increase over the previous year.
- The gender gaps are particularly high in some of the fastest-growing and [highest-paid jobs of the future](#), like computer science and engineering.

SPARKS

SOURCES: Harvard Business Review, Yale Scientific, TedEX, The Atlantic, The New York Times, Time, Apple Podcasts

Here are some articles, podcasts, and videos digging deeper into why girls and women are leaving engineering and STEM fields, and how we can keep them engaged.

For context on STEM education and girls, look here:

- [How to get more girls involved in STEM](#)
- [Making STEM more engaging and inclusive](#)

For viewpoints on STEM and the college and university world, look here:

- [How to attract more female engineers](#)
- [Inspiring the next generation of female engineers](#)
- [Science Is Soaring: Here's How To Pursue A STEM Career And Why It Matter](#)
- [Transforming Undergraduate Education in Engineering Phase IV](#)

For insights on STEM engineers and women in the workforce, look here:

- [Why do so many women leave the engineering field?](#)
- [What the statistics reveal about ongoing gender disparities](#)
- [What managers can do to keep more women in engineering](#)
- [The More Gender Equality, the Fewer Women in STEM](#)
- [15 Most Wanted Engineering Skills](#)

For female STEM role models, look here:

- [Ordinarily Extraordinary - conversations with women in STEM](#)
- [The Ella Project](#)

For opinions on the future of the workforce, look here:

- [One Decade One Millions More STEM Graduates](#)
- [Future of Work](#)
- [Perspectives: Future of Work](#)

For stories on organizations in Miami leading on STEM and engineering, look here:

- [Girl Scouts of Tropical Florida introducing girls to STEM](#)
- [Girls Inc.: Developing Girls interest in STEM](#)
- [STEM centers open at 3 Boys and Girls Clubs of Miami-Dade locations](#)
- [Building Bridges: South Florida mechanical engineer founds STEM nonprofit Tech Girl Power](#)

SOLUTIONS

Raising, recruiting, and retaining more girls and women in engineering and STEM-related careers will take all of us - parents, mentors, teachers, and managers - across the education and career lifespans.

Parents / Caretakers / Mentors

To be effective and long-lasting, STEM engagement needs to start early.

- Give girls role models. Seeing women who have succeeded in STEM helps inspire and motivate girls, especially when they can relate to these role models as people with lives outside of work.
- Teach them the skills they will need, encourage them, and show them that tech careers will help change the world for the better.
- Invite questions. Encourage girls' natural curiosity about the world – scientists and engineers are professional question askers and problem solvers. Even if you aren't comfortable with STEM, you can discover and learn together.

Schools / Nonprofits / Community-Based Organizations

Help her access STEM activities.

- Spark her interest. Give girls hands-on experiences to get in STEM clubs and activities. Organizations like [Girl Scouts of Tropical Florida](#), [Tech Girl Power](#), [Code/Art](#), [Dibia Dream](#), [Code Fever Miami](#), [Girls Who Code](#), and [Launch Code](#) are a good place to start.
- Engage her outside of school. Take advantage of spring and summer breaks and enroll girls in science and STEM camps. Check out [Miami-Dade County Parks, Recreation and Open Spaces](#), [Frost Science](#) and [Florida International University](#) offerings.
- Stand by her. Support their career intentions throughout their academic career.

Colleges / Universities

Keep engineering relevant.

- Enhance classroom content. Reframe the goals of engineering research and curriculums to be more relevant to societal needs.
- Build community. Encourage mentorship opportunities that establish a sense of “belonging” with their academic and professional colleagues
- Inspire self-efficacy. Foster positive, affirming experiences early in students' academic careers that will reverse negative stereotypes and gender biases.

Companies

Make the workplace a desirable one to work and thrive in.

- Encourage growth. Give women stretch assignments beyond their existing skill levels – inviting women to stand in for managers or high-status colleagues, take higher-level responsibilities, and/or take on new, challenging areas of work.

- Provide personalized feedback. Personalized feedback can help her overcome uncertainties around her work.
- Demonstrate work-life balance. Show them how work and parental responsibilities could be combined.

Government

Invest in STEM.

- Provide federal grants for programs in elementary school, middle school, and high school that would help create educational opportunities in STEM fields for girls.

ON THE HORIZON

SOURCES: FIU CEC, Miami Herald, Miami Dade College

Colleges, companies and investors are pouring funds into programs encouraging women and underrepresented communities toward tech studies.

- [Florida International University's \(FIU\) College of Engineering and Computing Knight Foundation School of Computing and Information Science \(KFSCIS\) has partnered with Break Through Tech](#) to develop programs that will propel women and underrepresented communities into technology degrees, careers and leadership positions. Part of the Gender Equality in Tech (GET) Cities Initiative, this partnership also will help expand the talent pipeline that is infusing South Florida's burgeoning tech ecosystem.
- [Backed by Bill Gates' investment company Pivotal Ventures, the Gender Equality in Tech program will partner with Florida International University](#) to direct female students in search of a major toward technology studies.
- [Miami Dade College's \(MDC\) School of Engineering and Technology \(EnTec\) will receive a three-year grant from the National Science Foundation](#) for nearly \$600,000 for the launch of MDC's Women RISE (Reinvigorating Industry Support & Empowerment) program, which will empower more women to enter emerging technology fields, such as cybersecurity, cloud computing, IoT and data analytics.

INFOGRAPHICS

Possible infographics to create

Infographic: The Equality Equation: Advancing the Participation of Women and Girls in Science, Technology, Engineering and Mathematics (STEM)

Source: World Bank

<https://www.worldbank.org/en/news/infographic/2021/04/19/the-equality-equation-advancing-the-participation-of-women-and-girls-in-science-technology-engineering-and-mathematics-s>

Highlights:

- Primary & Secondary education enrollment
- University enrollment & research
- Biases & Stereotypes at home, classroom, workplace
- What can be done

Women Making Gains in STEM Occupations but Still Underrepresented

Source: Census.gov

<https://www.census.gov/library/stories/2021/01/women-making-gains-in-stem-occupations-but-still-underrepresented.html>

Highlights:

- In 1970, women made up 38% of all U.S. workers and 8% of STEM workers. By 2019, the STEM proportion had increased to 27% and women made up 48% of all workers.
- Since 1970, the representation of women has increased across all STEM occupations and they made significant gains in social science occupations in particular – from 19% in 1970 to 64% in 2019.
- Women in 2019 also made up nearly half of those in all math (47%) and life and physical science (45%) occupations.
- However, women did not make as big gains in computer and engineering occupations, which made up the largest portion (80%) of the STEM workforce.
- Women represented only about a quarter of computer workers and 15% of those in engineering occupations.
- Women working in engineering occupations increased from 3% in 1970 to 15% in 2019. And while the percentage of women in computer occupations is higher than in 1970, it decreased between 1990 and 2019.
- Median earnings - Among the 70 detailed STEM occupations the Census Bureau reports on, women earned more than men in only one STEM occupation: computer network architects.

Society of Women Engineers

Source:

<https://alltogether.swe.org/2019/11/swe-research-update-women-in-engineering-by-the-numbers-nov-2019/>

Highlights:

- Freshmen Intentions to Major in Engineering, Math, Statistics, or Computer Science
- Women Leaving Engineering/STEM
- Degrees Awarded
- In the Workforce
- Top 10 Engineering Degrees for Women

Cracking the code: girls' and women's education in science, technology, engineering, and mathematics (STEM)

Source: UNESCO

<https://unesdoc.unesco.org/ark:/48223/pf0000253479>

Highlights:

- Current status of girls and women in STEM education and careers
- Factors influencing girls' and women's participation, progression, and achievement in STEM education
- Interventions that help increase girls' and women's interest in, and engagement with, STEM education

Generation STEM: What Girls Say about Science, Technology, Engineering, and Math

Source: Girl Scouts of the USA Research Institute

https://www.girlscouts.org/content/dam/girlscouts-gsusa/forms-and-documents/about-girl-scouts/research/generation_stem_full_report.pdf

Highlights:

- Girls Like STEM!
- The Creative and Problem Solving Aspects of STEM Draw Girls
- The DNA of a "STEM Girl" Sets Her Apart
- A Gap Exists between STEM Interest and Career Choice
- The Story Differs for African American and Hispanic Girls

The State of Women in Miami-Dade County Report

SOURCE: FIU Metropolitan Center

<https://metropolitan.fiu.edu/research/periodic-publications/miami-dade-county-gender-equity-report/the-status-of-women-in-miami-2019.pdf>

Highlights:

- In Miami, women were the majority in education, legal, community service, arts, and media (63.8%) and the healthcare practitioner and technical (66.5%) occupations. The smallest representation of women was in computer, engineering, and science (24.5%), which is a high wage, high-skill occupation.
- Earnings Gap for Architecture and engineering occupations - 24.3% in Miami (13.3% in U.S.)
- The percentage of young women with science and engineering degrees continues to grow – 44.8% in 2017, up from 39.1% in 2016 for the 25-39 age group.