HISPANIC-SERVING COMMUNITY COLLEGES
STEM PIPELINES

# STEM Completion at Hispanic-Serving Community Colleges

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This research brief focuses on STEM degrees conferred nationally by race and gender at three institutional types: Hispanic-Serving Community Colleges (HSCCs), which are 2-year institutions with 25% Hispanic student enrollment or more; Emerging HSCCs, which are 2-year institutions with 15% to 24.9% Hispanic student enrollment; and Non-HSCCs, which are institutions with less than 15% Hispanic student enrollment.

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## Introduction

The Hispanic-Serving Community Colleges STEM Pipelines (HSCC-STEM) study is a research project that explores the transitions to and through Hispanic-serving two-year institutions for underrepresented minoritized STEM students. The literature largely notes Hispanic-serving institutions (HSIs) as four-year colleges and universities (Garcia, 2018; Núñez, Crisp, & Elizondo, 2016). As the discourse primarily engages four-year-centered and full-time equivalent student enrollment framing of HSIs, this should not be the default given the critical influence of HSIs that are community colleges. Hence, there is intentionality in this project that explicitly references two-year HSIs given the nuance of minority-serving institutions (MSIs), in particular minority-serving community college (MSCC) contexts (Fox, Thrill, & Zamani-Gallaher, 2017). In order to better capture STEM pathway of underrepresented minoritized part-time students, thus, HSCCs are any associate degree granting postsecondary institutions that have at least 25% enrollment of Latinx full time and part time students.

This brief uncovers the most viable HSCC STEM pathways for Latinxs and other underrepresented minoritized students as well as which fields they are more likely to persist in and the promising practices at HSCCs that provide transfer pathways leading to further education—on ramps to STEM baccalaureates. The following information provides a national profile outlining STEM degrees conferred by race and gender in three types of institutions: HSCCs, which are institutions with 25% or more Latinx student enrollment; emerging HSCCs, which are institutions with 15% to 24% Latinx student enrollment; and non-HSCCs, which are institutions with less than 15% Latinx student enrollment.

## National Demographics

The demographic shifts happening in the nation have a direct impact on higher education, namely HSCCs and other MSIs. During the past several decades, the population of people of color has increased dramatically, especially with the continued arrivals of immigrants from Latin America and Asia. In 2015 the U.S. had an estimated total population of 316,515,021, with whites numbering about 197,258,278 (62%), followed by Latinxs (54,232,205; 17%), Black/African Americans (38,785,726; 12%), Asians (16,054,074; 5%), and American Indian and Alaska Native (2,078,613; .07%) (U.S. Census Bureau, 2011-2015).

Of the entire U.S. population, people of color represent almost 40%, which is critical for higher education and society in general. Projections by the Pew Research Center suggest that by 2044 more than half of all U.S. residents will belong to a racially underrepresented group (Colby & Ortman, 2014). Latinxs are the second fastest growing among all racial and ethnic groups in the U.S. and the youngest population with a median age of 28 in 2015 (Flores, 2017). Figure 1 shows the top 10 states with Latinx populations. The top three largest states with Latinx populations are California, Texas, and Florida, which account for 30.2 million (55.7%) of the Latinx population. The states listed below have a combined Latinx population of 42.9 million (79.1%). While this is important, the Latinx dispersion has touched virtually every state in the nation, thus increasing the number of higher education institutions with large percentages of Latinx student enrollment. Meanwhile, an analysis by the Pew Research Center suggests that Latinx dropouts have declined as college enrollment has increased (Krogstad, 2016). Though this trend is positive, Latinxs continue to lag behind other groups in attaining a college credential.

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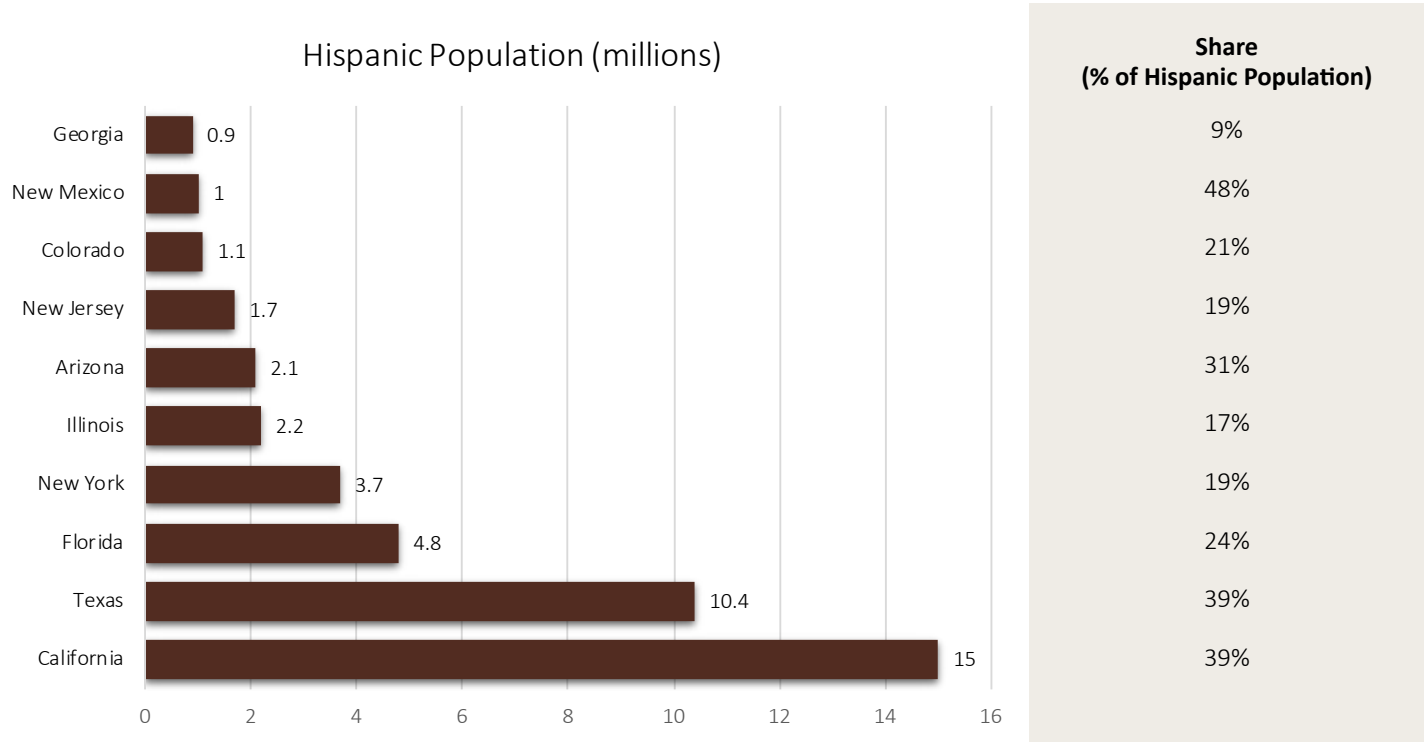



*Figure 1. 2014 Top 10 States by Latinx Population adopted from the Pew Research Center*

## Considering Institutional Type and Criteria for HSCCs

This brief contains 2015 data from the Integrated Postsecondary Education Data System (IPEDS). Two-year institutions were selected by using both the IPEDS and the Carnegie classifications. Three categories were used for the selection criteria of IPEDS: sector, highest degree offered, and institutional. Under the sector category we chose "two-year public," "private not-for-profit," and "private for-profit" options. In the highest degree offered category we selected the "associate's degree" option. As for the institutional category, we selected "degree-granting, associate's and certificates" and "degree-granting, not primarily baccalaureate or above" option. We obtained 1,623 institutions based on these criteria.

We used the category baccalaureate/associate's colleges in the selection criteria of Carnegie classification 2015 (Basic). Under the baccalaureate/associate's colleges category we chose the "associate's dominant," "baccalaureate/associate's colleges" and "mixed baccalaureate/associate's" options for a total of 403 drawn institutions.

Lastly, two datasets drawn from IPEDS and Carnegie classifications were merged and four overlapping institutions were deleted. Considering the high number of HSCCs in Puerto Rico, 23 institutions were included in our data while other institutions were not included. Therefore, a total of 2,022 institutions were obtained for this study. For the descriptive analysis, 1,998 institutions were used due to the exclusion of 18 institutions.

The demographic changes in the U.S. have affected the institutional characteristics of hundreds of higher education institutions. Out of 1,998 total community colleges in our data, there are 449 HSCCs, 217 emerging HSCCs, and 1,332 non-HSCCs. This means that 22.47% of community colleges have a Latinx student enrollment of at least 25% and that 10.8 of institutions have a Latinx enrollment of 15% to 24%. These institutions enroll almost 65% of all Latinx undergraduates but represent a small number of institutions (Excelencia in Education, 2018). Given the continuing increases in the Latinx population, these institutions will play an important role in educating Latinxs as well as other communities of color.

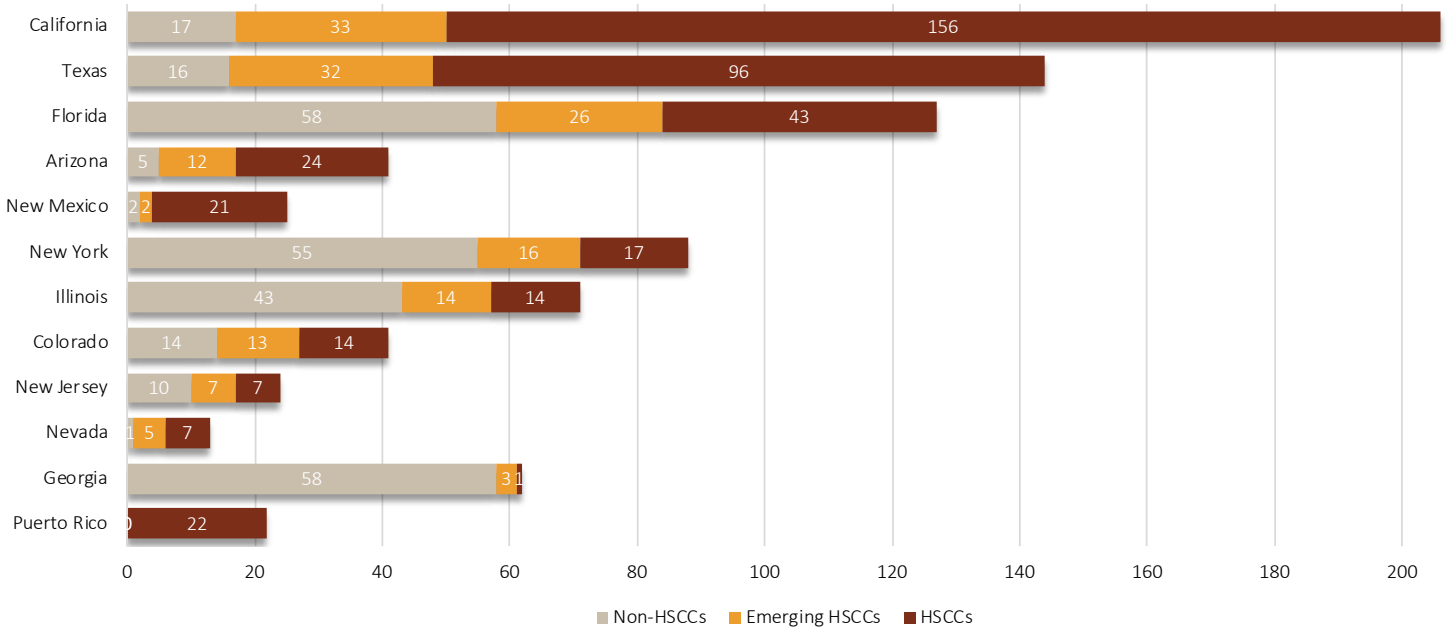



*Figure 2. Numbers of HSCCs in 11 states with high Latinx population and Puerto Rico (2014-2015)*

The data reveal a diverse number of institutional types. Among the 1,998 community colleges analyzed, there were 1,012 public, 174 nonprofit private colleges, and 812 for-profit private-institutions. In 1970, student enrollment at for-profit private colleges was 18,333. Over the past four decades, student enrollment at for-profit private institutions has increased to more than 1.8 million (Deming, Goldin, & Katz, 2012). Our data show that for-profit private schools account for 40.6% of community colleges nationwide. As for HSCCs, 46.3% of them are for-profit private schools and 46.0% of them are public. Within our data, HSCCs have a higher percentage of for-profit private institutions than the national average. While for-profit private schools have been linked to providing some opportunities for nontraditional and underrepresented student populations. However, they have also been linked to higher tuition costs, higher unemployment rates, and higher loan default rates compared to students and graduates at public institutions (Demin, Goldon, & Katz, 2012). Figure 2 shows the numbers of HSCCs in the 10 states with the highest Latinx population and Puerto Rico. The vast majority of HSCCs are in California, Texas, and Florida and account for 65.7% of the institutions. While these states contained the bulk of HSCCs, states such as Illinois and New York account for 6.9% of HSCCs and 13.8% of emerging HSCCs, respectively. This shows that HSCCs are not only located in the Southwest but also in the Midwest and Northeast.

**Table 1. Eligibility of HSCCs by control of institution**

| Control of institution (# of institutions) | Eligibility of HSCCs 2015 | | | |
|---|---|---|---|---|
| | Non-HSCCs | HSCCs | Emerging HSCCs | Total |
| | Count | Count | Count | |
| Public | 686 | 207 | 119 | 1,012 |
| Private not-for-profit | 123 | 34 | 17 | 174 |
| Private for-profit | 523 | 208 | 81 | 812 |
| **Total Institutions** | **1,332** | **449** | **217** | **1,998** |

## Minority-Serving Institution (MSI) Status of HSCCs

These demographic increases have resulted in many higher education institutions having multiple MSI designations. Two-year MSIs tend to be located in low-income areas and enroll a high proportion of underrepresented students, thus providing low-income students and students of color with access to postsecondary opportunities (Nguyen, Lundy-Wagner, Samayoa, & Gasman, 2015). Given that MSIs broaden higher education participation, they play a critical role in the national college completion goals (Harmon, 2012).

In our project, the MSI status was used to see whether there were other federal designations cross-listed with the HSI designation. We used the federal government designations for Asian American and Native American Pacific Islander institutions (AANAPISIs) and predominantly Black institutions (PBIs). At least 10% of Asian Americans and Native American Pacific Islander students are enrolled at AANAPISIs, while at least 40% of African-American or Black students are enrolled at PBIs (U.S. Department of Education, 2017).

Table 2 shows there were 211 HSCCs and emerging HSCCs with multiple MSI designations: 100 institutions are eligible for AANAPISI and 57 for PBIs. Among them, the Interactive College of Technology in Texas is the only institution designated as an HSCC, AANAPISI, and PBI. Among emerging HSCCs, two institutions are designated as AANAPISI and PBI simultaneously, and that includes the Interactive College of Technology-Chamblee in Georgia the Houston International College Cardiotech Ultrasound School. With demographics changing rapidly, institutions will serve a more diverse student body and must quickly adapt to serve these populations.

### Table 2. MSI designations by HSCCs Eligibility

| HSCCs Eligibility | AANAPISIs Eligibility | PBIs Eligibility | | Total |
|---|---|---|---|---|
| | | Non-PBIs | PBIs | |
| Non-HSCCs | Non-AANAPISIs | 1,016 | 274 | 1,290 |
| | AANAPISIs | 27 | 1 | 28 |
| Non-HSCCs Total | | 1,043 | 275 | 1,318 |
| HSCCs | Non-AANAPISIs | 359 | 23 | 382 |
| | AANAPISIs | 66 | 1 | 67 |
| HSCCs Total | | 425 | 24 | 449 |
| Emerging HSCCs | Non-AANAPISIs | 152 | 31 | 183 |
| | AANAPISIs | 31 | 2 | 33 |
| Emerging HSCCs Total | | 183 | 33 | 216 |
| Total | Non-AANAPISIs | 1,527 | 328 | 1,855 |
| | AANAPISIs | 124 | 4 | 128 |
| **National Total** | | **1,651** | **332** | **1,983** |

## HSCC Student Demographics

This section shows student demographics based on a 12-month enrollment period with an unduplicated headcount and degrees and awards conferred drawn from IPEDS. Figure 4 showcases the total student enrollment by race at community colleges nationally. In 2015 there were 11,512,995 students enrolled in two-year institutions in the U.S., with whites making up 48.01% of the total enrollment followed by Latinxs (21.10%), Black/African Americans (15%) and Asians (5%). Of the entire enrollment at two-year institutions, HSCCs enrolled 33% of students and emerging HSCCs enrolled 16% of students. In total, HSCCs and emerging HSCCs account for almost half of the total enrollment at community colleges. These community colleges, therefore, play a critical role in educating a diverse student body, including a substantial number of students of color.

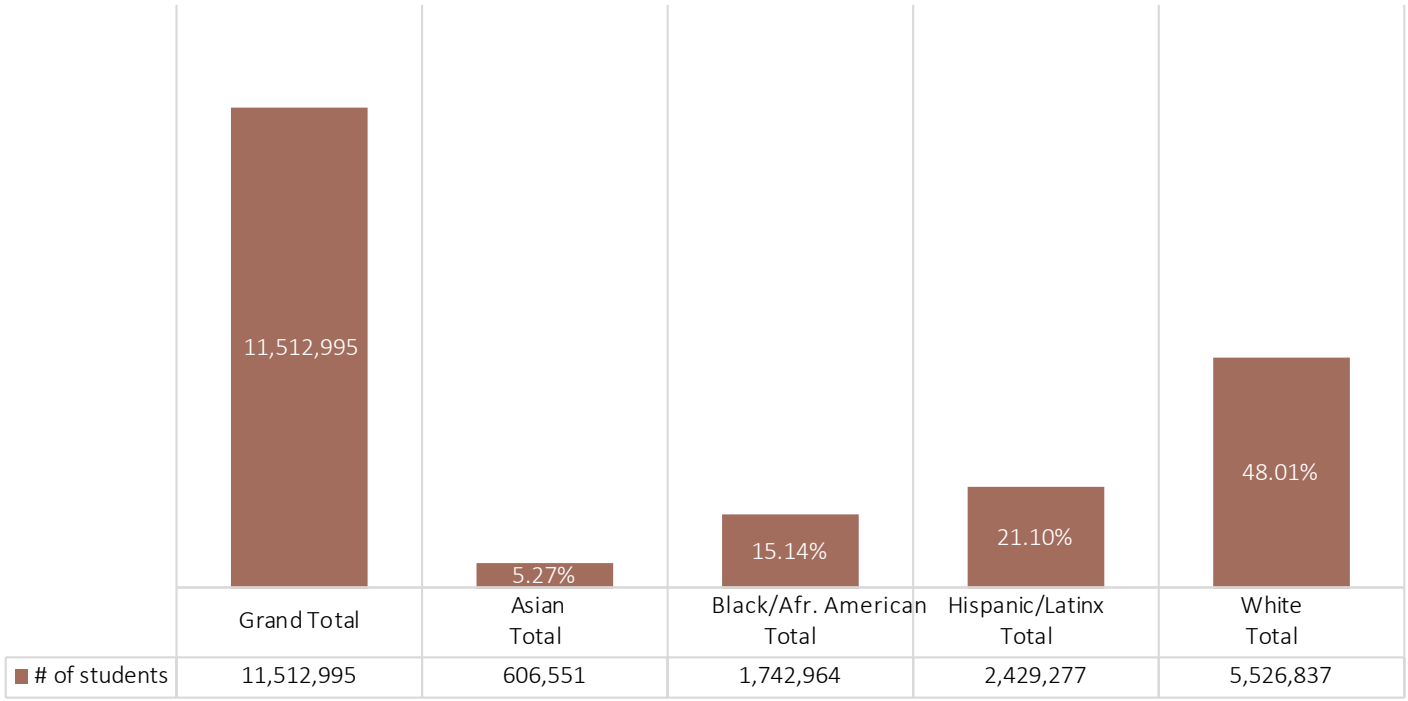



*Figure 3. 2015 Student demographics based on 12-month enrollment by race in the United States*

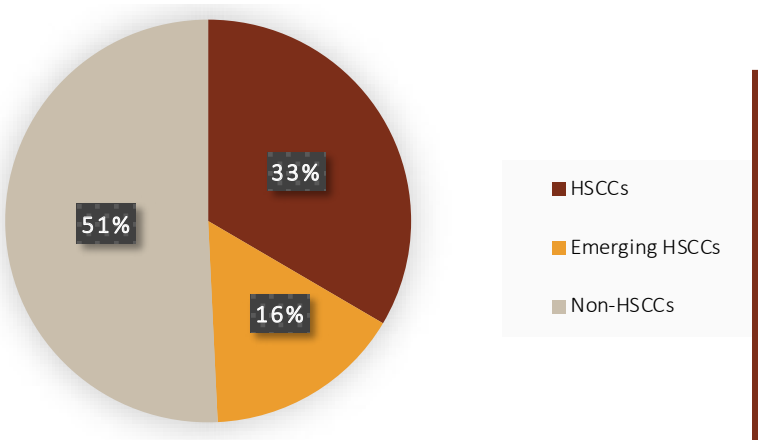



*Figure 4. 2015 Student demographics based on 12-month enrollment institutional type in the United States*

Figure 5 highlights the disproportionate gender enrollment in community colleges nationally. Of the 11,512,995 students enrolled at community colleges in the U.S., 57% were women and 43% were men. In general, women's enrollment was higher than men across racial groups.

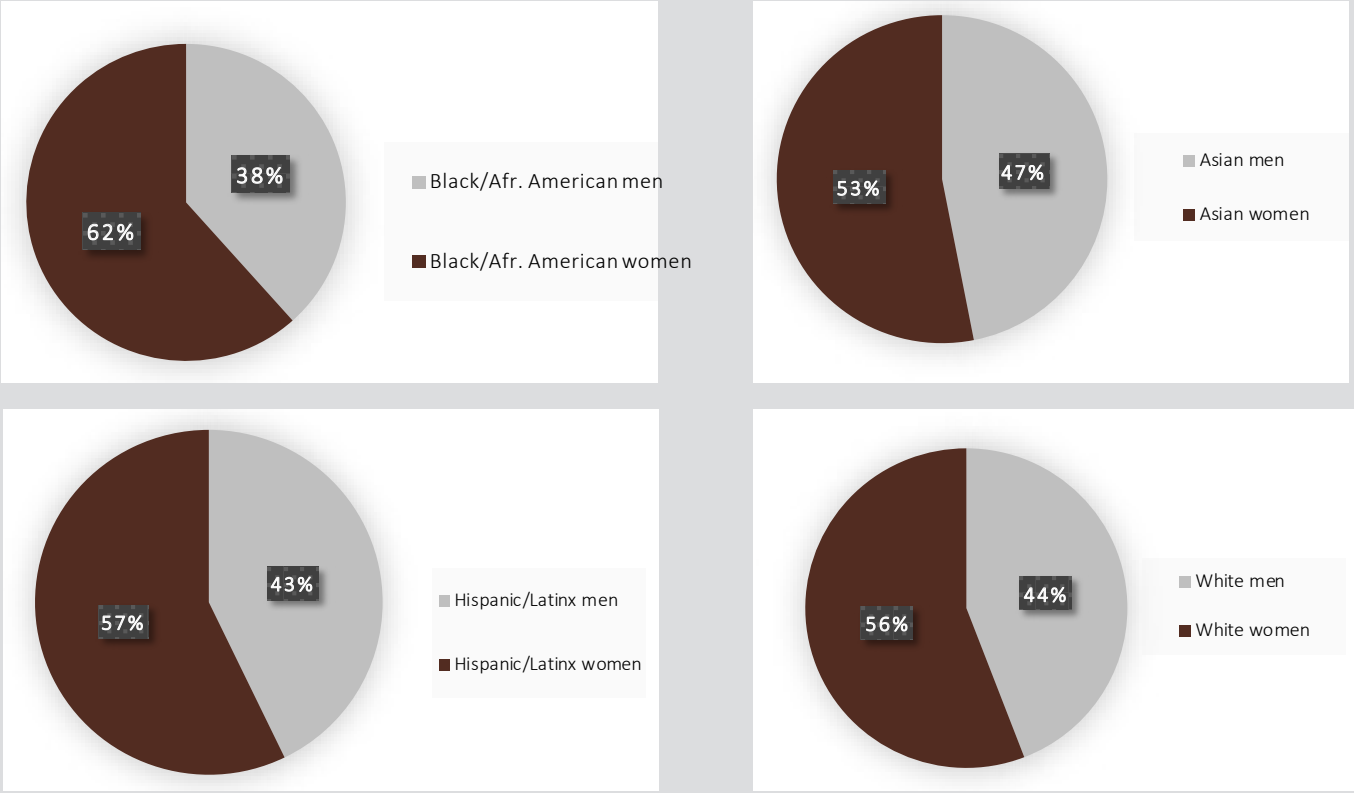
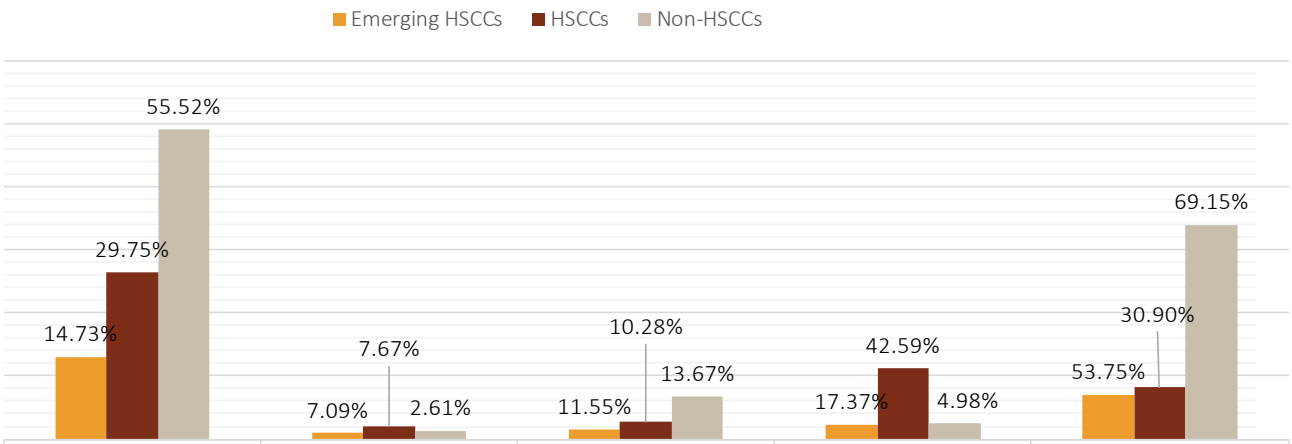



*Figure 5. 2015 National student demographics based on 12-month enrollment in the area of gender by race*

Figure 6-1 shows national degrees conferred by race in 2015. In terms of degrees and awards conferred in our data, there were 884,220 first major associate degrees conferred at community colleges. HSCCs awarded 29.75% associate degrees and emerging HSCCs conferred 14.73% degrees, which account for 44.48% of all associate's degrees conferred nationally. Furthermore, Latinx students earned 42.59% of their degrees at HSCCs and 17.37% at emerging HSCCs. Out of the total conferred degrees, Latinx students earned 159,135 (70.41%) at HSCCs.

Figure 6-2 shows quantified numbers of degrees conferred nationally by race and gender at different institution types. Of the total degrees conferred at community colleges in 2015, 60.64% were awarded to women and 39.36% were conferred to men. Our data show that in every racial group, women earned more associates degrees than men. Similar to our data, an analysis by the American Association of Community Colleges concluded that women have a higher completion rate at community colleges than men (Juszkiewicz, 2017).




| | Grand Total | Asian Total | Black Afr. American Total | Hispanic/Latinx Total | White Total |
|---|---|---|---|---|---|
| Emerging HSCCs | 130,217 | 9,236 | 15,039 | 22,619 | 69,987 |
| HSCCs | 263,089 | 20,179 | 27,037 | 112,054 | 81,284 |
| Non-HSCCs | 490,914 | 12,824 | 67,123 | 24,463 | 339,445 |

*Figure 6-1. 2015 National degrees conferred by race and institutional type including STEM*

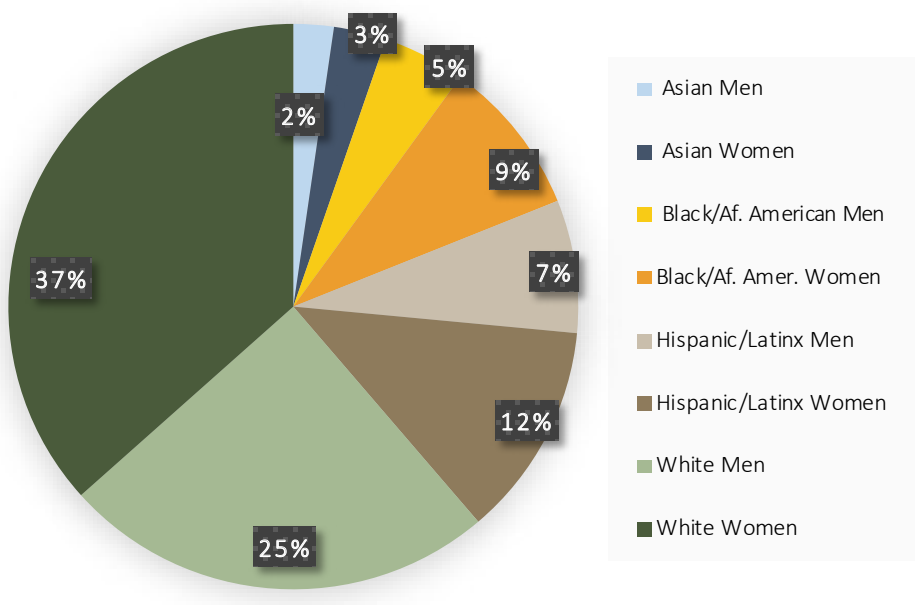



*Figure 6-2. 2015 National degrees conferred by gender and race including STEM*

## Participation in STEM by Race, Ethnicity, and Gender

Science, technology, engineering, and mathematics (STEM) programs were classified using the National Science Foundation (NSF) Classification of Instructional Program (CIP) Code Crosswalk for STEM disciplines (Louis Stokes Alliances for Minority Participation, 2018). By following the NSF LSAMP STEM category, STEM programs were aggregated into 11 STEM fields: agricultural sciences, natural resources and conversation, architecture, computer and information sciences, engineering, engineering technologies, biological sciences, mathematics, interdisciplinary studies, physical sciences, and business and management.

National STEM degrees that were conferred accounted for 11.41% (100,901) out of the total associate's degrees (884,220) awarded. Nationally, 34.67% of STEM degrees were awarded at HSCCs, 15.30% at emerging

HSCCs, and 50.03% at non-HSCCs. Of the national STEM degrees conferred, women earned 31.08% and men earned 69.92%. Considering the 6:4 ratio of women to men in the total associate's degrees conferred nationally, the 3:7 ratio of women to men in STEM-degree attainment shows the disparate gender gap in this area, which has important implications. For example, women account for more than half of the workforce yet hold less than a quarter of STEM employment, which pays significantly higher salaries than non-STEM degrees (Beede et al., 2017). More efforts must be implemented, therefore, to ensure that women are entering and graduating from STEM fields.

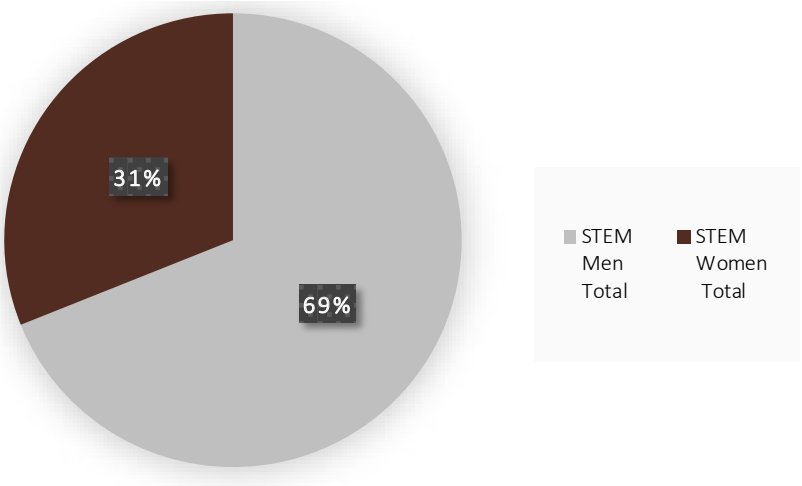



*Figure 7. National STEM degrees conferred by gender*

The summary below draws on the statistical portraits of HSCCs, emerging HSCCs, and non-HSCCs from the eight largest U.S. states with Latinx populations including Arizona, California, Colorado, Florida, Illinois, New Mexico, New York, Texas, and Puerto Rico.

## HSCCs

HSCCs awarded 245,534 total degrees in these eight states and Puerto Rico. Of the total degrees, 60% were conferred to women and 40% were awarded to men. STEM degrees represented 12.93% (33,036) of the total associate degrees. Latinxs were conferred the largest number of STEM degrees with 39.06%, followed by whites (32.79%), Asians (11.98%), and Black/African Americans (7.44%). Latinxs received almost four out of 10 STEM degrees conferred at HSCCs while Black/African Americans received the least STEM degrees. Out of the 33,036 STEM degrees conferred at HSCCs, men earned 59% and 41% were earned by women, despite women earning 60% of the total degrees awarded at HSCCs.

## Emerging HSCCs

In 2015 emerging HSCC institutions conferred 87,052 total degrees. Of the total degrees, 58% were earned by women and 42% were earned by men. STEM degrees represented 12% (10,561) of the total degrees awarded. Whites were the largest group with 52.50% STEM degrees conferred, followed by Latinxs (15.27%), Asians (12.24%), and Black/African Americans (9.55%). Whites received nearly 50% of STEM degrees in emerging HSCCs while Black/African Americans were conferred the least number of STEM degrees. Of the total number of STEM degrees conferred, 6,341 (60%) were earned by men and 4,220 (40%) were earned by women, even though women received nearly six out of 10 of the total degrees at emerging HSCCs.

## Non-HSCCs

Non-HSCC institutions awarded 91,891 total degrees, and of those, 61% were awarded to women and 39% were awarded to men. STEM degrees represent 10% (9,332) of the total degrees awarded. Whites were conferred the largest share of STEM degrees with 74.80%, followed by Black/African Americans (8.75%), Latinxs (5.03%), and Asians (2.00%). Whites were conferred almost three-quarters of STEM degrees, while Asians earned the least number of STEM degrees. Of the 9,332 STEM degrees awarded, 68% were conferred to men and 32% were conferred to women despite women earning more than 60% of the total degrees at non-HSCC institutions.

## Underrepresentation in STEM

Among the eight largest U.S. states with Latinx populations—Arizona, California, Colorado, Florida, Illinois, New Mexico, New York, Texas, and Puerto, Rico, seven STEM fields were dominant. The fields were biological sciences, computer and information sciences, engineering technologies, engineering, interdisciplinary studies, mathematics, and physical sciences.

Figure 8 highlights the STEM degrees conferred nationally and within the eight states and Puerto Rico. Of the 100,901 STEM degrees conferred nationally at two-year institutions, 52% of STEM degrees were awarded in eight states and Puerto Rico. Furthermore, 29% of the STEM degrees that students of color earned were conferred in two-year institutions in these eight states and Puerto Rico.

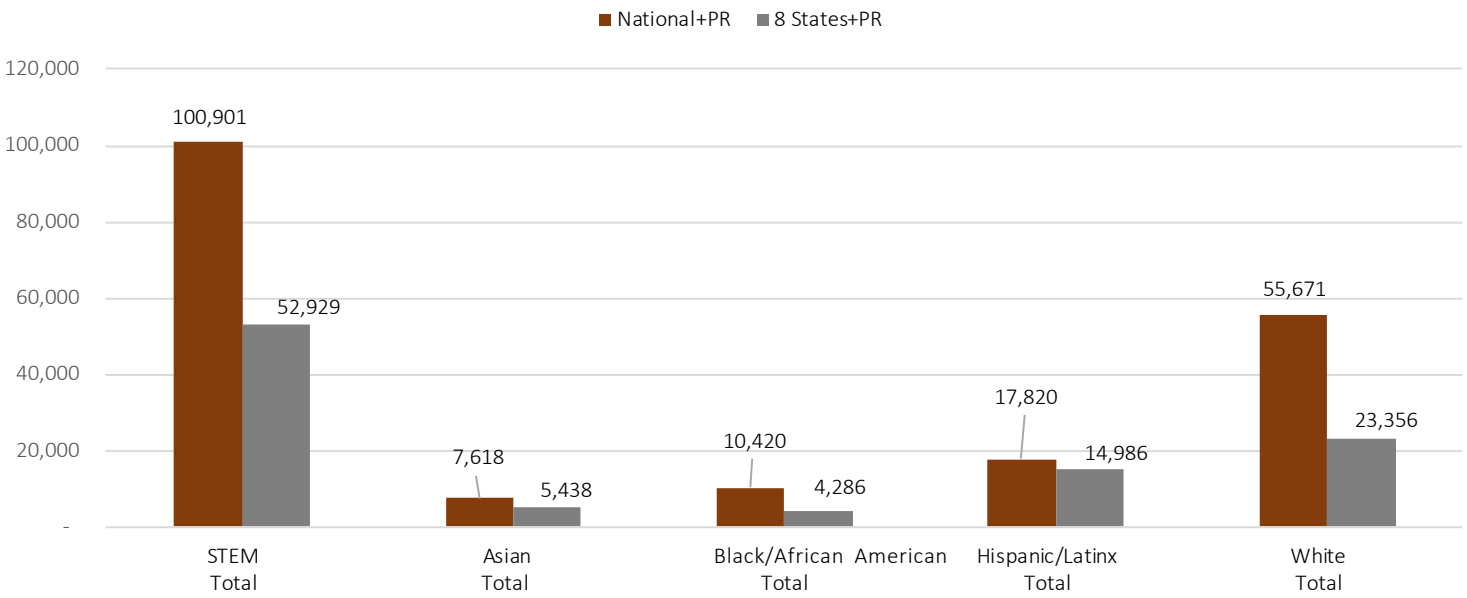



*Figure 8. Comparison of STEM degrees conferred by race between the national and eight states and Puerto Rico*

A significant gender gap exists in major STEM fields. Men earned 61.26% (32,851) and women earned 38.74% (20,776) STEM degrees in eight states and in Puerto Rico. In general, women received fewer STEM degrees than men (see Figure 10).

The top contributing STEM fields are interdisciplinary studies (20,292; 37.84%), computer and information sciences (10,745; 20.04%), engineering technologies (9,187; 17.13%), biological sciences (3,107; 5.79%), physical sciences (3,030; 5.65%), mathematics (2,310; 4.31%) and engineering (1,891; 3.53%). Specific information about the top three fields—interdisciplinary studies, computer and information sciences, and engineering technologies—is included in the following section.

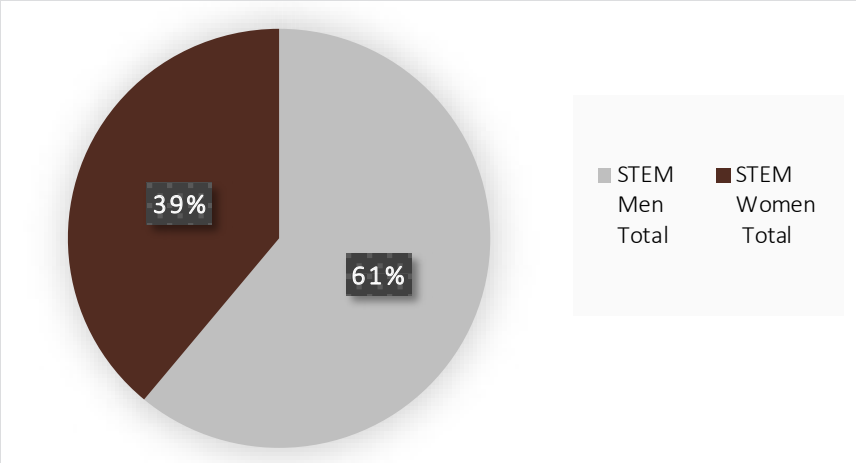



*Figure 9. STEM degrees conferred by gender in eight states and Puerto Rico*

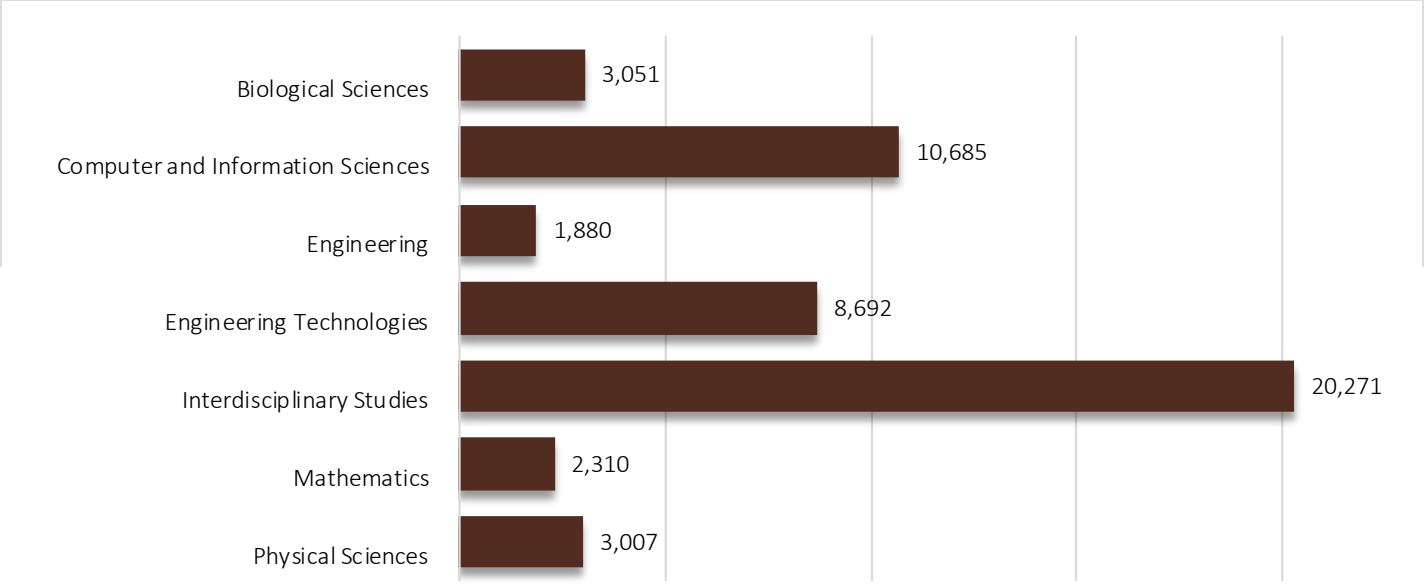



*Figure 10. Top contributing STEM fields in eight states and Puerto Rico*

## Table 3. Top contributing STEM fields by eligibility of HSCC institutions in eight states and Puerto Rico

| | Biological Sciences | Computer and Information Sciences | Engineering | Engineering Technologies | Interdisciplinary Studies | Mathematics | Physical Sciences |
|---|---|---|---|---|---|---|---|
| **Emerging HSCCs** | 661 | 2,301 | 284 | 1,341 | 4,277 | 454 | 865 |
| **HSCCs** | 2,317 | 5,505 | 1,125 | 5,102 | 13,002 | 1,822 | 2,122 |
| **Non-HSCCs** | 73 | 2,879 | 471 | 2,249 | 2,992 | 34 | 20 |
| **Total Sum** | **3,051** | **10,685** | **1,880** | **8,692** | **20,271** | **2,310** | **3,007** |

***Interdisciplinary Studies***

In 2015 there were 20,292 interdisciplinary studies degrees awarded. HSCC institutions conferred 13,002 (64.14%) degrees; emerging HSCC institutions conferred 4,277 (21.10%) degrees; and non-HSCC institutions conferred 2,992 (14.76%) degrees. Unlike other STEM fields, women earned more interdisciplinary studies degrees than men across different HSCC types in 2015, earning 11,955 (59%) degrees while men earned 8,316 (41%) degrees.

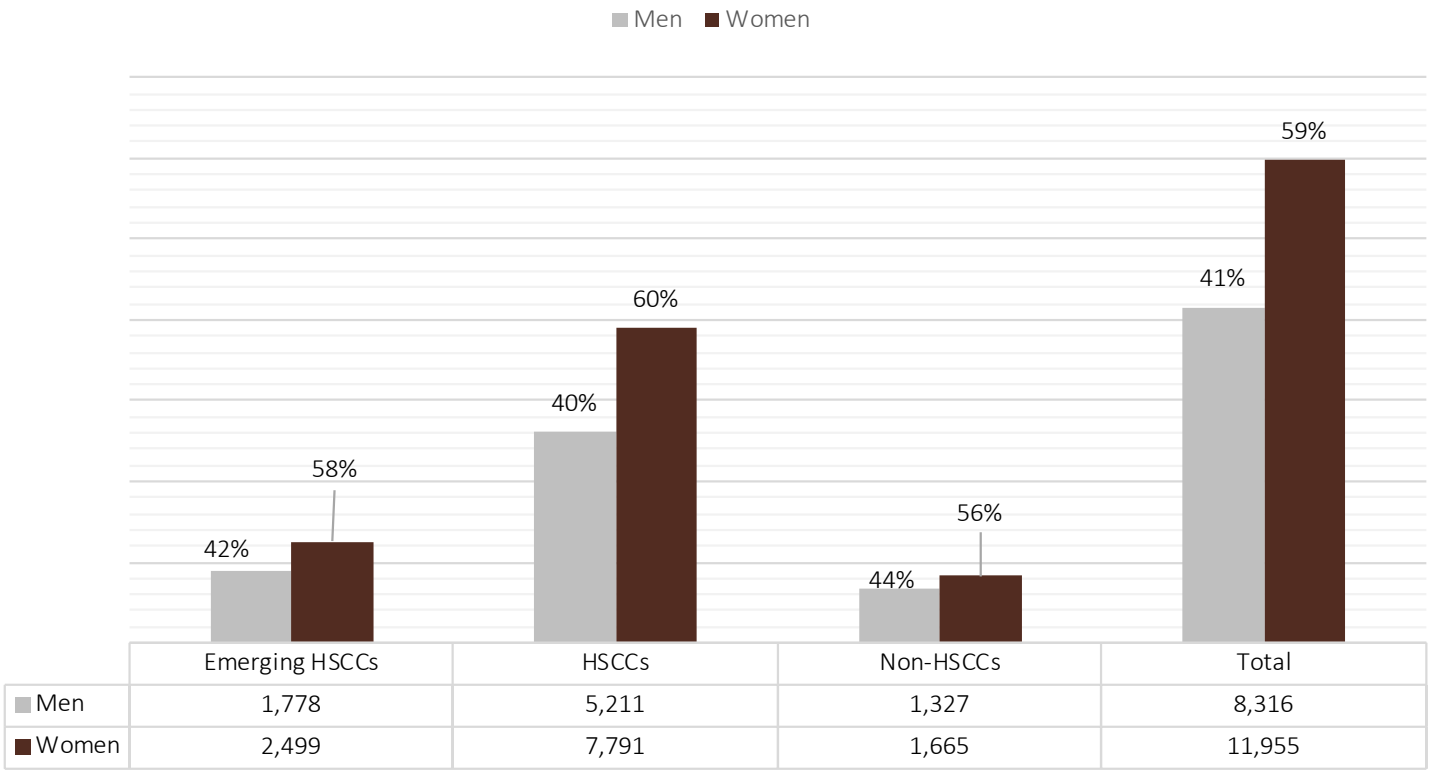
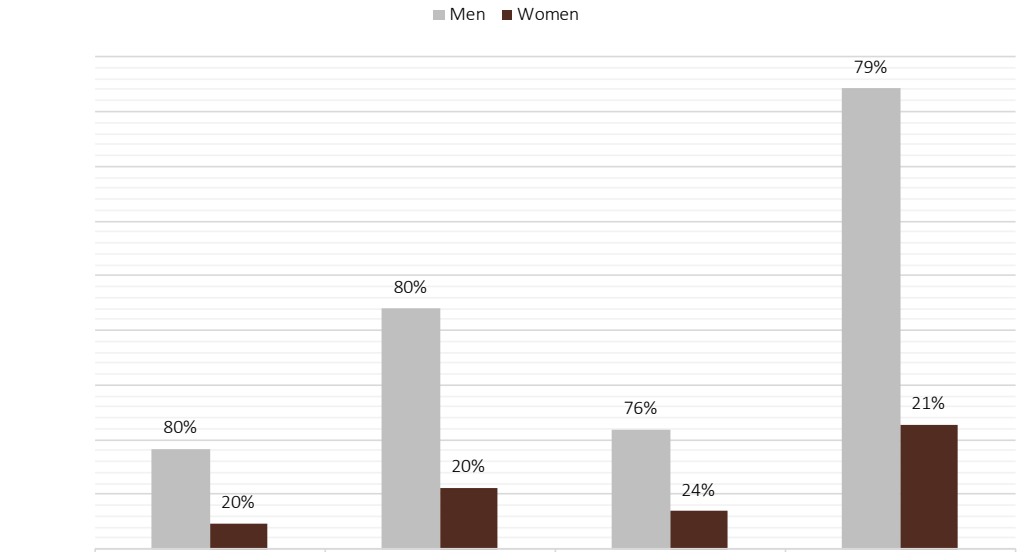



*Figure 11. Interdisciplinary studies degrees conferred by gender and institutional type*

### *Computer and Information Sciences*

In 2015 there were 10,685 computer and informational sciences degrees awarded by two-year community colleges. Of those, 5,505 (51%) were conferred by HSCCs. Non-HSCC institutions conferred 2,879 degrees (27%), and emerging HSCC institutions conferred 2,301 degrees (22%). There was a substantial gender disparity in the field of computer and informational sciences, with men earning 8,416 degrees (79%) and women earning 2,269 (21%) degrees.

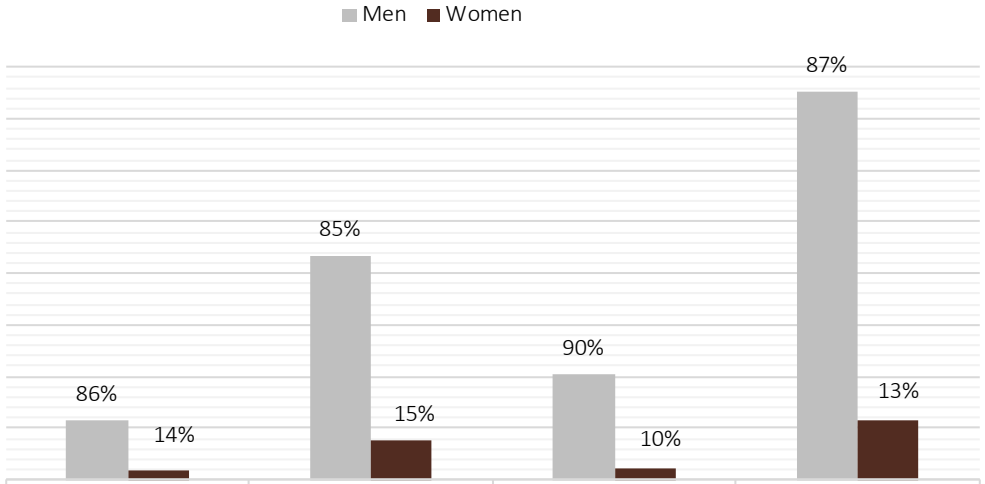



| | Emerging HSCCs | HSCCs | Non-HSCCs | Total |
|---|---|---|---|---|
| Men | 1,837 | 4,389 | 2,190 | 8,416 |
| Women | 464 | 1,116 | 689 | 2,269 |

*Figure 12. Computer and information sciences degrees conferred by gender and institutional type*

### *Engineering Technologies*

In 2015 there were 8,692 engineering technologies degrees awarded by two-year community colleges. HSCC institutions conferred 5,102 (56%), followed by non-HSCC institutions (2,249; 24%), and emerging HSCC institutions (1,341; 20%). Women earned fewer engineering technologies degrees (1,161; 13%) compared to men (7,530; 13%).




| | Emerging HSCCs | HSCCs | Non-HSCCs | Total |
|---|---|---|---|---|
| Men | 1,151 | 4,344 | 2,035 | 7,530 |
| Women | 190 | 758 | 214 | 1,162 |

*Figure 13. Engineering technologies degrees conferred by gender and institutional type*

## Summary

Community colleges conferred a total of 427,081 degrees in the aforementioned eight states and Puerto Rico. The STEM degrees that were conferred account for 12.56% (52,929). Whites earned 44.13% (23,356) of STEM degrees followed by Latinxs at 28% (14,986), Asians at 10.27% (5,438), and Blacks (8.10%; 4,286). There were four key takeaways from this national narrative:

- Of the STEM degrees earned by Latinxs, 86% were awarded by HSCC institutions. These numbers suggest that HSCCs are a point of access for Latinx students, especially when it comes to conferring STEM degrees in the aforementioned eight states and in Puerto Rico.
- Of the total STEM degrees conferred in the aforementioned eight states and in Puerto Rico, HSCCs represented 62.42%, followed by emerging HSCCs (19.95%). Together, HSCCs and emerging HSCCs awarded 82.37% of STEM degrees, showing that these institutions play an important role in awarding STEM degrees in the aforementioned eight states and in Puerto Rico.
- HSCC institutions had the largest percentage of STEM degrees (33,036; 13.45%) out of a total of 245,534 associate degrees conferred by HSCCs to total degrees compared to emerging HSCCs and non-HSCCs.
- In terms of gender, there is an overwhelming gap in every institutional type. Though women earned the majority of total degrees (60.64%), they continue to lag behind men in earning STEM credentials (38.74%). While HSCCs and Emerging HSCCs play a crucial role in awarding STEM credentials to Latinx students when it comes to gender, there are disparities present in every institutional type. Therefore, institutions should pay special attention to and address these gender inequities in STEM-degree enrollment and attainment.

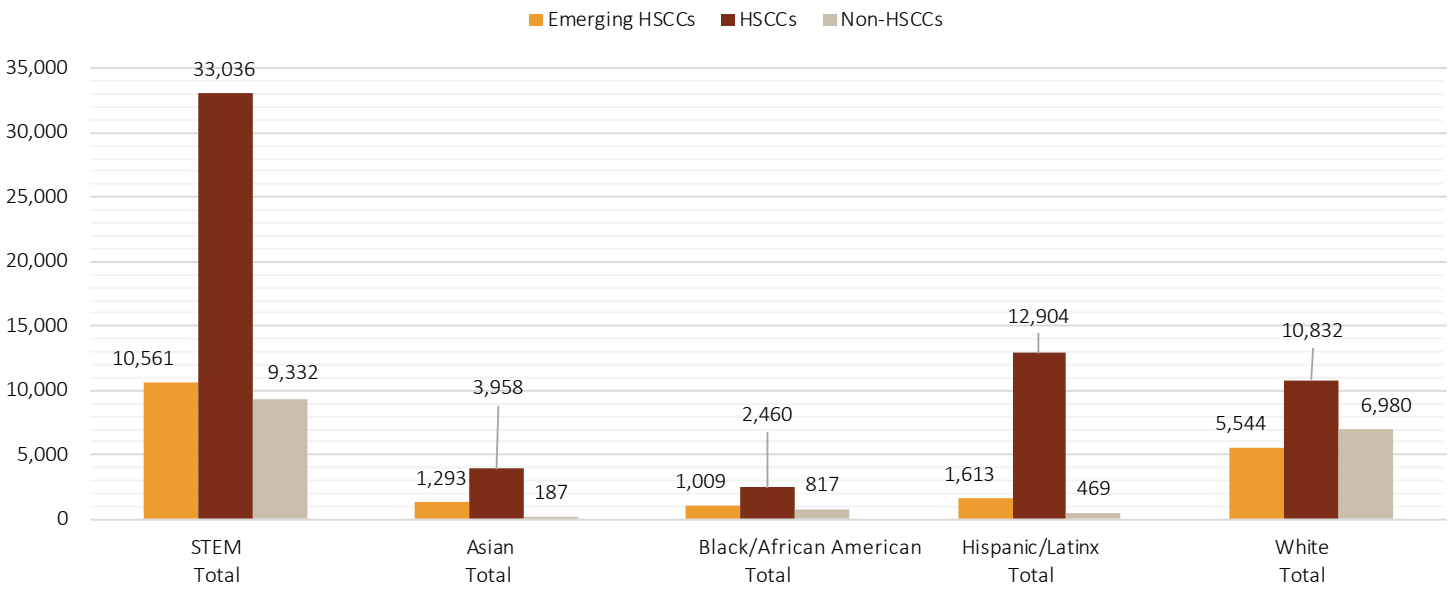



*Figure 14. STEM degrees conferred by race and institutional type in eight states and Puerto Rico*

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**Notes.**

1. Racial/ethnic categories in the data followed the IPEDS categories using their data collection and reports. The groups used to categorize are as follows: Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, Hispanic, White, two or more races, race/ethnicity unknown, nonresident alien. Among these, this research focused on four groups: Blacks or African Americans, Hispanic Americans or Latinx, and White Americans. In addition, this research intentionally identified Black/African American and Hispanic as Latinx (i.e., gender nonconforming) and all groups included in this analysis to reflect domestic racial/ethnic diversity, not international student enrollments.
2. The percentage and racial/ethnic groups in the figures and text do not add up to 100% due to the exclusion of other racial and ethnic groups.

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