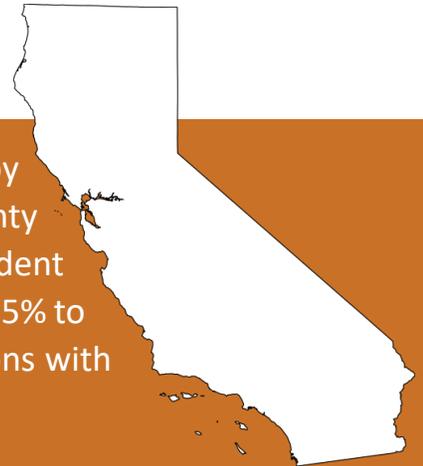


STEM Degree Attainment at Hispanic-Serving Community Colleges in California

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This research brief focuses on STEM degrees conferred in California 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.



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 due to the nuance of minority-serving institutions (MSIs) and in particular minority-serving community college (MSCC) contexts (Fox, Thrill, & Zamani-Gallaher, 2017). Thus, in order to better capture STEM pathway of underrepresented minoritized part-time students, HSCCs are any associate degree-granting postsecondary institutions that have at least 25% enrollment of full- and part-time Latinx students (Zamani-Gallaher, Yeo, Velez, Fox, & Samet, 2019).

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 that have a Latinx enrollment rate of less than 15%.

State Demographics

The unprecedented population growth in California has mostly been driven by immigration for the past four decades. In 1960, the population was estimated to be almost 16 million people. Today, California holds the largest population in the country (Bird et. al., 2019). In 2015, there was an estimated population in California of 38,421,468 people. In 2015, Whites were about 14,879,258 (38.7%) of the total population, followed by Latinxs (14,750,686 or 38.4%), Asians (5,192,548 or 13.5%), and Blacks/African Americans (2,160,795 or 5.6%) (U.S. Census Bureau, 2011-2015). People of color represent more than 60% of the population, thus providing an important reminder of the demographic shifts happening in the U.S..

California has an even more unique demographic context since there is no racial or ethnic majority group. Actually, Latinxs have overtaken Whites as the largest ethnoracial group in California, while Asians are the fastest growing population (Bird et. al, 2019). These population circumstances are crucial for understanding higher education access and opportunity, especially in the STEM fields, for Latinxs and other historically underrepresented groups. An analysis done by the Public Policy Institute of California emphasizes that Latinx and Blacks/African American graduates of high school have increased dramatically in the last decade (Gao, Lopes, & Lee, 2017), a positive trend. However, these groups still lag behind Asians and Whites in high school graduation and college attainment (Johnson, Cuellar Mejia, and Bohn, 2018). Projections show that California will continue to become more diverse and have an increased population over the next three decades, and higher education will play a major role in its economy (Bird et. al., 2019).

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Postsecondary Context and the HSCC Landscape

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. The options selected in each category are “two-year public,” “private not-for-profit,” and “private for-profit” in the sector category; “associate’s degree” option in the highest degree offered category; “and degree-granting, associate’s and certificates” and “degree-granting, not primarily baccalaureate or above” options in the institutional category. Based on these criteria, 1,623 institutions were obtained.

A category labeled “baccalaureate/associate’s colleges” was selected in the Carnegie classification 2015 (Basic). The “associate’s dominant,” “baccalaureate/associate’s colleges,” and “mixed baccalaureate/associate’s” options were chosen 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 institutions in other U.S. territories were not included. Thus, a total of 2,022 institutions were obtained for this study. For the descriptive analysis, 1,998 institutions nationwide were used due to the exclusion of 18 invalid institutions. This brief focuses on 206 community colleges in California.

Institutional Type

The demographic growth during the past three decades has changed the higher education landscape in California. Out of the 1,998 total community colleges in our data, California was home to 206 two-year institutions. From this number, 156 were identified as HSCCs, 33 as emerging HSCCs, and 17 as non-HSCCs. This indicates that 76% of community colleges have an enrollment rate of at least 25% of Latinx students and 16% have an enrollment rate of 15% to 25% of Latinx students. Combined, these two institutional types account for more than 90% of community colleges in California. Furthermore, out of the 449 HSCCs and 217 emerging HSCCs nationally, California is home to nearly 35% of HSCCs and 15% of emerging HSCCs. Given the large Latinx population in California, the substantial number of HSCCs and emerging HSCCs is not surprising.

Table 1. Eligibility of HSCCs by control of institution in California

Control of institution	Eligibility of HSCCs 2015 in California			
	Non-HSCCs Count	HSCCs Count	Emerging HSCCs Count	Total
Public	2	92	22	116
Private not-for-profit	2	5	2	9
Private for-profit	13	59	9	81
Total Institutions	17	156	33	206

Over the past three decades, there has been a significant increase nationally in private for-profit institutions (Deming, Goldin, & Katz, 2012). In our data, a similar proportion of institutional control was shown within the California context as well. Overall, the data reveal a diverse number of institutional types. Table 1, for example, shows the control of institutions and HSCC eligibility in California. Within this context, there were 116 public institutions (56%), 81 private for-profit institutions (39%), and 9 private not-for-profit institutions (5%). When it comes to HSCCs in California, 59% of institutions are public, 38% are private for-profit, and 3% are private not-for-profit, numbers that are similar to the total California data. In California, almost six out of 10 two-year institutions are public, thus playing a substantial role in the education of Latinx and other underrepresented students.

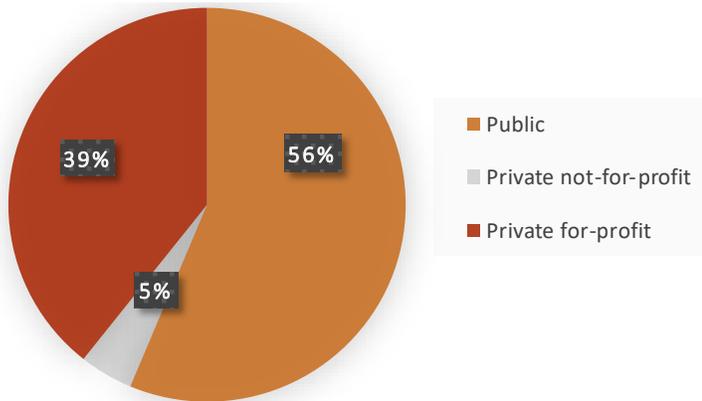


Figure 1-1. Community colleges by control of institution in California

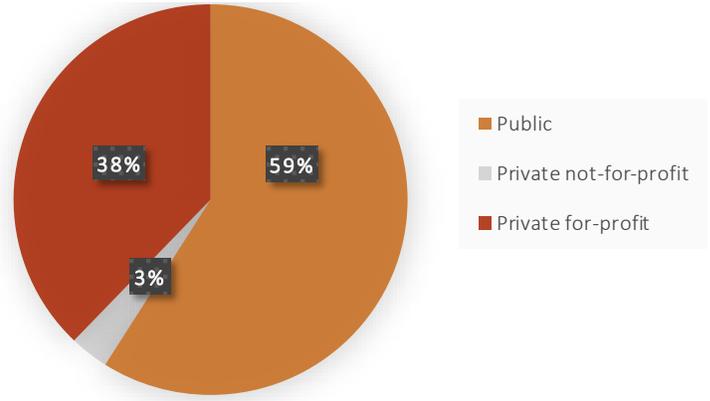


Figure 1-2. HSCCs by control of institution in California

Minority-Serving Institution Status at HSCC and Emerging HSCCs

Given that California is a majority-minority state, in which people of color comprise most of the population, many higher education institutions may hold multiple Minority-Serving Institution (MSI) designations. MSIs are often located in low-income areas and enroll underrepresented students of color and are therefore essential in providing access to postsecondary opportunities and broadening participation (Nguyen, Lundy-Wagner, Samayoa, & Gasman, 2015; 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-serving institutions (AANAPISIs) and predominantly Black institutions (PBIs). AANAPISIs have at least 10% of Asian- American and Native American Pacific Islander student enrollment, while PBIs have at least 40% of African-American or Black student enrollment (U.S. Department of Education, 2017).

Table 2 shows the MSI designations by HSCC eligibility. In California, 73 institutions were designated as AANAPISIs and two as PBIs out of the 206 two-year institutions. Basically, one out of every three community colleges in California are AANAPISIs, which are known for enrolling the bulk of low-income Asian-American and Pacific Islander students (Teranishi, 2011). Out of the 156 HSCCs, 53 were identified as AANAPISIs, which means that over 33% of HSCCs are also AANAPISIs.

Furthermore, out of the 73 AANAPISIs in California, 53 were identified as HSCCs, which indicates that 72% of AANAPISIs are also HSCCs. There was only one PBI cross-listed as an HSCC. The important information to note here is that institutions of higher learning, especially those enrolling a high proportion of low-income students and students of color are essential for the access and success of minoritized students. Given the history of two-year institutions providing access and opportunity for marginalized populations, they will continue to play a crucial role in credential attainment, especially when it comes to the transfer function.

Table 2. MSI designations by HSCCs Eligibility in California

HSCCs Eligibility	AANAPISIs Eligibility	PBIs Eligibility		Total
		Non-PBIs	PBIs	
Non-HSCCs	Non-AANAPISIs	16	0	16
	AANAPISIs	1	0	1
	Total	17	0	17
HSCCs	Non-AANAPISIs	102	1	103
	AANAPISIs	53	0	53
	Total	155	1	156
Emerging HSCCs	Non-AANAPISIs	13	1	14
	AANAPISIs	19	0	19
	Total	32	1	33
California Total	Non-AANAPISIs	131	2	133
	AANAPISIs	73	0	73
	Total	204	2	206

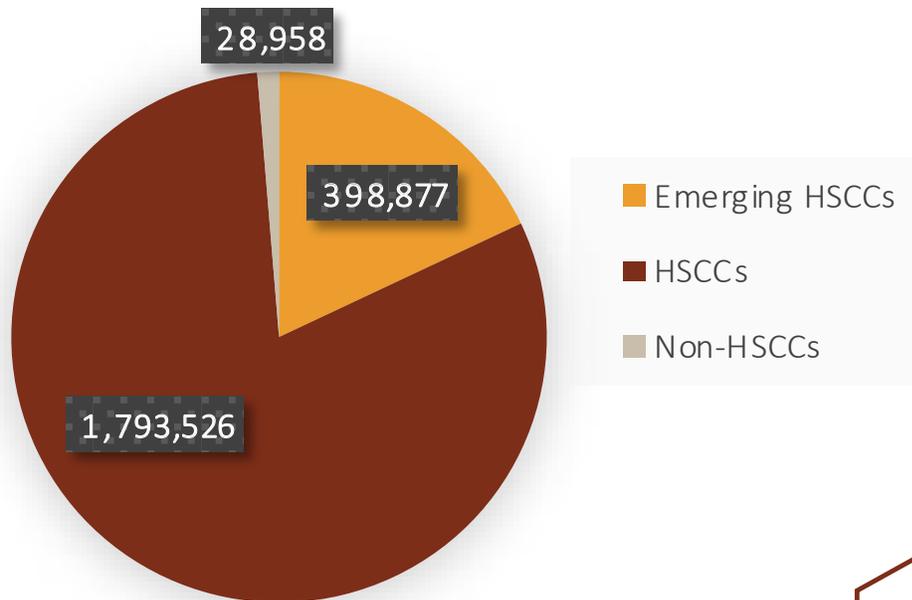
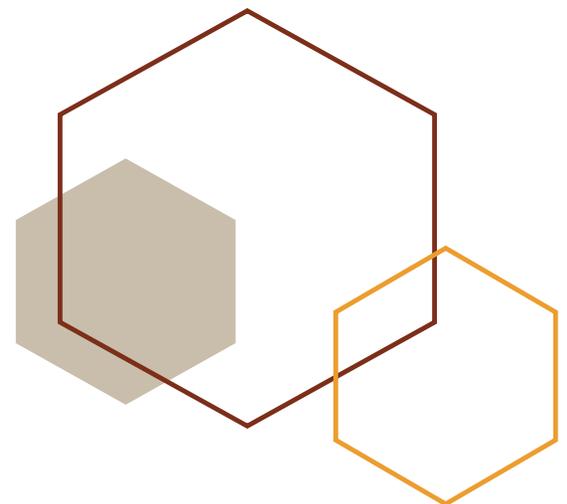


Figure 2-1. 2015 total student enrollment in community colleges based on 12-month enrollment by institutional type in California



2015 Student Demographics Based on 12-month Enrollment by Race in California

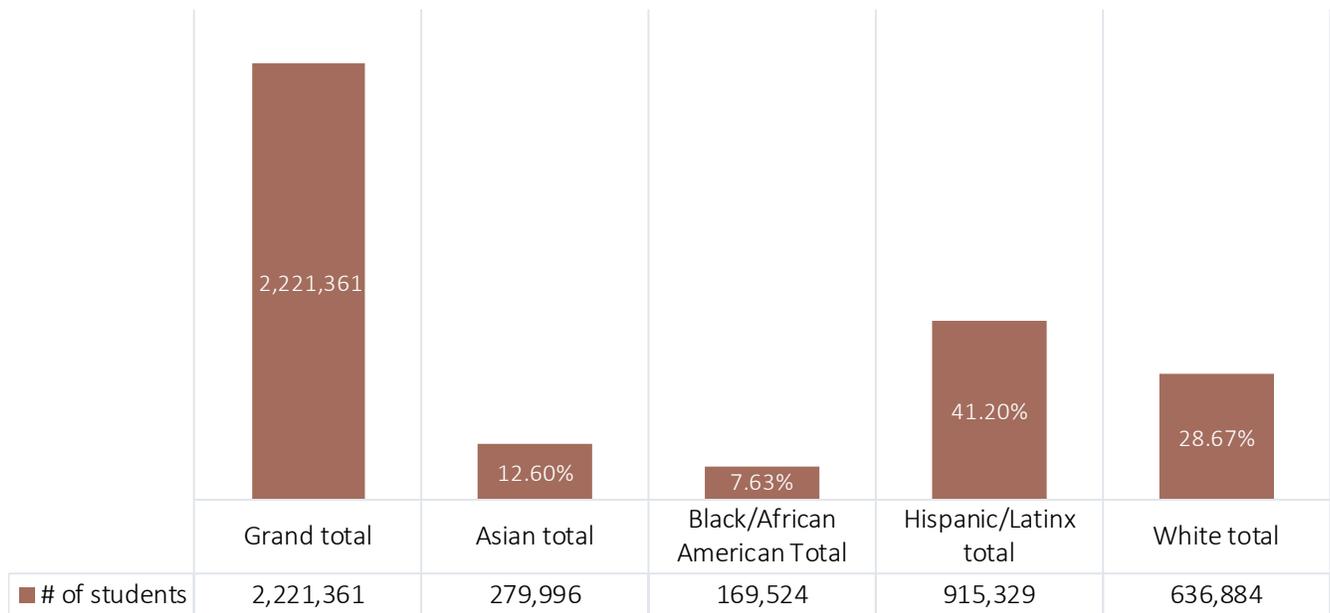


Figure 2-2. 2015 Student racial demographics based on 12-month enrollment in California

HSCC Student Demographics

In this section, the student demographics are described based on a 12-month enrollment period, with an unduplicated headcount and degrees/awards conferred drawn from IPEDS. Figure 2 highlights the total student enrollment at community colleges in California by race. In 2015 there were 2,221,361 students enrolled in two-year institutions in California. Despite representing only 12% of the national population, the state enrolled 19% of community college students nationally. In California most students are enrolled in HSCCs (81%), followed by emerging HSCCs (18%). Taken together, HSCCs and emerging HSCCs enrolled nearly 99% of the students in two-year institutions in the state. Latinx students represent 41% of the total enrollment, followed by Whites (29%), Asians (13%) and Blacks/African Americans (8%). Given that HSCCs enroll most of the college students in California, they play a critical role in meeting the needs of a changing economy (Johnson, Cuellar Mejia, and Bohn, 2018).

Figure 3 depicts the 2015 student enrollment by gender and race in California. Out of the total students enrolled in the state, 53% were women and 47% were men. In general, the enrollment of women was slightly higher than that of men across racial groups, especially among Latinx and Blacks/African Americans. The gender gap among Latinxs and Blacks/African Americans was 10%, while there was only a 4% gender gap for Whites and Asians. Overall, men of color continue to trail every racial demographic when it comes to enrollment rates.

Figure 4-1 and 4-2 highlight the total degrees conferred by institutional type and race in California in 2015. In terms of conferred degrees and awards in our data, there were 125,011 first-major associate degrees conferred at community colleges in 2015. Across institutional types, HSCCs granted 103,490 (83%) degrees, followed by emerging HSCCs (15%), and non-HSCCs (2%). In California, Latinxs earned a total of 48,507 (39%) degrees, followed by Whites (32%), Asians (15%), and Blacks/African Americans (6%). Specifically, Latinxs earned 91% of their degrees at HSCCs, 8% at emerging HSCCs, and .4% at non-HSCCs (see Figure 4-2). Latinxs earned almost four out of 10 degrees conferred by community colleges in California. Out of the total degrees conferred, women earned 74,683 (60%) and men earned 50,328 (40%).

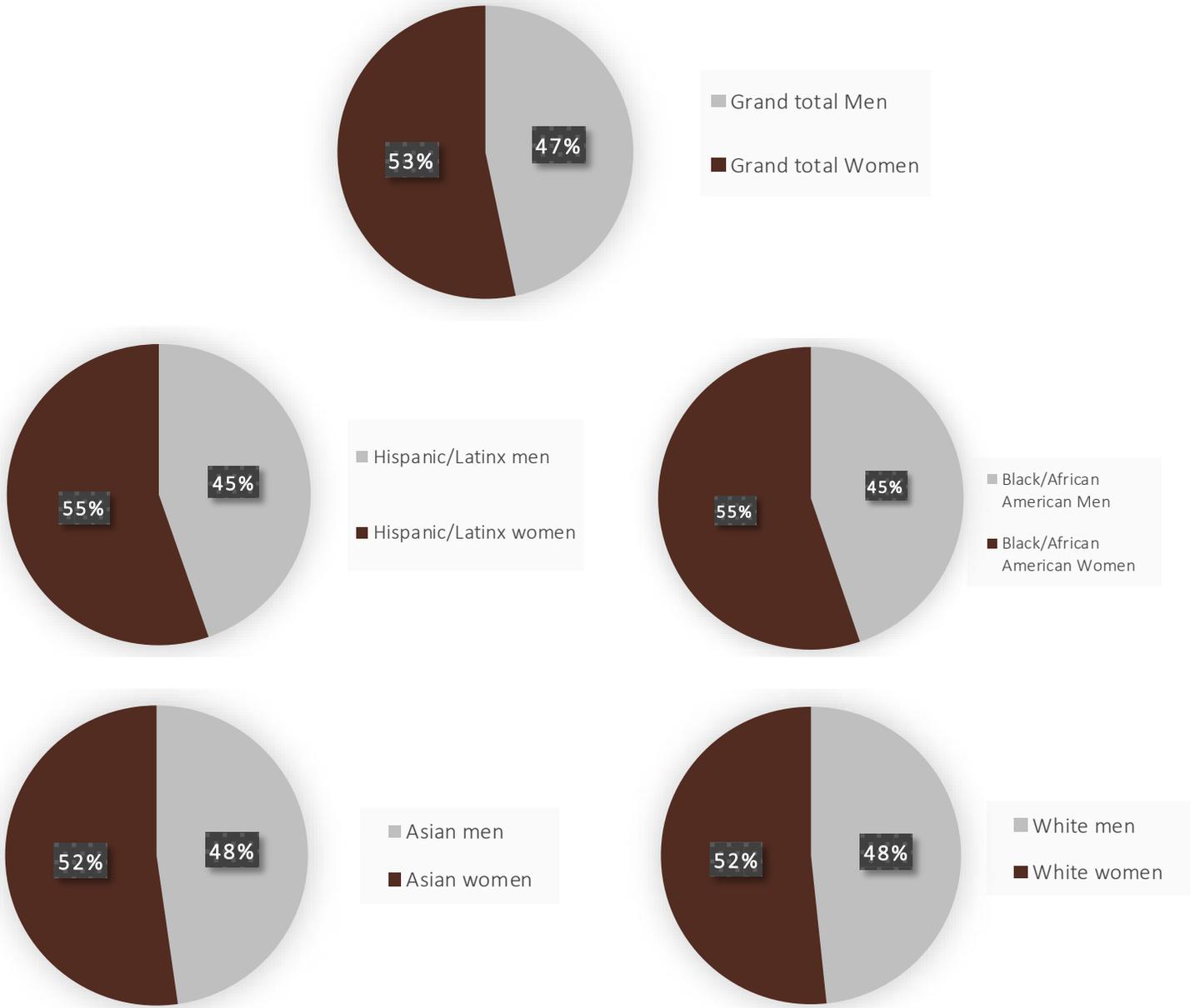


Figure 3. 2015 Student demographics by gender and race in California

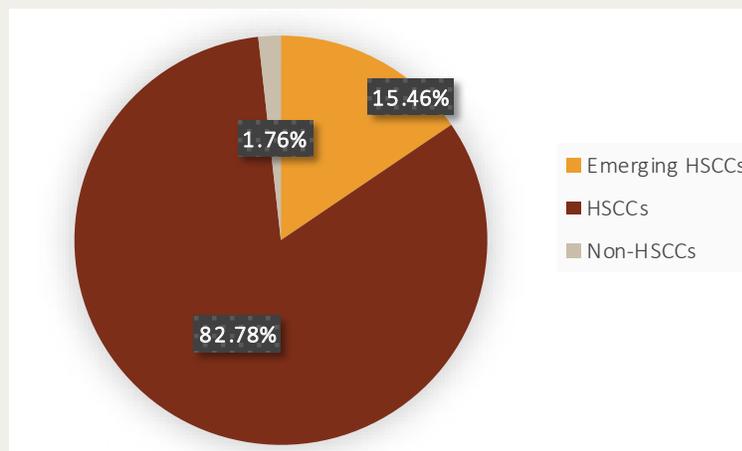
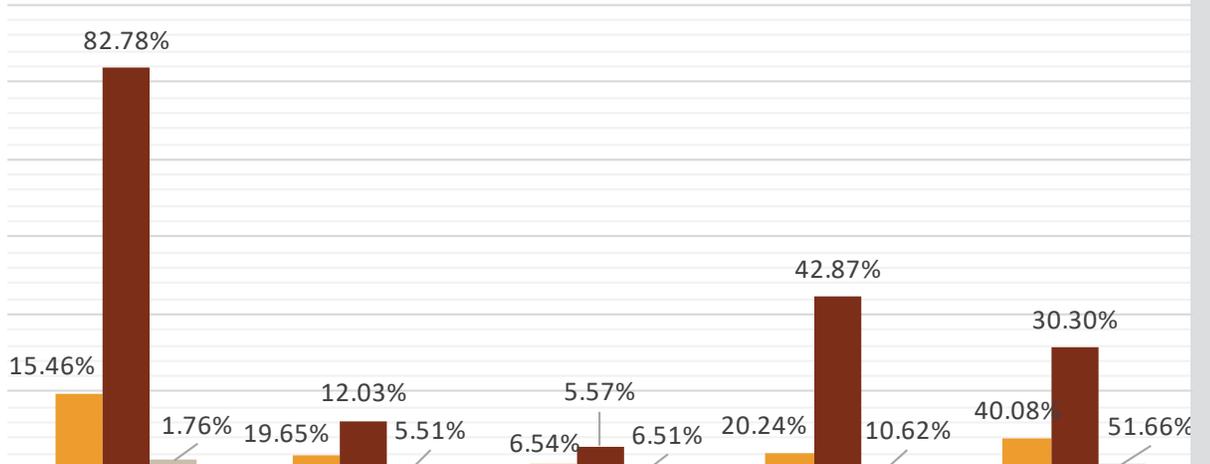


Figure 4-1. 2015 First major total associate degrees conferred by institutional type in California



2015 Total Degrees Conferred by Race at HSCCs in California

Emerging HSCCs HSCCs Non-HSCCs



	Grand Total	Asian Total	Black/African American Total	Hispanic/Latinx Total	White Total
Emerging HSCCs	19326	3798	1264	3912	7745
HSCCs	103490	12450	5761	44362	31359
Non-HSCCs	2195	121	143	233	1134

Figure 4-2. 2015 First-major total associate degrees conferred by race and institutional type in California

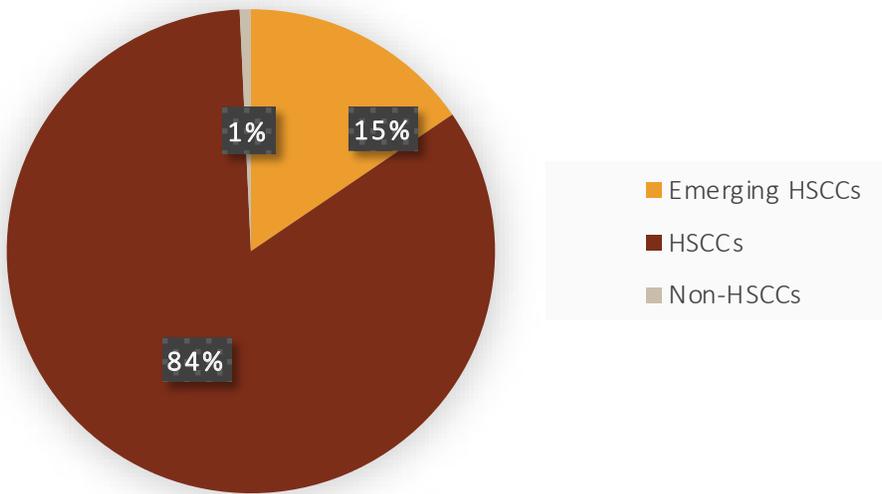
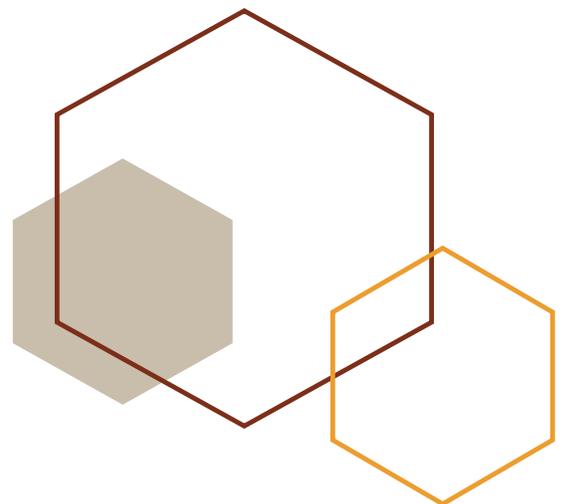


Figure 5. 2015 STEM degrees conferred by institutional type in California



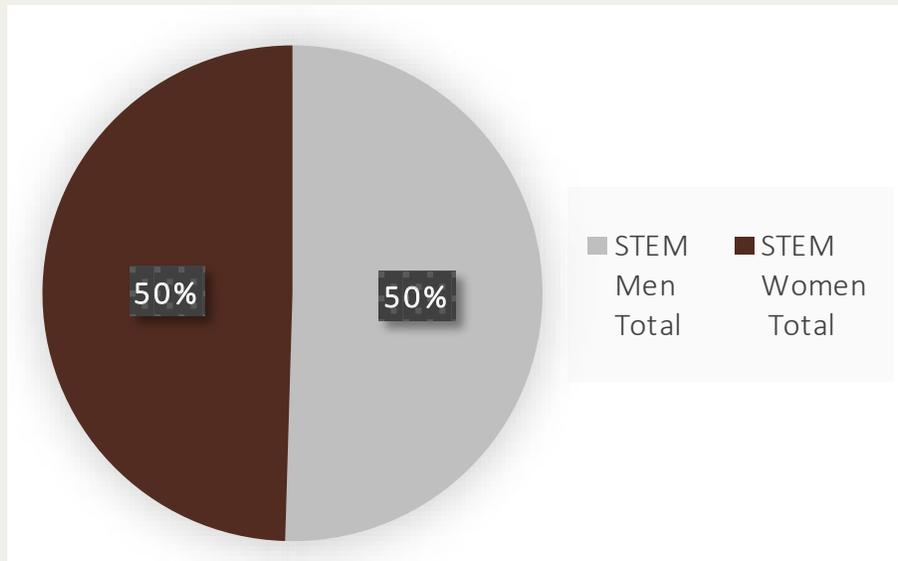


Figure 6. 2015 STEM degrees conferred by gender in California

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 Louis Stokes Alliances for Minority Participation (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.

In 2015 community colleges in California conferred 21,612 STEM degrees, which accounted for 17% of the total degrees awarded. Latinxs earned 7,499 (35%) STEM degrees, followed by Whites (33%), Asians (19%), and Blacks/African Americans (4%). In California, Latinxs earned more than one-third of the STEM degrees awarded. Despite being only 13% of the total community college population, Asians received almost one-fifth of the STEM degrees conferred. In total, Latinxs and Asians earned over 50% of all STEM degrees conferred at two-year institutions in the state.

In general, the enrollment of women and degrees conferred to them was higher than that of men across racial groups in California. In STEM fields, women earned slightly fewer degrees than men (10,705 and 10,907, respectively). When converted in percentages, the average shows an even split (Figure 6). Even though the general trend of the STEM degrees that were conferred by gender was similar, the gender gap was different by STEM fields. For example, women earned a relatively fewer number of degrees in the fields of computer and information sciences, engineering, engineering technologies, mathematics, and physical sciences. More details will be described in the next section by the institutional type and three top STEM fields in California.

2015 STEM Degrees Conferred by Race and Gender at HSCCs in California

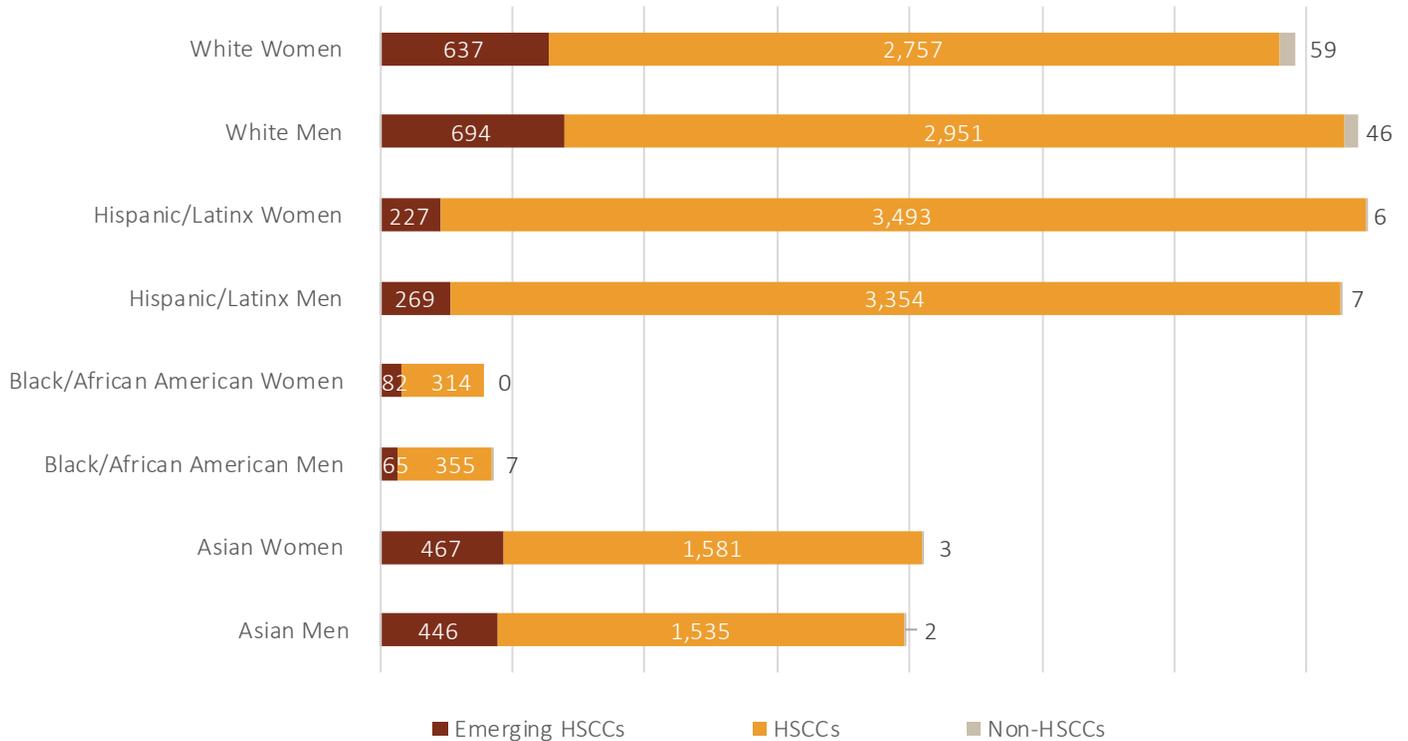


Figure 7. 2015 STEM degrees conferred by gender, race, and institutional types in California

HSCCs

HSCCs awarded 103,490 (83%) of the total degrees conferred in California. Latinxs earned 44,362 (43%) degrees in HSCCs, followed by Whites (30%), Asians (12%), and Blacks/African Americans (6%) (see Figure 4-2). Out of the total degrees conferred at HSCCs, women earned 62,624 (61%) and 40,866 (39%) were earned by men. STEM degrees conferred at HSCCs accounted for 18,115 (16%) out of the total degrees awarded. Of the STEM degrees conferred in 2015 by HSCCs in California, Latinxs earned 6,847 (38%) STEM degrees, followed by Whites (32%), Asians (17%), and Blacks/African Americans (4%) (see Figure 7). The percentage of Latinxs who earned STEM degrees at HSCCs in California is comparable to the national percentage for HSCCs (39%). Out of the STEM degrees conferred, 9,140 (50.4%) were earned by men and 8,995 (49.5%) were earned by women. While women earned most of the overall degrees (61%), they only earned 49.5% of the STEM degrees that were conferred. However, this rate is considerably higher than the national HSCC STEM percentage (31%) earned by women.

Emerging HSCCs

Emerging HSCCs awarded 19,326 (15%) of the total degrees conferred in California. Whites, meanwhile, earned 7,745 (40%) degrees in emerging HSCCs, followed by Latinxs (20%), Asians (20%), and Black/African Americans (7%) (see Figure 4-2). Out of the total degrees conferred at emerging HSCCs, women earned 10,969 (66%) and men earned 8,357 (43%). STEM degrees conferred at emerging HSCCs accounted for 3,338 (17%) out of the total degrees awarded. Of the STEM degrees conferred by emerging HSCCs in 2015, Whites earned 1,331 (40%) STEM degrees, followed by Asians (27%), Latinxs (15%), and Blacks/African Americans (4%) (see Figure 7). Nationally, Whites at emerging HSCCs earned almost half of all the STEM degrees conferred but accounted for less than 40% of the STEM degrees awarded at these California institutions. Out of the STEM degrees conferred, 1,712 (51%) were earned by men and 1,626 (49%) were earned by women. Women earned almost two-thirds of all degrees awarded at emerging HSCCs in California but only earned 49% of the STEM degrees awarded at emerging HSCCs.

This percentage, however, is still higher than the STEM percentage (40%) earned by women at the emerging HSCCs from the eight largest states with Latinx populations, which are Arizona, California, Colorado, Florida, Illinois, New Mexico, New York, and Texas, as well as one of the U.S. territories, Puerto Rico.

Non-HSCCs

Non-HSCCs awarded 2,195 (2%) of the total degrees conferred in California. Whites earned 1,134 (52%) degrees in non-HSCCs, followed by Latinxs (11%), Blacks/African Americans (7%), and Asians (6%) (see Figure 4-2). Out of the total degrees conferred at non-HSCCs, men earned 1,105 (50.3%) and women earned 1,090 (49.6%). There were 159 (7%) STEM degrees conferred at non-HSCCs. Of the STEM degrees conferred by non-HSCCs in 2015, Whites earned 105 (66%) STEM degrees, followed by Latinxs (8%), Blacks/African Americans (4%), and Asians (3%) (see Figure 7). At non-HSCCs, Whites continued to earn most of the STEM credentials. While the STEM credential percentages seem exorbitant, there are only 17 non-HSCCs in California. Out of the STEM degrees conferred, women earned 84 (53%) and men earned 75 (47%). Women earned almost 50% of all degrees that were awarded at non-HSCCs but earned almost 53% of all STEM degrees conferred. The 53% of STEM degrees awarded to women at non-HSCCs is substantially higher than the national non-HSCC STEM percentage (32%) conferred to women.

Underrepresentation in Top Three STEM Fields

Overall, the top three STEM fields were interdisciplinary studies (12,936), computer and information sciences (1,993), and mathematics (1,827) (see Figure 8). Combined, these STEM fields account for 78% of the STEM degrees conferred in community colleges in California. Other degrees included biological sciences (1,656 or 8%), physical sciences (1,447 or 7%), and engineering technologies (1,169 or 5%). More details of the top three STEM fields will be described in the following section.

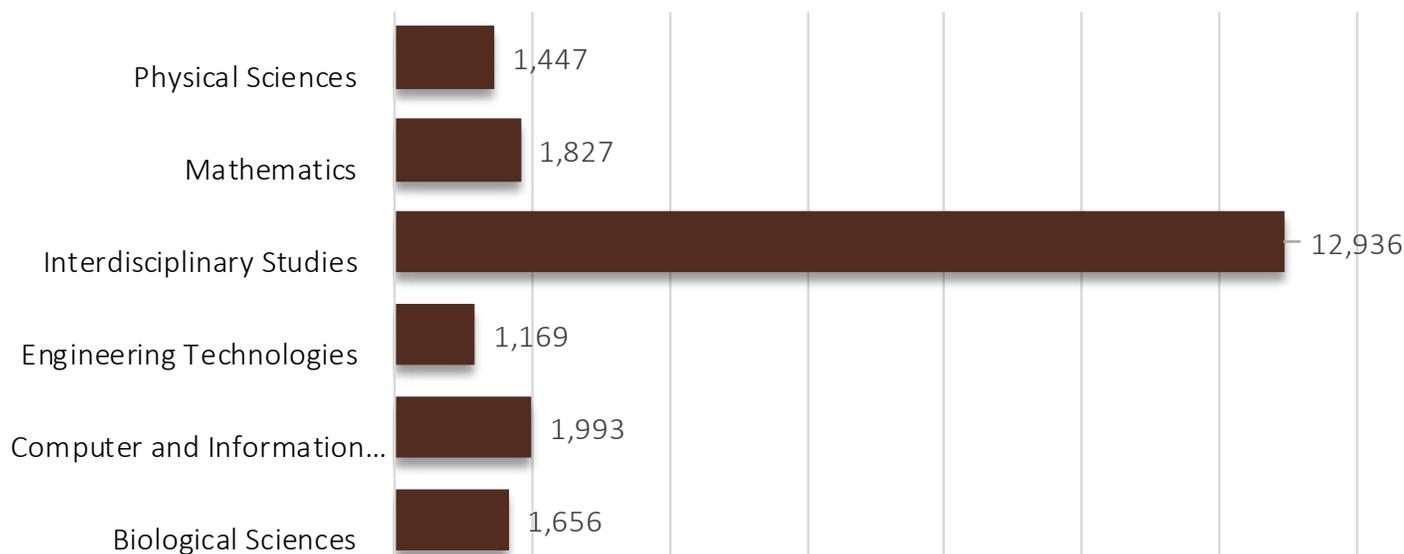


Figure 8. Top contributing STEM fields in California

Interdisciplinary Studies

In 2015 there were 12,936 degrees awarded in interdisciplinary studies. Out of the 12,936 degrees awarded in interdisciplinary Studies, 87% of the degrees were conferred at HSCCs, 13% at emerging HSCCs, and only 1% at non-HSCCs (Figure 9). Latinxs earned 4,604 (36%) STEM degrees, followed by Whites (31%), Asians (18%), and Blacks/African Americans (4%). Unlike other STEM fields, women earned more interdisciplinary studies degrees than men in California. Additionally, women received 7,788 (60%) degrees and men received 5,148 (40%) overall. To further break it down, the individuals receiving degrees encompassed 1,723 Latinx men and 2,881 Latinx women; 1,697 White men and 2,482 White women; 989 Asian men and 1,396 Asian women; and 188 Black/African American men and 276 Black/African American women.

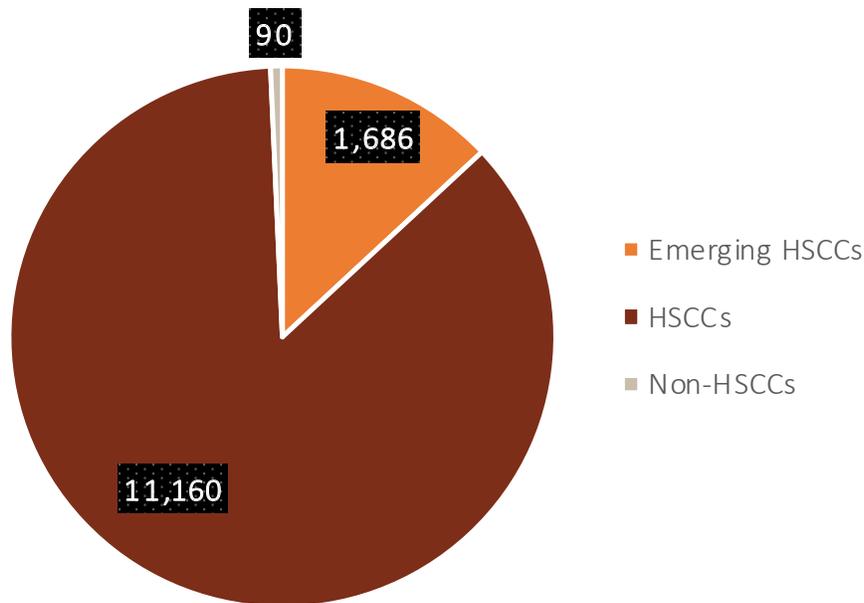


Figure 9. Interdisciplinary Studies degrees conferred by institutional type in California

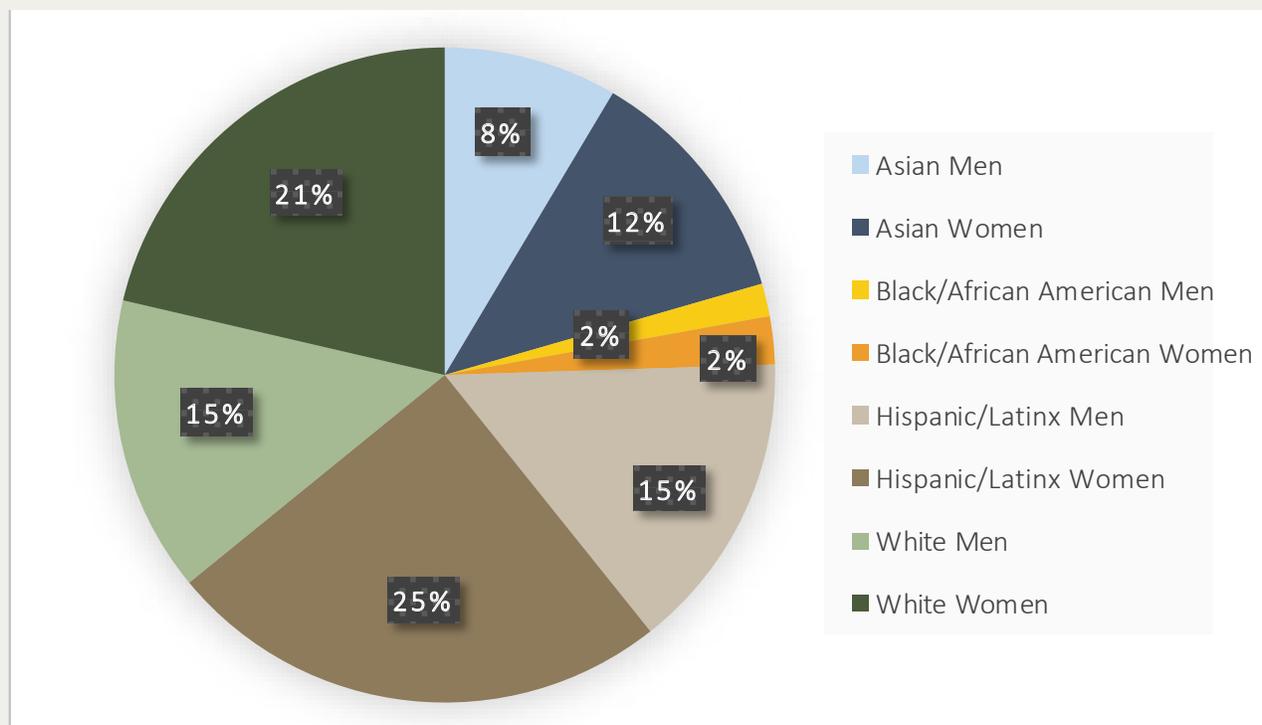


Figure 10. Interdisciplinary Studies degrees conferred by race and gender in California

Computer and Informational Sciences

In 2015 there were 1,993 degrees awarded in computer and informational sciences. Out of these degrees, 74% were awarded at HSCCs, 24% at emerging HSCCs, and 2% at non-HSCCs. Whites earned 728 (37%) STEM degrees, followed by Latinxs (31%), Asians (18%), and Blacks/African Americans (4%). There is a substantial disparity when it comes to gender in computer and informational sciences. Overall, men received 1,579 (79%) degrees and women received 21% of the degrees (see Figure 11). Within that total, the breakdown of degrees was 579 White men and 149 White women; 469 Latinx men and 114 Latinx women; 233 Asian men and 76 Asian women; 119 Black/African American men and 19 Black/African American women. (see Figure 12).

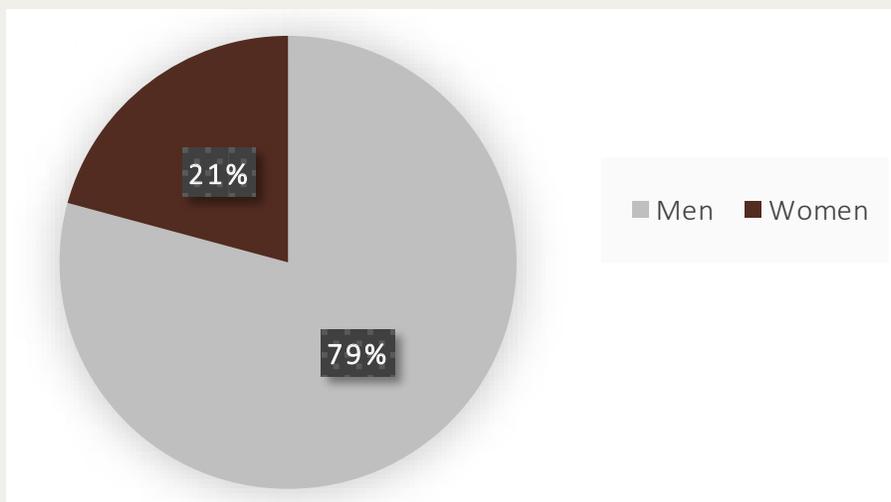


Figure 11. Computer and Information Sciences degrees conferred by gender and institutional type in California

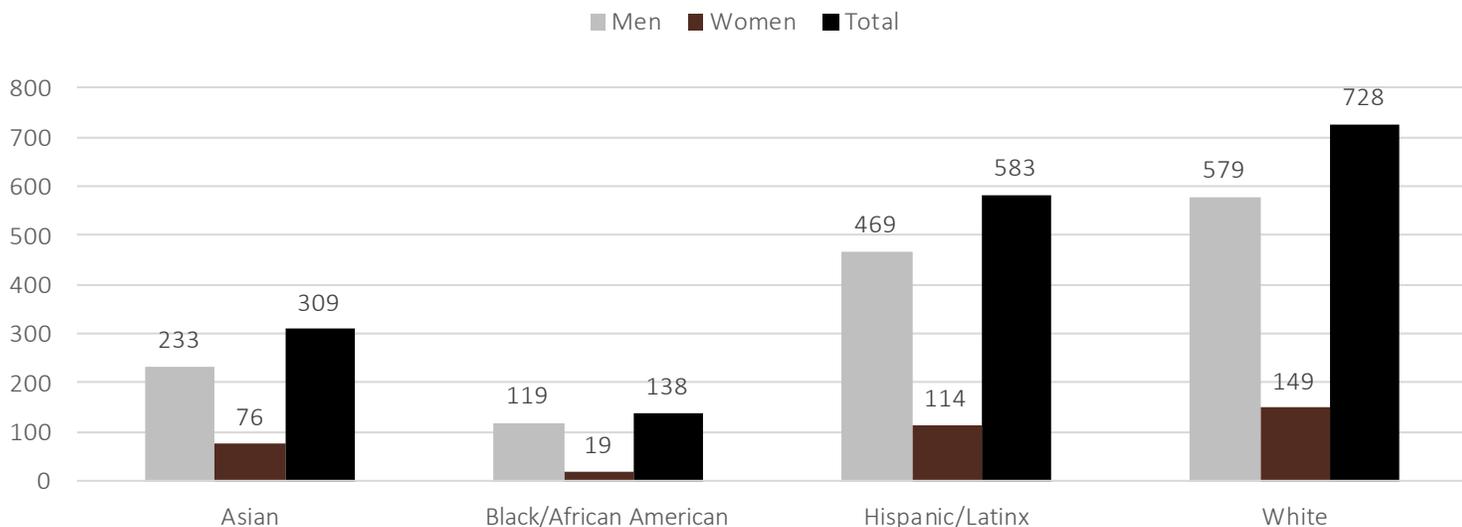


Figure 12. Computer and information sciences degrees conferred by race, gender, and institutional type in California

Mathematics

There were 1,827 degrees awarded in mathematics in 2015. Out of these degrees, 1,527 (84%) were awarded in HSCCs, 16% at emerging HSCCs, and .1% at non-HSCCs. Whites earned 609 (33%) STEM degrees, followed by Latinxs (33%), Asians (21%), and Blacks/African Americans (2%) (see Figure 13). The numbers reveal a considerable gap in gender in mathematics as men received 1,328 (73%) degrees and women received 499 (27%) degrees (see Figure 14). Drilling down further into the populations that received degrees, there were 453 White men and 156 White women; 447 Latinx men and 147 Latinx women; 266 Asian men and 121 Asian women; and 27 Black/African American men and 10 Black/African American women.

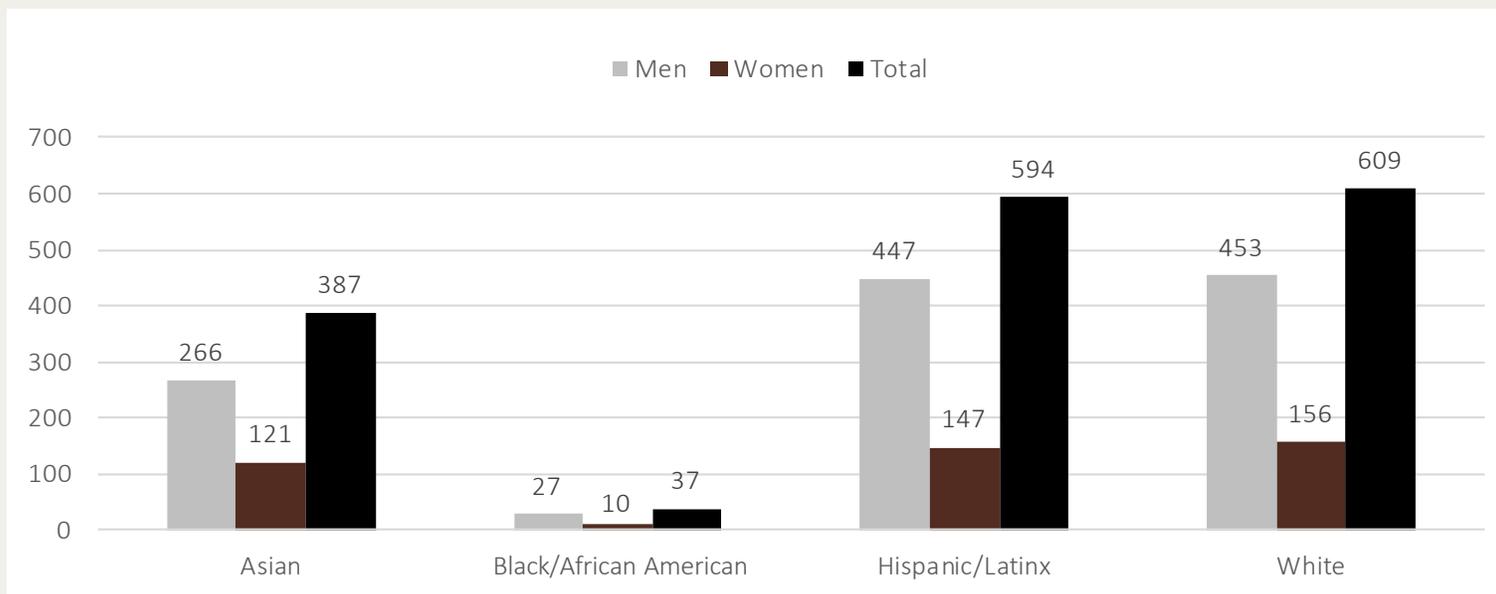


Figure 13. Mathematics degrees conferred by race and institutional type in California

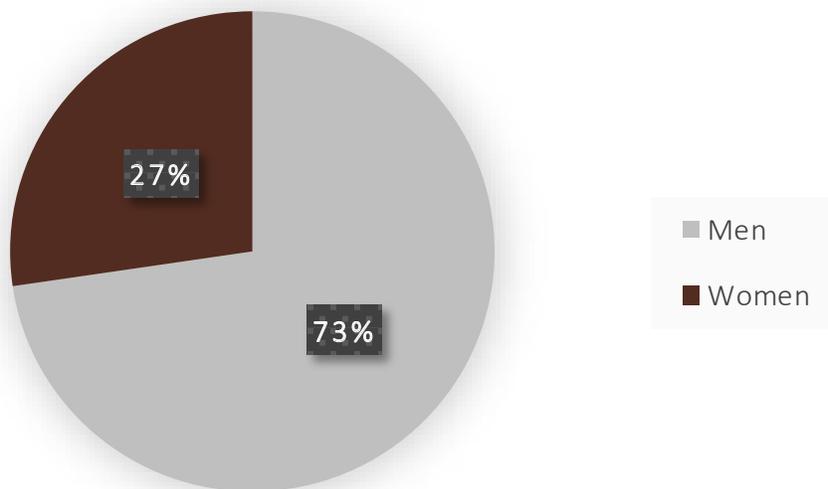


Figure 14. Mathematics degrees conferred by gender and institutional type in California

Summary

In summary, HSCCs conferred more than four-fifths of the degrees awarded in California, which serves as a critical point of access for students of color.

- Over 60% of degrees conferred at HSCCs were awarded to students of color. Furthermore, almost 60% of the STEM degrees conferred at HSCCs were awarded to students of color, especially to Latinx students.
- In California, HSCCs conferred 84% of all STEM degrees awarded, many with a concentration in computer and informational sciences and mathematics.
- Women earned nearly one out of two STEM degrees in California, which is substantially higher than the national average (30%). HSCCs also awarded almost 50% of all STEM degrees to women. While these numbers are impressive, a more nuanced story emerges when the data is broken down by STEM fields. Such data shows that women earned more degrees in interdisciplinary studies, but a significant gender gap exists in major STEM fields such as computer and informational sciences and mathematics.

In short, fewer women completed degrees in certain STEM fields. Overall, STEM degree attainment by women continues to lag behind the total degrees earned by women. Since most two-year institutions in California are HSCCs, these schools will continue to play a critical role in educating students of color and women, especially in STEM degree attainment.



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Notes.

1. The percentage of racial/ethnic groups on the figures and texts are not added up to 100% due to the exclusion of other racial/ethnic groups.



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