



HISPANIC-SERVING COMMUNITY COLLEGES

STEM PIPELINES

Small but Serving Large: Hispanic-Serving Community Colleges and STEM Degree Attainment in New York

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This research brief focuses on STEM degrees conferred in New York 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), particularly in minority-serving community college (MSCC) contexts (Fox, Thrill, & Zamani-Gallaher, 2017). Thus, 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.

This brief uncovers the most viable HSCC STEM pathways for Latinxs and other underrepresented minoritized students. It also focuses on which fields these students are more likely to persist and the promising practices that provide transfer pathways leading to further education on-ramps to STEM baccalaureates. The following information provides a state 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

For the last century, New York has been the entry point for many people of color, particularly foreign-born immigrants (The Contributions of New Americans in New York, 2016). These immigrants have contributed to every aspect of New York, from the economy to its cultural fabric. In 2015, the estimated population in the state of New York was 19,795,791. Out of the total population, Whites were 11,050,851 or 55.8%, followed by Hispanic/Latinxs (3,725,193 or 18.8%), Blacks/African Americans (2,845,960 or 14.4%), and Asians (1,659,534 or 8.4%) (U.S. Census, 2015). In a 10-year period culminating in 2018, the Latino population increased 25% in the Northeast, particularly in New York, and continues to be the youngest population in the country (Pew Research Center, 2019). These demographic changes are already here, and higher education institutions are facing a surge in students of color, particularly Latinx students.

Selection Criteria for HSCCs

This brief draws from 2015 data from the Integrated Postsecondary Education Data System (IPEDS). Using both the IPEDS and the Carnegie classifications, two-year institutions were selected first.

This material is based upon work supported by the National Science Foundation under grant number 1625918. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

The specific selection criteria of two-year institutions in IPEDS are

- Sector: ‘two-year Public,’ ‘Private not-for-profit,’ and ‘Private for-profit’;
- The highest degree offered: ‘Associate’s degree’;
- The institutional category: ‘Degree-granting, associate’s and certificates’ and ‘Degree-granting, not primarily baccalaureate or above’.

Based on these criteria, a total of 1,623 institutions were obtained.

In the Carnegie classification 2015 (Basic), one category was selected for this study,

- Baccalaureate/ Associate’s Colleges: ‘Associate’s dominant’ and ‘Mixed Baccalaureate/Associate’s.’

A total of 403 institutions were drawn. Lastly, two datasets drawn from IPEDS and Carnegie classifications were merged and four overlapped institutions were deleted. Considering the high number of HSCCs in Puerto Rico, 23 institutions in Puerto Rico were included in our data, while other institutions in the U.S. territory were excluded. Thus, 2,022 total institutions were obtained for this study. For the descriptive analysis, 1,998 institutions were used from the exclusion of 18 invalided institutions. This brief focuses on 88 institutions in the state of New York. It is important to note that this number might be different from the numbers the state of New York identified as community colleges due to different classification criteria. This study includes institutions that conferred more than 10% of degrees at the baccalaureate level or higher (fewer than 90% associate’s degrees) as well as institutions that conferred associate’s degrees as the highest degree-level offering.

Postsecondary Context: NY HSCC Landscape

Table 1 illustrates the landscape of two-year institutions in the state of New York. In 2015, 88 two-year institutions were drawn in our data, and 37.50% of them were Hispanic-Serving Institutions. Specifically, 17 (19.32%) were identified as HSCCs, 16 (18.18%) as emerging HSCCs, and 55 (62.50%) as non-HSCCs. There has been a significant increase nationally over the last three decades in private for-profit institutions (Deming, Goldin, & Katz, 2012). In our data, a similar proportion of institutional control was shown nationally. A growing number of private for-profit institutions and a similar proportion of institutional control was shown in New York data as well. Out of the total 88 institutions in New York, 33 institutions (37.50%) were private for-profit

Table 1

Eligibility of HSCCs by Control of the Institution in New York

Control of institution (# of institutions)	Eligibility of HSCCs 2015			
	Non-HSCCs	HSCCs	Emerging HSCCs	Total
	Count	Count	Count	
Public	27	7	7	41
Private not-for-profit	10	2	2	14
Private for-profit	18	8	7	33
Total institutions	55	17	16	88

institutions. There were 14 (15.91%) private not-for-profit institutions. Out of 17 HSCC institutions, eight (47.06%) were private for-profit and seven (41.18%) were public institutions. There were two private not-for-profit institutions.

Minority-Serving Institution Status

In our project, the MSI status is used to see whether there were other federal designations cross-listed with the HSCC designation. We use 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).

In New York there were 13 institutions designated as MSIs (see Table 2). Among them, seven institutions were designated as AANAPISIs and six as PBIs. Specifically, four AANAPISIs and two PBIs were cross-listed as HSCCs and three AANAPISIs and one PBIs were cross-listed as emerging-HSCCs, respectively. Table 3 shows the list of MSIs (highlighted in light blue) by HSCC eligibility. There is no tribal college in New York.

Table 2

Cross-designated MSIs in New York

	HSCCs Eligibility	AANAPISIs Eligibility	PBIs Eligibility		Total
			Non-PBIs	PBIs	
New York	Non-HSCCs	Non-AANAPISIs	51	3	54
		Total	51	3	54
	HSCCs	Non-AANAPISIs	11	2	13
		AANAPISIs	4	0	4
		Total	15	2	17
	Emerging HSCCs	Non-AANAPISIs	12	1	13
		AANAPISIs	3	0	3
		Total	15	1	16
	NY Total	Non-AANAPISIs	74	6	80
		AANAPISIs	7	0	7
		Total	81	6	87

Table 3

Cross-designated MSIs in New York

HSCC's Eligibility	#	Institution (entity) name	Sector of institution	Degree of urbanization	AANAPISIs	PBIs
HSCCs	1	Vaughn College of Aeronautics and Technology	Private not-for-profit	City: Large	AANAPISIs	Non-PBIs
	2	CUNY Borough of Manhattan Community College	Public	City: Large	AANAPISIs	Non-PBIs
	3	CUNY LaGuardia Community College	Public	City: Large	AANAPISIs	Non-PBIs
	4	CUNY Queensborough Community College	Public	City: Large	AANAPISIs	Non-PBIs
	5	Mandl School-The College of Allied Health	Private for-profit	City: Large	Non-AANAPISIs	PBIs
	6	Technical Career Institutes	Private for-profit	City: Large	Non-AANAPISIs	PBIs
Emerging HSCCs	1	Bramson ORT College	Private not-for-profit	City: Large	AANAPISIs	Non-PBIs
	2	CUNY Kingsborough Community College	Public	City: Large	AANAPISIs	Non-PBIs
	3	Long Island Business Institute	Private for-profit	City: Large	AANAPISIs	Non-PBIs
	4	Mildred Elley-New York Campus	Private for-profit	City: Large	Non-AANAPISIs	PBIs
Non-HSCCs	1	Bryant & Stratton College-Syracuse	Private for-profit	City: Midsize	Non-AANAPISIs	PBIs
	2	Bryant & Stratton College-Buffalo	Private for-profit	City: Large	Non-AANAPISIs	PBIs
	3	Bryant & Stratton College-Henrietta	Private for-profit	Suburb: Large	Non-AANAPISIs	PBIs

HSCC Student Demographics

In this section, the student demographics are described based on 12-month enrollment with an unduplicated headcount and degrees/awards conferred drawn from IPEDS. In 2015 there were a total of 537,611 students enrolled in two-year institutions in New York. Approximately 52.63% of students were enrolled in Hispanic Serving Community Colleges. Specifically, 28.30% of students (152,164) were enrolled in HSCCs and 24.33% (130,813) were enrolled in emerging HSCCs. Whites made up 241,875 (44.99%) of the total enrollment, followed by Hispanic/Latinx (10,5978 or 19.71%), Black/African American (90,279 or 16.79%), and Asian (30,933 or 5.75%).

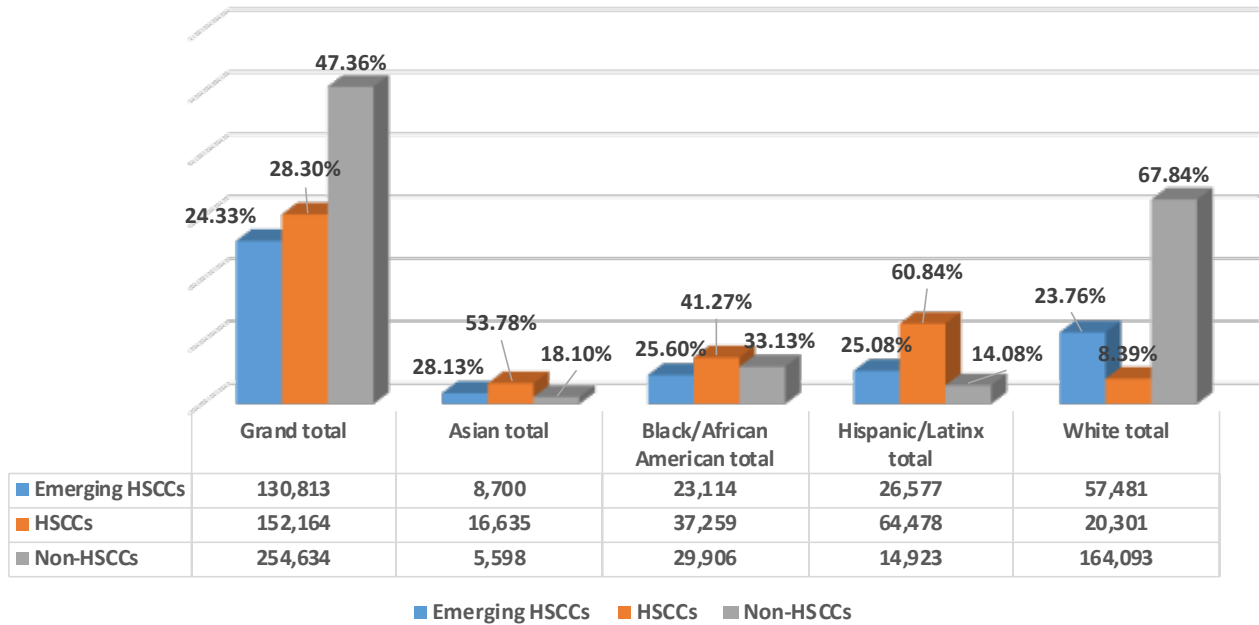


Figure 1-1
2015 Student Racial Demographics Based on 12-month Enrollment by Institutional Type in New York

Out of the total students enrolled, 236,180 (43.93%) were men and 301,431 (56.07%) were women. In general, women’s enrollment was higher than men’s across racial groups. See Figure 1-2.

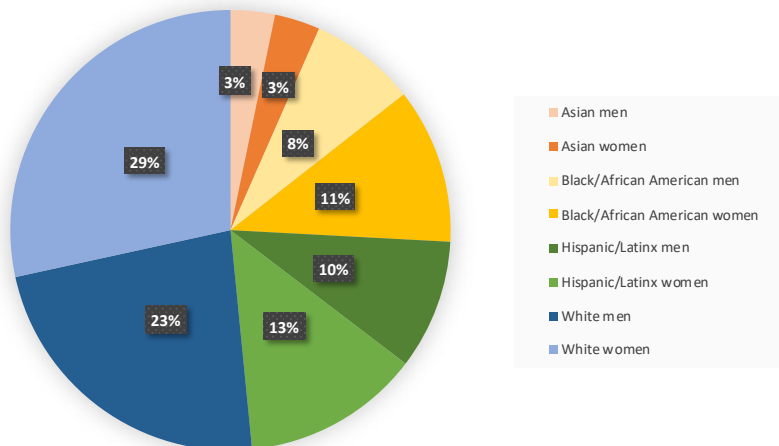


Figure 1-2
2015 Student Enrollment by Gender and Race in New York

Community colleges in New York awarded a total of 55,575 degrees, with Whites earning the most with a total of 50.65% (28,151), followed by Hispanic/Latinxs (19.10% or 10,617), Black/African Americans (15.94% or 8,858), and Asians (5.55% or 3,083). Across institutional types, non-HSCCs granted 25,143 (45.24%). HSCCs granted 15,758 (28.35%) degrees, followed by emerging HSCCs (14,674 or 26.40%). Out of the total degrees conferred in 2015, 32,991 (59.36%) of them went to women and 22,584 (40.64%) went to men. In general, women maintained a 55% rate of enrollment and associate’s degrees conferred in New York, which translates to a gender gap of approximately 16 %. When the data segregated into STEM fields, however, the percentage of women who earned STEM degrees in New York was below the national percentage (31.08%; Zamani Gallaher et al., 2019a). The following section describes how inequity was manifested in STEM degrees that were conferred by race and ethnicity in New York in 2015.

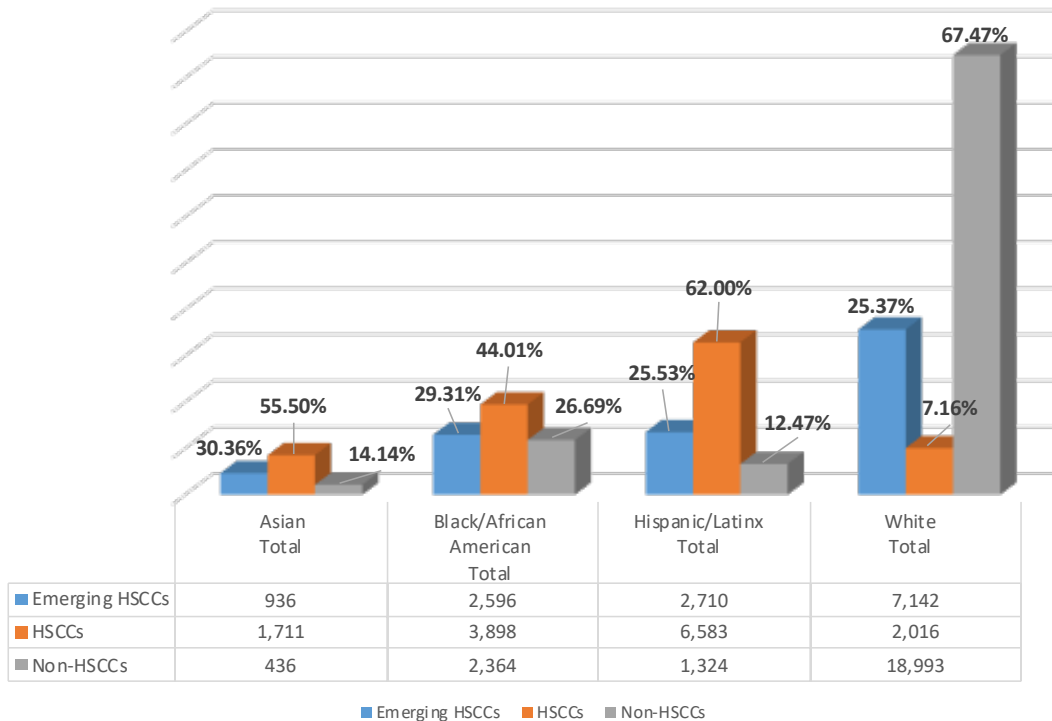


Figure 2
2015 First Major Total Associate Degrees Conferred by Race and Institutional Type in New York

Participation in STEM by Race, Ethnicity, and Gender

Science, technology, engineering and mathematics (STEM) programs were classified using the NSF Classification of Instructional Program (CIP) Code Crosswalk for STEM disciplines (Louis Stokes Alliances for Minority Participation, 2018). By following this 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.

Community colleges in the state of New York conferred 5,129 STEM degrees in 2015, which accounted for 9.23% of the total degrees awarded in the state. Among the total STEM degrees conferred, 51.98% (2,666) of them were awarded at Hispanic-serving community colleges (see Figure 3-1) and 40.82% (2,094) went to students of color (see Figure 3-3).



Specifically, Whites earned 2,551 (49.74%) total STEM degrees, followed by Hispanic/Latinxs (885 or 17.25%), Black/African Americans (716 or 13.96%), and Asians (493 or 9.61%). Women earned only 1,126 (21.95%) STEM degrees and men earned 4,003 (78.05%). Additionally, women earned approximately 19% more associate’s degrees than men, but they earned 56% fewer STEM degrees than men (see Figure 3-2). In the following section, the details of the STEM degree attainments are addressed by HSCCs eligibility.

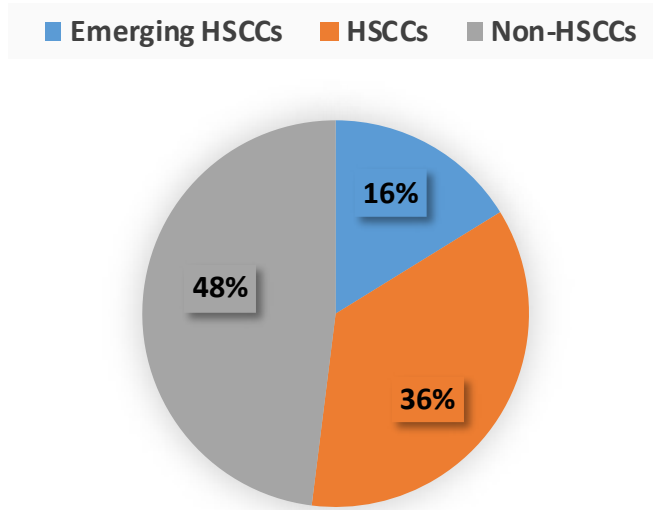


Figure 3-1
2015 STEM Degrees Conferred by Institutional Types in New York

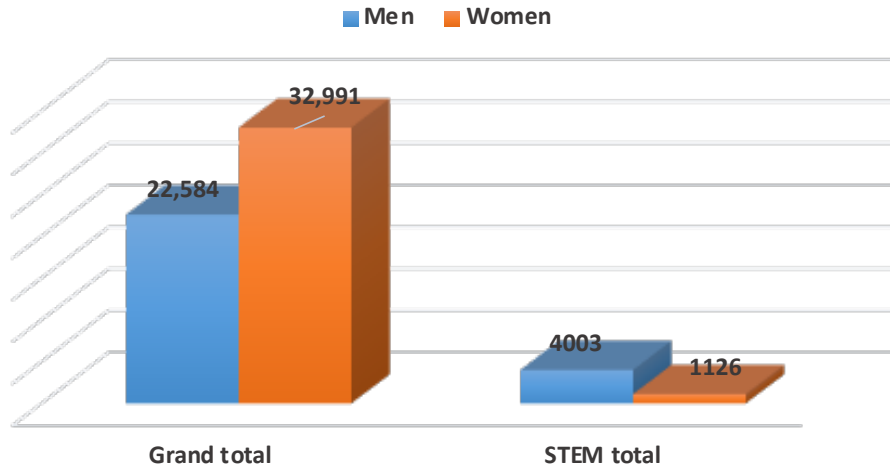


Figure 3-2
2015 STEM Degrees Conferred by Gender in New York

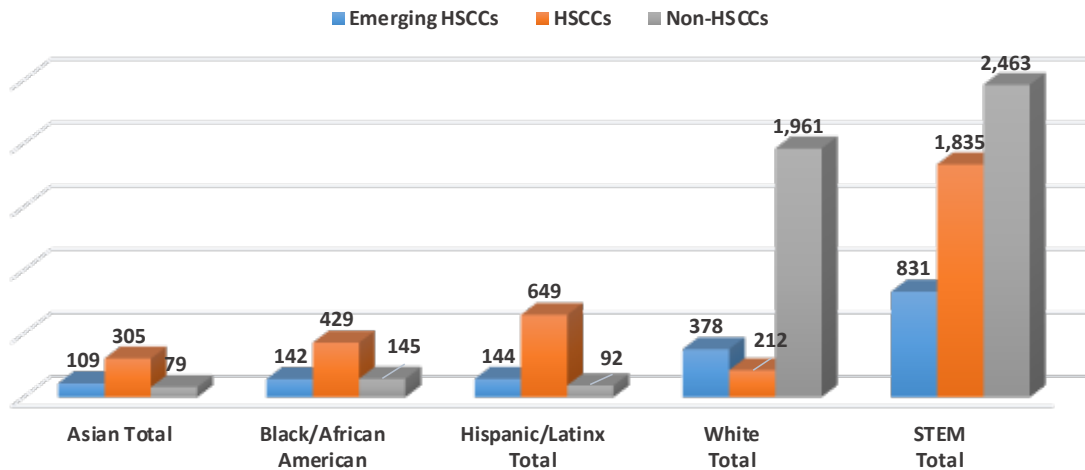


Figure 3-3

2015 Total and STEM Degrees Conferred by Race and Institutional Types in New York

HSCCs

HSCCs awarded 15,758 (28.35%) of the total degrees conferred in the state of New York. Hispanics earned 6,583 (41.78%) degrees in HSCCs, Whites earned 2,016 (12.79%), Blacks/African Americans earned 3,889 (24.74%), and Asians earned 1,711 (10.86%; see Figure 2). Of the total degrees awarded at HSCCs, women earned 21.62 % more than men; women earned 9,582 (60.81%) degrees and men earned 6,176 (39.19%). Figure 3-3 illustrates STEM degrees conferred by race at HSCCs. STEM degrees that were conferred accounted for 11.64% (1,835) out of the total degrees awarded at HSCCs (15,758). Of the STEM degrees conferred by HSCCs in 2015, Hispanic/Latinxs earned 649 (35.37%), followed by Black/African Americans (429 or 23.38%), Asians (305 or 16.62%), and Whites (212 or 11.55%). Of the STEM degrees conferred by HSCCs, women earned 34.19% less than men, with men earning 4,003 (72.37%) and women earning 1,126 (38.18%). HSCCs in New York play a significant role in the education that Hispanic/Latinxs attain in the STEM degree field.

Emerging HSCCs

Emerging HSCCs awarded 14,674 (26.40%) of the total degrees conferred in the state of New York. Whites earned 7,142 (48.67%) degrees in emerging HSCCs, followed by Hispanics (2,710 or 18.47%), Black/African Americans (2,596 or 17.69%), and Asians (936 or 6.38%; see Figure 2). Out of the total degrees awarded at emerging HSCCs, women earned 17.74 % more than men; additionally, women earned 8,638 (58.87%) degrees and men earned 6,036 (41.13%). Figure 3-3 illustrates STEM degrees conferred by race at emerging HSCCs. As far as STEM degrees conferred, emerging HSCCs awarded 831 (5.66%) out of the total degrees (14,674): Whites earned 378 (45.49%) STEM degrees, followed by Hispanic/Latinxs (144 or 17.33%), Black/African Americans (142 or 17.09%), and Asians (109 or 13.12 %). Out of the STEM degrees conferred by emerging HSCCs, women earned 44.89% less than men, with men earning 633 (76.17%) and women earning 198 (31.28%).

Non-HSCCs

Non-HSCCs awarded 25,143 (45.24%) of the total degrees conferred in the state of New York. Whites earned 18,993 (75.54 %) degrees in non-HSCCs, followed by Black/African Americans (2,364 or 9.40 %), Hispanic/

Latinxs (1,324 or 5.27%), and Asians (436 or 1.73%; see Figure 2).

Out of the total degrees awarded at non-HSCCs, men earned 10,372 (41.25%) and women earned 14,771 (58.75%) degrees. Figure 3-3 illustrates STEM degrees conferred by race at non-HSCCs. As far as STEM degrees conferred out of the total degrees (25,143), non-HSCCs awarded 2,463 (48.02%): Whites earned 1,961 (79.62%) STEM degrees, followed by Black/African Americans (145 or 5.89%), Hispanic/Latinxs (92 or 3.74%) and Asians (79 or 3.21%). Out of the STEM degrees conferred by non-HSCCs, women earned 52.29% less than men, with men earning 2,042 (82.91%) and women earning 421 (20.62%).

Underrepresentation in Top Three STEM Fields

In 2015, there was a total of 5,129 STEM associate's degrees awarded in the state of New York. Of that number, men received 4,003 (78.05%) and women received 1,126 (28.13%). Overall, the top three STEM fields in New York were computer and information sciences (1,955 or 38.12%), engineering technologies (1,605 or 31.29%), and engineering (575 or 11.21%). These three STEM fields accounted for 80.62% of the STEM degrees conferred in the state of New York, followed by physical sciences (400 or 7.80%), biological sciences (231 or 4.50%), and natural resources and conservation (129 or 2.52%). In general, there were substantial disparities for gender and race in top contributing STEM fields. In addition, 690 degrees awarded at non-HSCCs accounted for 73.02% of STEM degrees. Most of the degrees in STEM fields were conferred at non-HSCCs (Figure 4). The following section describes the details of the degree attainments at the top three STEM.

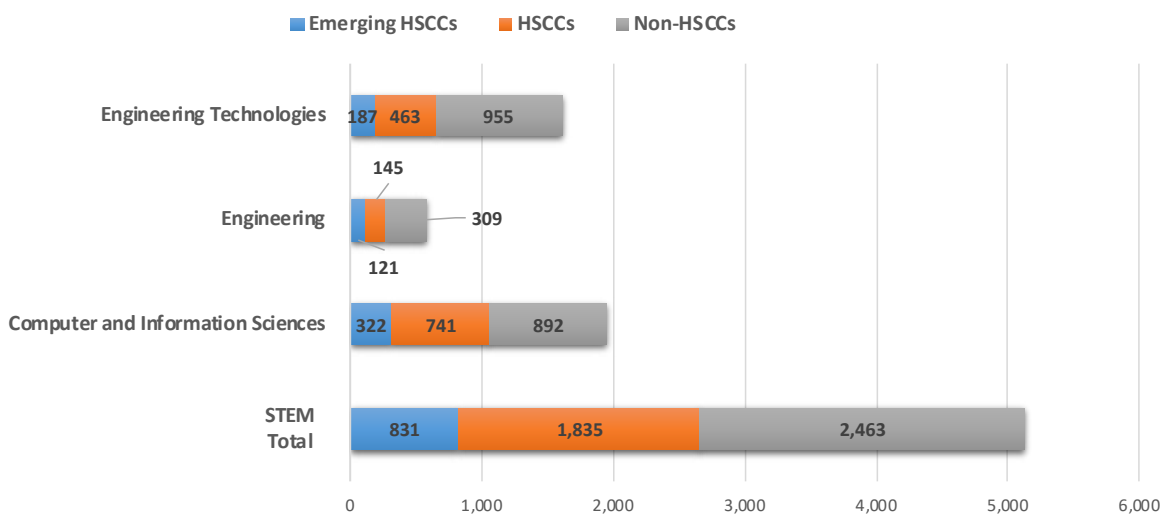


Figure 4
Top Contributing STEM fields by Institutional Type in New York

Computer and Information Sciences

HSCCs conferred 37.90% of the degrees in computer and information sciences in the state of New York. Specifically, 892 (45.63%) out of the total degrees in this major (1,955) were awarded at non-HSCCs, followed by HSCCs (741 or 37.90%) and emerging HSCCs (322 or 16.47%; Figure 4). Figure 5-1 shows the degrees conferred in computer and information sciences by race: Whites earned 912 (46.65%) computer and information sciences degrees, followed by Hispanic/Latinxs (381 or 19.49%), Black/African Americans (291 or 14.88%), and Asians (180 or 9.21%). Men earned 1,599 (81.79%) and women earned 356 (18.21%) computer and information sciences degrees. There was an eight to two gender gap ratio in this field across racial groups (Figure 5-2). Specifically, there were 763 White men and 149 White women, 312 Hispanic/Latinx men and 69 Hispanic/Latinx women, 237 Black/African American men and 54 Black American women, and 148 Asian men and 32 Asian Women who received computer and information sciences degrees (Figure 5-2).

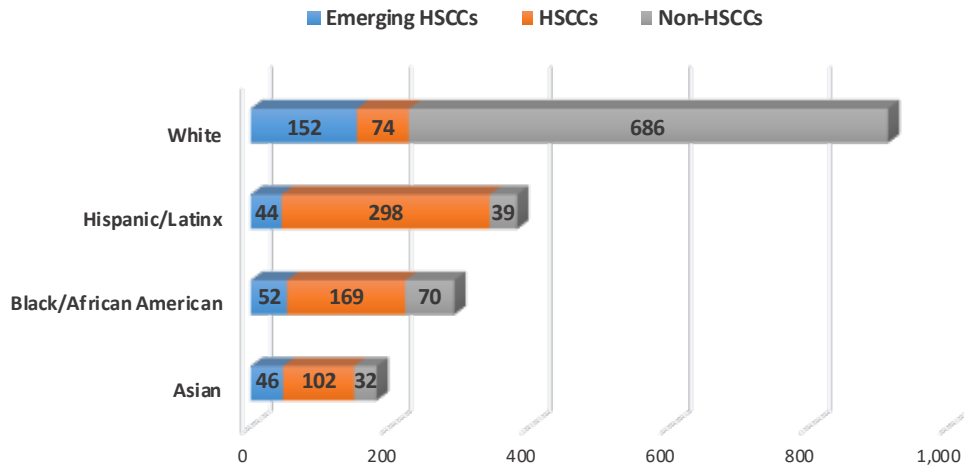


Figure 5-1

Computer and Information Sciences Degrees Conferred by Race and Institutional Type in New York

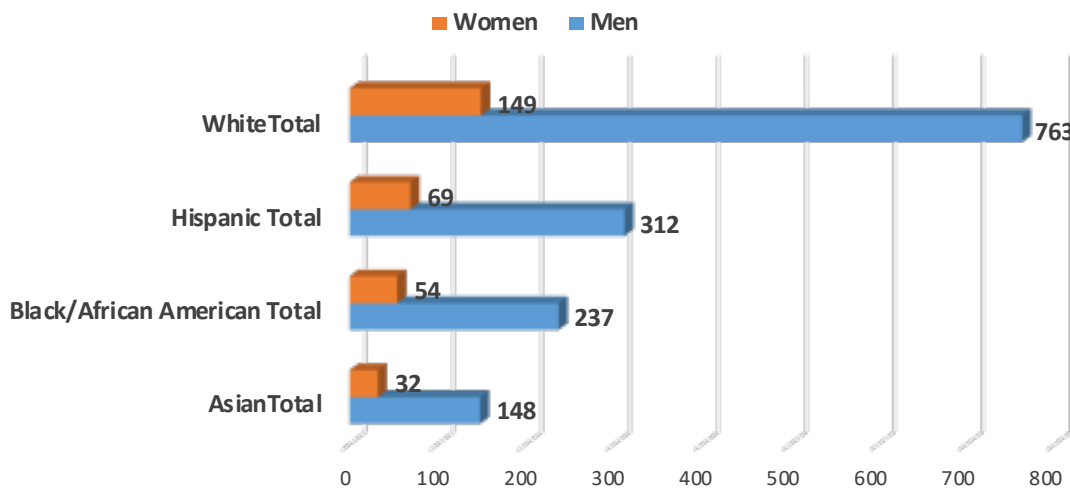


Figure 5-2

Computer and Information Sciences Degrees Conferred by Race and Gender in New York

Engineering Technologies

In 2015, 33.25% out of the total 1,605 degrees in engineering technologies were awarded at HSCCs. Specifically, HSCCs awarded 463 (23.68%) degrees and emerging HSCCs awarded 187 (9.57%) engineering technologies degrees. More than 49% of engineering technologies degrees were awarded at non-HSCCs (Figure 4). Figure 6-1 shows the degrees conferred in engineering technologies by race: Whites earned 913 (56.88%), followed by Hispanic/Latinxs (240 or 14.95%), Black/African Americans (226 or 14.08%), and Asians (82 or 5.11%). Men earned 1,453 (90.53%) and women earned 152 (9.47%). This dramatic gender gap with a ratio of 9 to 1 in engineering technologies occurred across racial groups. Specifically, there were 838 White men and 75 White women, 213 Hispanic men and 27 Hispanic women, 204 Black/African American men and 22 Black/African American women, and 72 Asian men and 10 Asian Women who received engineering technologies degrees (Figure 6-2).

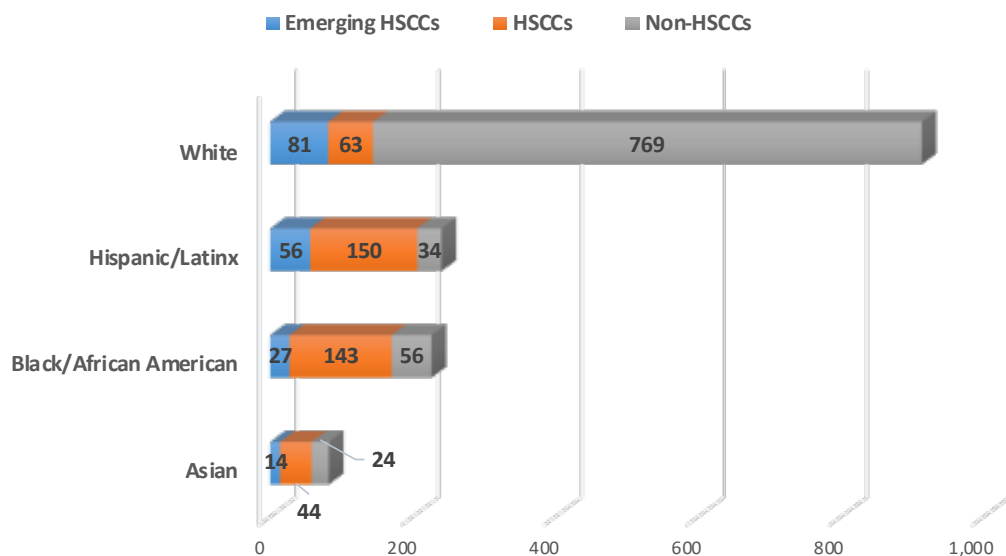


Figure 6-1
Engineering Technologies Degrees Conferred by Race and Institutional Type in New York

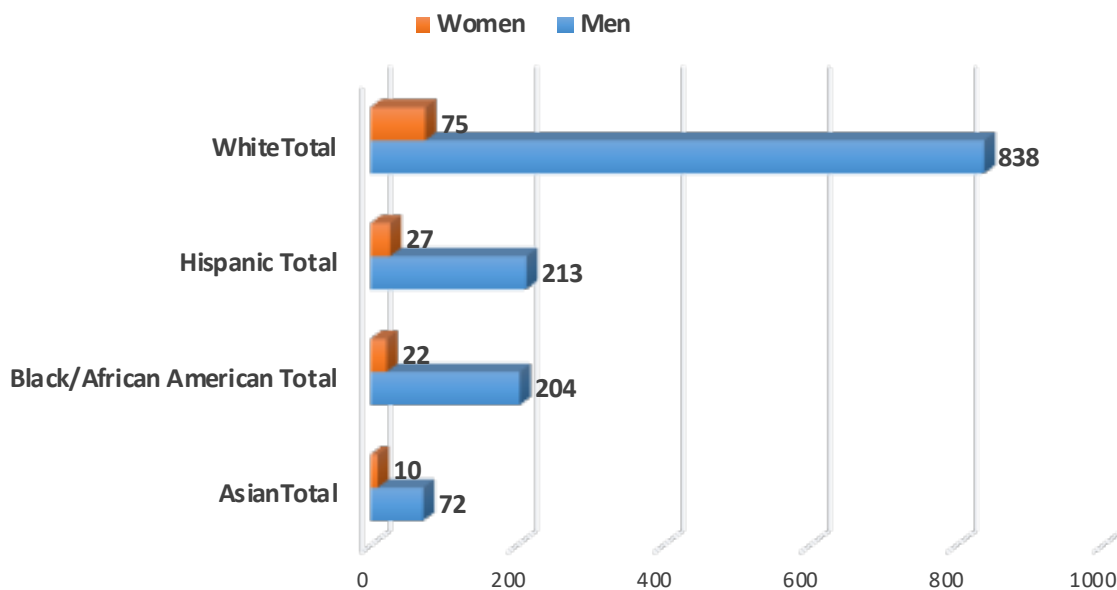


Figure 6-2
Engineering Technologies Degrees Conferred by Race and Gender in New York

Engineering

In 2015, 46.26% out of the total 575 degrees in engineering were awarded at HSCCs. Specifically, HSCCs awarded 145 (25.22%) degrees and emerging HSCCs awarded 121 (21.04%) engineering degrees. Fifty-four percent of engineering degrees were awarded at non-HSCCs (Figure 4). Figure 7-1 shows engineering degrees by race. Whites earned 349 (60.70%), followed by Hispanic/Latinxs (73 or 12.70%), Asians (62 or 10.78%), and Black/African Americans (39 or 6.78%). Men earned 495 (86.09%) and women earned 80 (13.91%). This gender gap in engineering occurred across racial groups.



Specifically, there were 304 White men and 45 White women, 59 Hispanic men and 14 Hispanic women, 53 Asian men and nine Asian Women, and 33 Black/African American men and six Black/African American women who received engineering degrees (Figure 7-2).

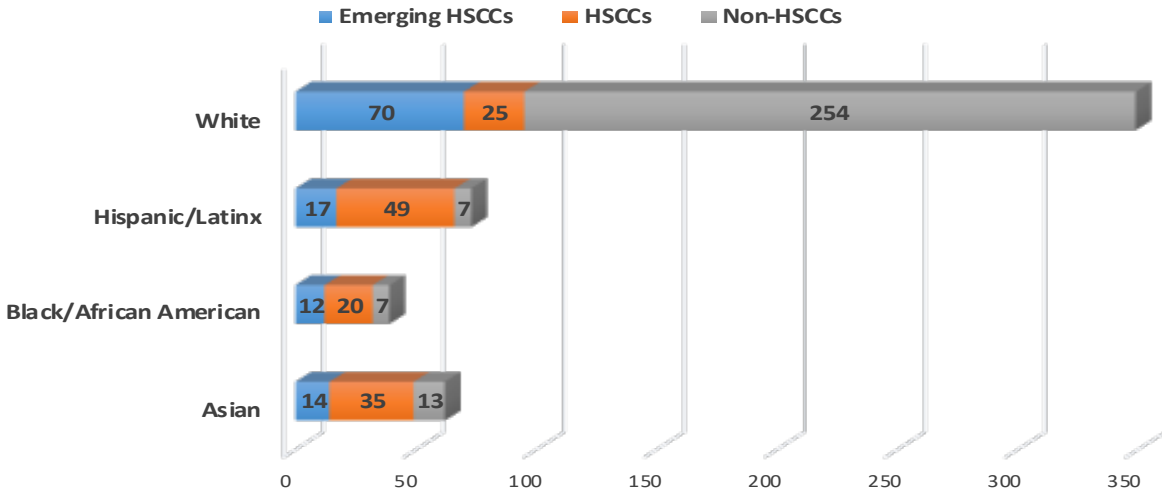


Figure 7-1
Engineering Degrees Conferred by Race and Institutional Type in New York

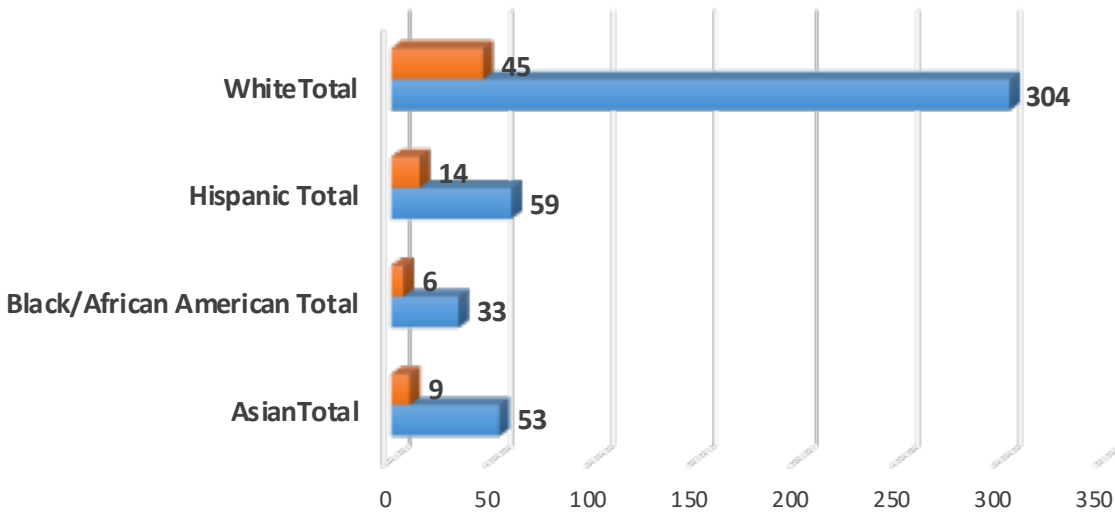


Figure 7-2
Engineering Degrees Conferred by Race and Gender in New York

Summary

To conclude, almost four out of 10 two-year institutions in 2015 were designated as Hispanic-serving institutions in New York.

- HSCCs awarded most of their conferred degrees to students of color (Figure 2).
- HSCCs and emerging HSCCs accounted for almost 54.75% of the total degrees awarded in New York.
- The top three STEM fields in New York were computer and information sciences (1,955 or 38.12%), engineering technologies (1,605 or 31.29%), and engineering (575 or 11.21%).
- Women continue to be disproportionately underrepresented within the STEM fields, only receiving 28% of the STEM degrees conferred (Figure 3-2), despite earning more than 59% of the total degrees awarded in New York (Figure 1-2).
- Given that HSCCs awarded more than half of the total degrees, they continue to increase access and opportunity to students of color, especially Hispanic students.

Despite the fact that there are growing numbers of private for-profit and large degrees conferred at non-HSCCs, HSCCs continue to increase access to and opportunity for students of color, especially Hispanic students and women of color. In the future, these institutional types will continue to play a significant role in the education that students of color attain in the STEM degree field.

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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, Asian Americans, Hispanic Americans or Latinx, 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 reflect domestic racial/ethnic diversity, not international student enrollments.

2. The percentage of racial/ethnic groups within the figures and texts do not add up to 100% due to the exclusion of other racial/ethnic groups.



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