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# Increasing Graduation and Transfer Rates for STEM Students in the Community College

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## Abstract

This paper describes efforts of a scholarship and student services project at a Maryland community college to increase the number of graduates and transfers to four-year institutions, especially among women and underrepresented minority groups in computer science, engineering, and science programs. Beginning in Fall 2008, through National Science Foundation funding, need-based scholarships were provided for full-time students with a minimum grade point average, and U.S. citizenship or status as permanent resident alien or refugee alien. Faculty mentoring, a seminar luncheon series, and career information were used to increase degree attainment or transfer in STEM fields. Outcomes of these efforts are described, including comparisons of awardees' transfer and graduation rates with those for the general full-time student population at this community college, and at other Maryland community colleges. Outcomes by gender and initial mathematics placement of awardees are also provided.

**Keywords:** computer science, engineering, graduates, mathematics, mentoring, minorities, NSF, scholarships, STEM, transfer rate, underrepresented, women

## 1. INTRODUCTION

One program under the National Science Foundation's Division of Undergraduate Education is its Scholarships for Science, Technology, Engineering, and Mathematics (S-STEM) program. "This program makes grants to institutions of higher education to support scholarships for academically talented students demonstrating financial need, enabling them to enter the STEM workforce or STEM graduate school following completion of an associate, baccalaureate, or graduate-level degree in science, technology, engineering or mathematics disciplines. Grantee institutions are responsible for selecting scholarship recipients, reporting demographic information about student scholars, and managing the S-STEM project at the institution," (NSF, 2012) Goals of the S-STEM program include increasing the numbers of well-educated and skilled employees in technical

areas of national need. The individual college/university determines award criteria, including GPA and eligible major programs. NSF guidelines specify that students to be awarded scholarships must be US citizens, permanent residents, nationals, or refugees.

This paper describes a specific S-STEM scholarship program at the Community College of Baltimore County. The scope of the paper includes demographics of the awardees, and a determination of the overall successfulness of the program based on graduation and transfer rate outcomes for all 99 awardees and for certain subgroups of awardees.

## 2. BACKGROUND INFORMATION

### Women and Underrepresented Minority Groups in STEM Fields

A report by the American Council on Education titled, *Increasing the Success of Minority Students in Science and Technology*, found that major factors contributing to degree completion in STEM fields were full-time attendance, hours worked while enrolled, and rigor of high school curriculum. "The challenge now is to move traditionally underrepresented students toward timely degree completion by supporting these students – both academically and financially throughout their undergraduate careers," according to this report (Anderson & Kim, 2006).

Nationally, less than half of the freshmen intending to major in science and engineering fields complete a bachelor's degree in these fields within 5 years, and underrepresented minorities drop out of these majors at a higher rate than other groups (NSB, 2003). It has been projected that in 2018, 46.9% of the workforce will be female and 29.7% will be African American or Hispanic (BLS, 2009). Nationally women received just 18% of engineering bachelor's degrees in 2010 (Gibbons, 2010). Similarly, women earned just 18% of bachelor's degrees in computer sciences in 2009 (NSB, 2012). Most of the decline, from 48% in 2000 to 40% in 2009, in women's share of associate's degrees in science and engineering is attributable to a decrease in women's share of computer science degrees, from 42% in 2000 to 25% in 2009 (NSB, 2012). In 2007, although women comprised 46% of the workforce, the composition of the total college-educated science and engineering workforce was only 27% women (NSB, 2010). Underrepresented minorities in science and engineering, including African American, Hispanic, and American Indian groups, comprised 26% of the U.S. population, and 11% of the college-degreed science and engineering workforce in 2008 (NSB, 2012).

Although the U.S. has 5.8% of its entire workforce in STEM occupations, the nearby Washington-Arlington-Alexandria metropolitan area has 12.7% of its workforce in STEM occupations (NSB, 2012). The greater Baltimore-Washington-Northern Virginia metropolitan area offers a great variety of job opportunities for STEM professionals. These range from businesses like Osiris Therapeutics, a tissue regeneration company with a platform technology based on stem cells, to the NASA Goddard Space Flight Center and Northern Virginia's information technology firms, to engineering jobs at major defense contractors

Lockheed Martin and Northrop Grumman, and jobs related to the nation's military and homeland security missions.

### 3. INSTITUTIONAL INFORMATION

The Community College of Baltimore County (CCBC) is a public two-year college system with three campuses serving the greater Baltimore metropolitan area. The Fall 2011 combined credit enrollment was 26,271 students of which 36% (8,973) were full-time students. Thirty-eight percent (38%) of the credit students were enrolled in transfer programs, 60% of credit students were female, and 34% were African American. In FY 2011, CCBC awarded 1,854 Associate's degrees, of which 55% were transfer degrees and 45% were career degrees. Of the 2,330 students who earned Associate degrees (1,854 degrees) or certificates (476 awards) in FY 2011, 63% were female and 23% were African American.

The institutional rate of Pell awards provides one indication of the level of unmet financial need. At CCBC in the 2010-11 academic year, 38% of credit students received a Pell grant, and 45% of students received some financial aid. Of those receiving financial aid, 49% were African-American, and 69% were female. In addition, 57% of CCBC students worked more than 20 hours per week.

### 4. S-STEM SCHOLARSHIP PROJECT AT CCBC

#### S-STEM Project Goal at CCBC

The NSF-funded four-year project at CCBC, *STEM Scholars Community*, provided renewable scholarships of up to \$10,000 (but not to exceed unmet financial need as determined by FAFSA) per year for full-time students with 2.8 GPA majoring in one of these 7 transfer programs: Biology (BIOL), Chemistry (CHEM), Physics (PHYS), Mathematics (MATH), Computer Science (CMSC), Environmental Science (ENVS), and Engineering (ENGR). Scholarship awards were made before the start of each semester beginning in Fall 2008, through Fall 2012. The project goal was to increase the enrollment, graduation and transfer of students, particularly women and underrepresented minorities, in these STEM programs at CCBC, and to provide awardees with academic, career, and professional development opportunities for transfer to a four-year institution (CCBC, 2013).

### Demographics of Targeted STEM Programs and Departments

Data on full-time program majors, percentage of female enrollment, and associate's degrees awarded in the CMSC, ENGR, and Science Transfer Programs is shown in **Figure 1** (see Appendix). **Figure 2** provides the number of CCBC Associate degrees awarded and students in the targeted major programs from FY2007 – FY2011 with demographic information for STEM disciplines, highlighting the percentage of female and underrepresented minority students.

### S-STEM Awardees at CCBC

Award criteria are shown in **Figure 3**. As shown in **Figure 4**, 99 individual CCBC students (36 Females and 63 Males) received S-STEM Scholarship awards over the period from Fall 2008 through Fall 2012. The average length of award was 2.55 semesters, and the average award was \$3450 per year. Thirty-seven (37%) percent (94/252) of these semester awards were made to women.

Associate Degree Program	Number of Awards through Fall 2012	
	F	M
<b>BIOL</b>	39	24
<b>CHEM</b>	11	19
<b>CMSC</b>	10	9
<b>ENGR</b>	22	77
<b>ENVS</b>	1	7
<b>PHYS</b>	5	11
<b>MATH</b>	6	11
<b>Total Awards</b>	<b>94</b>	<b>158</b>
<b>Transfer Awards</b>	<b>22</b>	<b>47</b>
<b>New Awardees</b>	<b>36</b>	<b>63</b>

**Figure 4. CCBC S-STEM Semester Awards Fall 2008 through Fall 2012 by Program and Gender**

**Figure 5** shows that of the 99 awardees, there were 36 in ENGR, 25 in BIOL, 13 in CHEM, 10 in CMSC, 8 in MATH, 4 in PHYS, and 3 in ENVS. **Figure 5** also shows differences by gender in the major programs selected by the 99 awardees. Although BIOL was the major program for 39% of the female awardees, it was selected by only 17% of the male awardees.

Although ENGR was the major program for 44% of the male awardees, it was selected by only 22% of the female awardees.

### Benefits of Mentoring Awardees

High-quality connections between students and faculty can increase student retention in college. Astin identified the 3 most powerful forms of involvement contributing to student success as: "academic involvement, involvement with faculty, and involvement with student peer groups" (Astin, 1996). Cohoon found that mentoring and providing encouragement to persist were effective interventions for retaining women in computing majors at the undergraduate level (2003). Many community college students are the first in their families to attend college. Having a specific faculty member assigned to them as a mentor who will remain with them throughout their college career can be an important factor in helping them achieve their career goals. Therefore, each S-STEM awardee is assigned a CCBC faculty mentor based on the student's major and/or campus. Since traditional CCBC students are not assigned specific academic advisors to guide them through college, the S-STEM mentorship program is a major benefit for awardees. Over the years of this project, 10 faculty members from the targeted STEM fields each mentored from 1 to 6 awardees per semester. Faculty mentors met by phone, email, or in person, at least once a month with their student mentees.

Each semester before classes began, 1 or 2 required STEM Career Days were held for awardees to provide an orientation to the S-STEM scholarship program, an overview of STEM major program requirements, and activities including guest speakers or panelists from STEM occupations with a focus on STEM career and transfer information. Before each semester, awardees completed mentoring agreement forms and met over lunch with their mentors. Awardees also completed a Likert-scale Attitude Assessment Questionnaire, shown in (Mento, Sorkin, & Prettyman, 2006). The questionnaire was provided by Claudia Morrell, then Director of the Center for Women & Information Technology at the University of Maryland Baltimore County (UMBC, 2013). Results from analysis of selected items from the questionnaire are provided in (Sorkin & Gore, 2010).

### Monitoring Awardee Progress

The program had controls and reviews in place, so weaker students could be identified quickly and given appropriate support for academic success. Each awardee's progress was monitored to identify whether they had maintained eligibility from semester to semester. A probation procedure was used for students who fell just short of completing the required 12 credits, or of maintaining the required 2.8 GPA for renewal. The probation option gave borderline students another semester of scholarship aid to improve their grades while being tracked more closely. However, students whose academic performance was significantly lower than required lost their scholarships and had to regain good academic standing before reapplying. The renewal application process for students transferring to a four-year institution ensured that these awardees had a STEM major, had an advisor, and had registered as fulltime students at their transfer institution. In addition, CCBC S-STEM mentors continued to mentor their transferring awardees.

#### **Mentoring by Faculty in S-STEM Programs**

Each awardee signed a Mentoring Agreement and mentoring logs were due monthly or bi-monthly from all mentors and mentees. The responsibilities of each student (mentee) and faculty member (mentor) were clearly communicated when the student first received the award, and reinforced during the Summer Career Experience, and the Career Luncheon Seminar Series for awardees and faculty mentors. During the interactions, one helpful activity was development and management of an Individual Academic Learning Plan created by students under the guidance of faculty mentors. The IALP helped the student gauge the amount of time and coursework necessary to complete his/her studies before transfer to a four-year institution and/or completion of the associate's degree.

#### **Efforts to Increase the Transfer Rate**

This program encouraged awardees to continue their studies at four-year institutions. The project proposal designated a portion of its scholarship funds to "follow" awardees who transfer and assist their completion of bachelor's degrees in these fields for up to 2 semesters after transfer. A total of 27% of semester awards (69/252) were such transfer awards. To be eligible for the transfer scholarship awards, renewal scholarship students must have earned

an Associate's degree, or at least 45 credits at CCBC, and provide documentation of their acceptance and full-time status at the four-year institution in a STEM major; unmet financial need; and successful completion of prior coursework in a STEM degree program. Offering students the option of transferring their S-STEM scholarship along with their credits to a four-year institution enabled students to reach greater success in a STEM field by drawing attention to the possibility of transfer to a four-year school for students who otherwise might not have considered transfer.

### **5. DEFINING SUCCESSFUL STUDENT OUTCOMES**

#### **Transfers among S-STEM Awardees**

Considering all 99 awardees from Fall 2008 through Fall 2012, as of June 2013, a total of 73 awardees ( $73/99 = 74\%$ ) have transferred to 4-year colleges/universities. In all, 24 female ( $24/36 = 67\%$  of female awardees), and 49 male ( $49/63 = 78\%$  of male awardees) awardees have transferred. Thirty-seven (37) awardees have transferred to the University of Maryland Baltimore County (UMBC), 10 others to the University of Maryland College Park (UMCP), 7 to Towson University (TU), and lesser numbers to 15 other institutions. Major programs for those 73 who have transferred are: 25 ENGR, 12 BIOL, 6 CMSC, 6 MATH, 5 PHYS, 3 CHEM, 2 ENVS, 2 Information Systems, 1 Economics, 1 Forensic Science, 1 Animal Science, 1 Medical Research Technology, 6 Pharmacy, 1 Unknown, and 1 Nursing. (Because Pharmacy and Nursing are clinical programs, those 7 former awardees were not eligible to receive S-STEM funding upon transfer.)

#### **"Success Rate" for CCBC S-STEM Awardees**

Of the 73 awardees who have transferred, 24 (5 female, and 19 male) have earned bachelor's degrees (as of August 2013) in Mechanical Engineering (7), Biology (2), Civil Engineering (2), Electrical Engineering (2), Materials Science & Engineering (2), Mathematics (2), Computer Science, Engineering, Financial Economics, Forensic Studies, Information Systems, Physics, and Secondary Mathematics. Time to bachelor's degree for those 24 was from 3.5 to 11 years after their initial CCBC entry, with mean time of 5.5 years from CCBC entry to bachelor's degree. An additional 14 (8 female, 6 male) awardees ( $14/99 = 14\%$ ) have graduated from CCBC with A.S., A.A., or A.A.T. degree but have not yet transferred. Another 11 (4 female, 7 male)

awardees (11/99 = 11%) are still enrolled at CCBC or other community college; and 1 (male) awardee (1/99 = 1%) has dropped out without transfer or graduation. All but one of the 11 awardees still enrolled at community college have earned over 40 credits as of June 2013. All but one of the 11 still enrolled have completed at least College Algebra (1), Calculus I (4), or higher (5). These awardee outcomes are summarized in **Figure 6**.

#### **MHEC Definition of "4-Year Success Rate"**

Just as 4-year colleges maintain data on the percentage of their students who graduate with bachelor's degrees 4, 5, or 6 years after entry, community colleges maintain data on the percentage of their students who transfer or graduate with an associate's degree 2, 3, or 4 years after entry. The "4-year success rate," as defined by the Maryland Higher Education Commission, counts those who transferred to a Maryland 4-year institution and/or graduated with an associate's degree or certificate within 4 years after entry. In the state of Maryland, the 4-year success rate of all 16,307 new full-time freshmen matriculating at Maryland public community colleges in 2007 (the most recent year for which 4-year data is available) was 35.8% (26.6% transferred, and an additional 9.2% graduated but did not transfer), 12.9% were still enrolled, and 51.3% had dropped out from college. At CCBC, the 4-year success rate of all 2,375 new full-time freshmen matriculating in all programs in 2007 was slightly lower at 31.9% (25.1% transferred and an additional 6.8% graduated but did not transfer), 15.5% were still enrolled at a Maryland community college, and 52.6% had dropped out without transfer or graduation. This is shown in **Figure 6**. Among the 16 public community colleges in Maryland, the 4-year success rate ranged from a low of 17.1% to a high of 47.2%. Transfer and graduation rates for African American (23.8%) and Hispanic (29.6%) students in Maryland community colleges remain below the rates for White and Asian students. (MHEC, 2012).

#### **Demographics of S-STEM Awardees**

As shown in **Figure 7**, the distribution of all credit students at CCBC in Fall 2009 by racial/ethnic group as self-described at course registration was as follows: White 53%, African American 34%, Asian 5%, Hispanic 3%, and Other/Unknown 5%. Minority groups that have been under-represented in STEM fields nationally have been represented among the 99

S-STEM awardees (from Fall 2008 through Fall 2012) in proportions close to or greater than their population percentage at CCBC. In particular, 38% of the 99 awardees were White, 32% were African American, 21% were Asian, 5% were Hispanic, and 3% were Other/Unknown.

**Figure 7** and **Figure 8** show that African American and Hispanic minority groups that are under-represented in STEM fields nationally are represented among the 99 S-STEM awardees (from Fall 2008 through Fall 2012) in proportions close to or greater than their percentage in S-STEM eligible programs at CCBC in Fall 2009. In particular, 31% of CCBC students in S-STEM eligible programs were African American and 4% were Hispanic, whereas 32% of the 99 S-STEM awardees (from Fall 2008 through Fall 2012) were African American and 5% were Hispanic.

### **6. AWARDEE OUTCOMES BY GENDER AND INITIAL MATHEMATICS PLACEMENT**

#### **Awards and Awardees by Gender**

**Figure 9** shows that in Fall 2009, 67% of CCBC students in S-STEM eligible programs were male, and 55% were full-time students. Although women are underrepresented in the S-STEM Scholarship awards made at CCBC under this project in comparison to their percentage of CCBC credit enrollment (63%), they are represented in proportion to their percentage in S-STEM eligible programs (33%). As shown in **Figure 4**, 37% (94/252) of the S-STEM semester awards from Fall 2008 through Fall 2012 were made to women. In the period from Fall 2008 through Fall 2012, 36% (36/99) of awardees were women.

#### **Outcomes and Success Rates by Gender**

The outcomes and success rates for the 36 female and 63 male awardees are shown in **Figure 10**. Among female awardees, 89% (32/36) transferred to a 4-year institution or graduated (but did not transfer). Among male awardees, 87% (55/63) transferred to a 4-year institution or graduated.

#### **Awardees with Initial Developmental Mathematics Placement Level at CCBC**

Students entering CCBC take an *Accuplacer* mathematics placement test which determines their initial mathematics placement. Fully 80% of entering students have an initial mathematics

placement that is developmental. That is, the student placed into one of the 3 developmental mathematics courses: MATH 081 Basic Mathematics, MATH 082 Introductory Algebra, or MATH 083 Intermediate Algebra. Among the total 99 (36F/63M) CCBC S-STEM awardees from Fall 2008 through Fall 2012 were 37 whose initial mathematics placement level at CCBC was developmental. Although most (30) of these 37 awardees initially placed into MATH 083, there were 4 who placed into MATH 082, and 3 who placed into MATH 081. The outcomes and success rates for the 37 awardees with initial placement into developmental mathematics, and the 62 who had initial placement into non-developmental mathematics are shown in **Figure 11**. Among those who initially placed into developmental mathematics, 89% (33/37) transferred to a 4-year institution or graduated (but did not transfer). Among those whose initial placement was into non-developmental mathematics, 87% (54/62) transferred to a 4-year institution or graduated.

Among the 99 total awardees, females formed 35% (13/37) of the developmental initial placement group, and 37% (23/62) of the non-developmental initial mathematics placement group of 99 total awardees. There were differences in major programs selected by the 2 groups as shown in **Figure 12**. In the developmental group, the most popular majors were BIOL (41%), ENGR (30%), and CMSC (16%). In the non-developmental group, the most popular majors were ENGR (40%), CHEM (18%), and BIOL (16%).

## 7. CONCLUSIONS

Since Fall 2008, ninety-nine (99) full-time CCBC students majoring in computer science, engineering and scientific fields received S-STEM scholarships for one or more semesters. Awardees also received pre- and post-transfer mentoring by STEM faculty at CCBC, optional internships, and STEM professional development opportunities with peers. Awardees have been highly successful in graduating and transferring in STEM fields, with 24 having already earned bachelor's degrees.

The success of this scholarship program at CCBC is clearly demonstrated by its "4-year success rate" of combined transfer and/or graduation (with an associate's degree) rates. That success rate was 32% for all full-time freshmen who

entered CCBC in 2007. The success rate for the 99 S-STEM scholarship awardees was more than doubled, at 88%

The project has been successful in reaching underrepresented minority African American and Hispanic students in these fields in numbers close to or greater than their population percentage among CCBC students. Thirty-seven percent (37%) of S-STEM scholarship awardees were African American or Hispanic.

Moreover, this project has shown that CCBC S-STEM awardees entering community college with initial developmental mathematics placement level (particularly at the Intermediate Algebra level) as determined by their *Accuplacer* mathematics placement test scores, have combined graduation and transfer rates (89% for 37 developmental mathematics level awardees) which are not statistically different from those of awardees who entered community college with non-developmental mathematics placement level (87% combined rates for 63 non-developmental mathematics level awardees).

Similarly, female CCBC S-STEM awardees had combined graduation and transfer rates (89% for 36 female awardees) which were not statistically different from those of male awardees (87% for 64 male awardees).

These are hopeful and unexpected outcomes having a positive impact on the development of human resources in STEM fields.

College administrators have recognized the importance of pre- and post-transfer academic and transfer advising for students in STEM transfer programs at community colleges. With Gates Foundation funding, a local 4-year university, University of Maryland Baltimore County, in collaboration with 4 regional community colleges (including CCBC) are now hiring a STEM Transfer program manager for a project to provide support infrastructure for prospective STEM transfer students from the 4 community colleges to UMBC.

Many of the awardees who received scholarships under this program had substantial unmet financial need of over \$10,000 per year as determined by FAFSA. They will go on to become productive, contributing and innovative

members of society. The 10 STEM community college faculty mentors (most in mathematics) who participated in this program will share what they learned from their direct work mentoring S-STEM awardees with their classrooms of students, the majority of whom will not pursue STEM careers.

## 8. ACKNOWLEDGMENT

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## Appendices

CCBC Program	Number of Full-Time Program Majors			Female Enrollment (Percent)			Associate's Degrees Awarded		
	Fall 2009	Fall 2010	Fall 2011	Fall 2009	Fall 2010	Fall 2011	FY 2009	FY 2010	FY 2011
<b>CMSC</b>	143	177	205	19%	16%	21%	6	7	9
<b>ENGR</b>	189	214	230	10%	13%	11%	1	3	10
<b>Science</b>	248	335	295	58%	60%	62%	14	21	22
<b>All Credit Programs</b>	8,558	9,038	8,973	62%	62%	62%	1,578	1,703	1,854

**Figure 1. CCBC Full-time program majors, percent female enrollment, and associate's degrees awarded in the CMSC, ENGR, and Science Transfer Programs**

CCBC Transfer Program	Associate Degrees Awarded over Five Years (FY07–FY11)	Students in the Major Fall 2010 (Full-Time + Part-Time)	% Women in the Major Fall 2010	% Non-Asian Minority in the Major Fall 2010
<b>CMSC</b>	34	345 (177+168)	16%	38%
<b>ENGR</b>	27	381 (214+167)	13%	41%
<b>Science</b>	61	644 (335+309)	60%	42%
<b>CCBC TOTAL</b>	8,199	26,425 (9,038+17,387)	62%	42%

**Figure 2. Number of CCBC Associate degrees awarded and students in the targeted major programs from FY2007–FY2011 with percentage of female and underrepresented minority students**



<b>Award Criteria for S-STEM Scholarship Students at CCBC</b>		
<b>Type of Applicant</b>	<b>Criteria for Consideration</b>	<b>Application Deadline</b>
<b>Current High School Senior or Recent High School Graduate (within 5 years)</b>	<ul style="list-style-type: none"> <li>• High School GPA 2.8, or higher</li> <li>• Completion of Algebra II with B, or higher</li> <li>• Completion of 2 high school science courses with B, or higher.</li> <li>• CCBC Math Placement test level of MATH 083 Intermediate Algebra, or higher.</li> <li>• Selection of eligible STEM major program.</li> </ul>	<p><b>June 1 for Fall</b></p> <p><b>December 1 for Spring</b></p>
<b>Current CCBC Student or Student Transferring to CCBC from Another College</b>	<ul style="list-style-type: none"> <li>• Cumulative GPA of 2.8, or higher</li> <li>• 12 or more credits earned within last 3 years</li> <li>• 6 credits of STEM coursework</li> <li>• Completed MATH 082 or higher, or CCBC Math Placement test level of MATH 083 Intermediate Algebra, or higher.</li> <li>• Selection of eligible STEM major program.</li> </ul>	
<b>Other Potentially Promising CCBC STEM Student</b>	<ul style="list-style-type: none"> <li>• Cumulative GPA of 2.5, or higher</li> <li>• Earned 6 credits of STEM coursework</li> <li>• Completed MATH 082 or higher, or CCBC Math Placement test level of MATH 083 Intermediate Algebra, or higher</li> <li>• Letter of recommendation from STEM program faculty</li> </ul>	
<b>Scholarship Renewal</b>	<ul style="list-style-type: none"> <li>• Completion of at least 12 credits with semester GPA 2.8 or higher in STEM program in previous semester</li> </ul>	
<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Awardees who have earned an Associate degree at CCBC or earned a minimum of 45 credits at CCBC in a STEM program are eligible to apply for a "transfer" award to a four-year institution in a STEM program there. However, such a "transfer" award will be made for at most 2 semesters while the student is at the four-year institution.</li> <li>2. Continuous MATH enrollment is required. That is, awardees must register for a MATH course each semester of award until all required mathematics for their STEM program is completed.</li> </ol>		

**Figure 3. Award Criteria for S-STEM Scholarships at CCBC**

Transfer Program	Female		Male		Combined	
	Number	Percent	Number	Percent	Number	Percent
<b>BIOL</b>	14	39%	11	17%	25	25%
<b>CHEM</b>	5	14%	8	13%	13	13%
<b>CMSC</b>	4	11%	6	10%	10	10%
<b>ENGR</b>	8	22%	28	44%	36	36%
<b>ENVS</b>	1	3%	2	3%	3	3%
<b>MATH</b>	3	8%	5	8%	8	8%
<b>PHYS</b>	1	3%	3	5%	4	4%
<b>TOTAL:</b>	36	100%	63	100%	99	100%

**Figure 5. Distribution of Major Programs for All 99 CCBC S-STEM Awardees Fall 2008 through Fall 2012 by Gender**

Outcome	All CCBC Full-Time Freshmen 4-Years after 2007 Entry		All 99 CCBC S-STEM Awardees from Fall 2008 through Fall 2012	
	Number of Full-Time Freshmen	% of Full-Time Freshmen	Number of Awardees	% of Awardees
<b>Transferred</b>	<b>596</b>	<b>25%</b>	<b>73 (24F/49M)</b>	<b>74%</b>
<b>Graduated (but did not transfer)</b>	<b>162</b>	<b>7%</b>	<b>14 (8F/6M)</b>	<b>14%</b>
<b>Still Enrolled</b>	<b>368</b>	<b>15%</b>	<b>11 (4F/7M)</b>	<b>11%</b>
<b>Dropped Out</b>	<b>1249</b>	<b>53%</b>	<b>1 (0F/1M)</b>	<b>1%</b>
<b>Total:</b>	<b>2,375</b>	<b>100%</b>	<b>99 (36F/63M)</b>	<b>100%</b>

**Figure 6. Comparison of Outcomes for All 99 CCBC S-STEM Awardees from Fall 2008 through Fall 2012 and for All CCBC Full-Time Freshman 4 Years after 2007 Entry (as of 6/3/13)**

Racial/ Ethnic Group	% of CCBC Fall 2009 Credit Enrollment	Females	Males	Total S-STEM Awardees	% of Total S-STEM Awardees
<b>White</b>	<b>53%</b>	13	25	38	38%
<b>African American</b>	<b>34%</b>	10	22	32	32%
<b>Asian</b>	<b>5%</b>	10	11	21	21%
<b>Hispanic</b>	<b>3%</b>	2	3	5	5%
<b>Other/ Unknown</b>	<b>5%</b>	1	2	3	3%
<b>TOTAL:</b>	<b>100%</b>	36	63	99	100%

**Figure 7. Racial/Ethnic Data for All 99 CCBC S-STEM Awardees Fall 2008 through Fall 2012**

S-STEM Eligible Program	African American		Asian		Hispanic		White		Other/ Unknown (includes Non- Resident Alien)	
	Count	%	Count	%	Count	%	Count	%	Count	%
<b>CMSC</b>	96	37%	22	8%	6	2%	111	43%	26	10%
<b>ENGR</b>	105	31%	31	9%	13	4%	153	45%	35	11%
<b>ENVS</b>	0	0%	0	0%	0	0%	22	96%	1	4%
<b>Sciences (includes BIOL, CHEM, PHYS, MATH)</b>	135	29%	47	10%	19	4%	195	43%	62	14%
<b>TOTAL (1079 students):</b>	<b>336</b>	<b>31%</b>	<b>100</b>	<b>9%</b>	<b>38</b>	<b>4%</b>	<b>481</b>	<b>45%</b>	<b>124</b>	<b>11%</b>

**Figure 8. Number and Percent of CCBC Enrollment in S-STEM Eligible Programs in Fall 2009 by Racial/Ethnic Group**

S-STEM Eligible Program	Full-Time		Part-Time		Total	Male	Female
	Count	%	Count	%			
CMSC	143	55%	118	45%	261	81%	19%
ENGR	189	56%	148	44%	337	90%	10%
ENVS	14	61%	9	39%	23	61%	39%
Sciences (includes BIOL, CHEM, PHYS, MATH)	248	54%	210	46%	458	41%	59%
<b>TOTAL (1079 students):</b>	<b>594</b>	<b>55%</b>	<b>485</b>	<b>45%</b>	<b>1079</b>	<b>67%</b>	<b>33%</b>

**Figure 9. CCBC Enrollment in S-STEM Eligible Programs in Fall 2009 by Full-Time/Part-Time Status and Gender**

Outcome	Female		Male		Combined	
	Number of Awardees	% of Awardees	Number of Awardees	% of Awardees	Number of Awardees	% of Awardees
Transferred	24	67%	49	78%	73	74%
Graduated (but did not transfer)	8	22%	6	10%	14	14%
Still Enrolled	4	11%	7	11%	11	11%
Dropped Out	0	0%	1	2%	1	1%
<b>Total:</b>	<b>36</b>	<b>100%</b>	<b>63</b>	<b>100%</b>	<b>99</b>	<b>100%</b>

**Figure 10. Outcomes for All 99 CCBC S-STEM Awardees from Fall 2008 through Fall 2012 by Gender (as of 6/3/13)**

Initial Mathematics Placement	Developmental Level		Non-Developmental Level		Combined	
	Number of Awardees	% of Awardees	Number of Awardees	% of Awardees	Number of Awardees	% of Awardees
<b>Transferred</b>	26 (8F/18M)	70%	47 (16F/31M)	76%	73 (24F/49M)	74%
<b>Graduated (but did not transfer)</b>	7 (4F/3M)	19%	7 (4F/3M)	11%	14 (8F/6M)	14%
<b>Still Enrolled</b>	4 (1F/3M)	11%	7 (3F/4M)	11%	11 (4F/7M)	11%
<b>Dropped Out</b>	0	0%	1 (0F/1M)	2%	1 (0F/1M)	1%
<b>Total:</b>	37 (13F/24M)	100%	62 (23F/39M)	100%	99 (36F/63M)	100%

**Figure 11. Outcomes for All 99 CCBC S-STEM Awardees from Fall 2008 through Fall 2012 by Initial Mathematics Placement Level at CCBC (as of 6/3/13)**

Major Program	Developmental Level		Non-Developmental Level		Combined	
	Number of Awardees	% of Awardees	Number of Awardees	% of Awardees	Total Number of Awardees	% of Total Awardees
<b>BIOL</b>	15 (7F/8M)	41%	10 (7F/3M)	16%	25 (14F/11M)	25%
<b>CHEM</b>	2 (2F/0M)	5%	11 (3F/8M)	18%	13 (5F/8M)	13%
<b>CMSC</b>	6 (2F/4M)	16%	4 (2F/2M)	6%	10 (4F/6M)	10%
<b>ENGR</b>	11 (2F/9M)	30%	25 (6F/19M)	40%	36 (8F/28M)	36%
<b>ENVS</b>	1 (0F/1M)	3%	2 (1F/1M)	3%	3 (1F/2M)	3%
<b>MATH</b>	2 (0F/2M)	5%	6 (3F/3M)	10%	8 (3F/5M)	8%
<b>PHYS</b>	0	0%	4 (1F/3M)	6%	4 (1F/3M)	4%
<b>TOTAL:</b>	37 (13F/24M)	100%	62 (23F/39M)	100%	99 (36F/63M)	100%

**Figure 12. Distribution of Major Programs for All 99 CCBC S-STEM Awardees from Fall 2008 through Fall 2012 by Initial Mathematics Placement Level at CCBC**