

**Implementation of the Computer Science, Engineering
Technology, and Mathematics Scholarship (CSEMS)
Program at Buffalo State College**

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The CSEMS program at Buffalo State College (BSC) is funded by a grant from the National Science Foundation (NSF). This program provides scholarships and career/educational opportunities for academically talented students that are financially needy in the areas of in computer science, computer technology, mechanical engineering technology, electrical engineering technology or mathematics. CSEMS better prepares the scholarship recipients to enter the workforce and with less education incurred debt than the typical undergraduate student.

CSEMS emphasizes the importance of recruiting students to high technology disciplines, mentoring and supporting students through degree completion, and partnering with industry to facilitate student career placement in the high technology workforce. Program goals include:

- Increasing the numbers of highly skilled and well educated individuals in technical areas of national need;
- Improving the educational opportunities for CSEMS scholars;
- Increased retention and graduation rates for students;
- Improving student support programs for these students;
- Strengthened partnerships between BSC and industry.

CSEMS students at Buffalo State College meet several times a semester, to listen to and discuss career-related topics with industry experts. Additionally, the Career Development staff at Buffalo State offers CSEMS students individualized attention to help them succeed in their pursuit of a degree and with career planning.

Program results show an increase in the number of students participating, along with an increase in the number of students graduating. The CSEMS grant provides an attractive recruitment incentive and means for attracting the top transfer students.

Introduction

The Computer Science, Engineering & Mathematics Scholarship (CSEMS) program, is funded by a grant from the National Science Foundation (NSF). It is a special scholarship program for academically-talented students who are pursuing a baccalaureate degree in Computer Information Systems (CIS), Engineering Technology (ET), and Mathematics. This program supports scholarship candidates who are full-time juniors or seniors in ET, CIS, or Mathematics; eligible for the Pell grant or have FAFSA need; US citizens; and has at least a 3.0 out of 4.0 GPA or demonstrates exceptional academic progress. Approximately 40 scholarships are awarded every semester and the amount of each scholarship has been as much as \$1562.50 per semester. Additionally, the Career Development staff at Buffalo State offers CSEMS students individualized counseling to help them succeed in their pursuit of a degree as well as with career and professional development.

Significant portions of the CSEMS program included the following activities:

- Providing scholarships to full-time juniors and seniors who have financial aid eligibility and have demonstrated academic maturity.
- CSEMS Professional Development Colloquium Series for the CSEMS scholars. The colloquium provides specialized topics that are not typically included in the normal course work.
- Mentor/counseling portion that supplements the CSEMS scholars' academic and career development.
- Tutor network necessary for the CSEMS students to volunteer to tutor students.

The CSEMS students benefited not only from the financial support but also from the useful information presented at the colloquia. The colloquia topics are carefully selected to better-prepare students for life immediately after graduation by developing interviewing skills, and locating jobs in Western New York. The colloquia were also designed to provide the CSEMS students with career tips that will likely enhance success early in their professional career.

BSC Demographic Information

Of the 11,200 students at Buffalo State College, more than 16% came from under-represented populations and the 65% of enrolled freshmen were first generation college students who are qualified to receive need-based financial assistance. (See Tables 1 & 2).

Table 1. BSC Student Enrollment Data at Buffalo State College

Enrollment

BSC	Fall 2003	Fall 2002	Fall 2001	Fall 2000
Undergraduate Total	11,157	11,803	11,743	11,399

Gender

BSC	Male	Female
	38.1%	61.9

Ethnicity

BSC	African American	Asian	Caucasian	Hispanic	Native American	Non Resident Alien	Undisclosed
	10.4%	1.3	69.2	3.7	0.5	0.8	14

Table 2. BSC Student after Graduation Data at Buffalo State College

After Graduation Data

Student placement in higher education upon graduation (as a % of the entire graduating class)

BSC Undergraduate Total	Full Time	Part Time
2003 Alumni Survey	13%	16
2002 Alumni Survey	11	18

After Graduation Data

Student placement in employment or further higher education upon graduation

BSC	Full Time	Unemployed, Not seeking Employment	Part-time	Unemployed, Seeking Employment	Military
Undergraduate Total	71%	5	15	1	8

Engineering Technology Demographics Information

Many of the BSC students entering these technical programs hold Associate Degrees (or equivalent), with approximately an equal number of students coming to BSC as freshmen. The diversity of ET students at BSC is a large challenge/opportunity that has been addressed by Barker^{1,2}. All the graduates from these areas are in demand as evidenced by more than 100 companies that have requested student graduate resumes for

graduates in these areas through the BSC Resume Referral Service. Most students are employed full time after graduation; however some students go on to graduate school (see Tables 3 & 4).

Table 3. BSC Engineering Technology Student Enrollment Data at Buffalo State College

Enrollment

Engineering Technology	Fall 2003	Fall 2002	Fall 2001	Fall 2000
Majors	178	197	202	193

Table 4. BSC Engineering Technology Student After Graduation Data at Buffalo State College

After Graduation Data Engineering Technology

Student placement in employment or further upon graduation

Engineering Technology*	Full Time	Unemployed, Not seeking Employment	Part-time	Unemployed, Seeking Employment	Military
	72%	7	7	0	14

Student higher education

Engineering Technology*	Enrolled f/t in grad degree program	Enrolled p/t in grad degree program	Enrolled in a certificate program	Enrolled in grad courses	Not presently enrolled, but plan to in the future	Not presently enrolled and no plans to in the future
	7%	11	4	0	57	21

* all programs combined – some are not part of CSEMS

Student Criteria

With this NSF award, students at Buffalo State College who are juniors or seniors majoring in Computer Information Systems, Engineering Technology, and Mathematics will have the opportunity to qualify to receive a renewable scholarship each semester. The following primary qualifications will be required of all scholarship recipients:

- United States citizens, nationals, or aliens admitted as refugees
- Eligibility for financial aid (FAFSA),
- Full-time status (at least 12 semester hours), and
- Academic maturity and talent.

Based upon financial qualifications and GPA, students will be invited to apply for the scholarship. The students who demonstrate the primary qualifications and who also

have the strongest academic talent will be awarded the scholarships. Additional criteria that can be used to assess the academic maturity and talent of the students include:

- Over-all GPA at least 3.0
- Indicators of professional success, such as part-time employment in a related industry.
- Exceptional leadership potential, professionalism, and other characteristics of academic maturity.
- Applicants who come from diverse backgrounds and with diverse career goals.
- Motivation, ability to manage time and resources, and communication skills.

While compliance with all criteria is desired, it is recognized that some students will not qualify in all areas.

The major requirements of the students after meeting the qualifications listed previously are the willingness to (1) interview with the CSEMS selection team, (2) maintain a full-time status during the semester of the scholarship, (3) attend and participate in the CSEMS colloquium series, (4) attend and participate in the career and academic consulting, (5) maintain an acceptable GPA and (6) Volunteer to tutor students.

Student Selection Process

Posters and CSEMS program information are regularly circulated to students in the targeted areas and CSEMS information sent out to other colleges. The CSEMS management team will use computer databases, that are readily available, to determine full time status, CSEMS status, major, financial eligibility, and transfer status. For those students who are possible CSEMS-grant recipients, the director of the Financial Aid office may also be used to identify other students who may qualify for the CSEMS program. The director of the Financial Aid office and the CSEMS management team are all aware of the privacy issues related to financial aid analysis, therefore every effort will be taken to protect that information in all literature and reports regarding the CSEMS scholars financial information. The Financial Aid office also confirms the students who meet the citizenship requirements of the CSEMS grant. Ultimate responsibility for insuring that all CSEMS grant recipients meet the primary qualifications lies with the CSEMS management team. They will also be responsible for selecting the most-qualified students. An equitable distribution of scholarships among the three disciplines will be secondary to a distribution based on qualifications. Students may decline the CSEMS opportunity for any reason without penalty.

Initial lists of student names are compiled, these lists will be those students who meet the primary qualifications of the CSEMS program; an additional list will be those students who lack some of the qualifications. Letters which describe the CSEMS program and which list all the qualifications for CSEMS grants will be initially sent to those students on the primary list informing them of their preliminary qualification. Students who intend

to apply for scholarships may ask faculty members and employers for letters of recommendation. Transfer students will be accepted initially based upon their previous college performance and letters of recommendation from faculty. Students may be interviewed and application materials reviewed by the CSEMS management team. Students will be selected for the CSEMS awards based on the results of the material review/interview.

In specific cases, necessary interviews will be scheduled with qualified and interested students as soon as possible after grades are available from the previous semester. Each interview/review will result in a single numeric score which is the average team score. An interview checklist containing points for each criterion will be used to determine the score. The point distribution for the qualification items will be determined by the selection team prior to the interview/review. The selection team has the freedom to change the point distribution each semester as necessary. Students with top scores will receive the CSEMS grants in the case where there are more qualified students than grants to be received. The CSEMS management team will independently confirm that each scholarship recipient meets the primary qualifications prior to the first award notification and for each continuing award. Each scholarship will be applied to tuition and other academic charges normally billed to all full-time students.

When CSEMS students are selected, qualifications of the students will be considered more important than any distribution. If a scholarship recipient fails to meet the requirements of the award during the award period, he/she will be allowed to reapply for the scholarship along with the other first-time candidates. One example is a student who is forced to become a part-time student during the award period through factors beyond his/her control. Students who continue to meet the qualifications and requirements of the award will have to renew. The CSEMS management team will confirm the qualifications for each renewal.

All students who applied for CSEMS were accepted, because only qualified CSEMS applicants were invited to apply. A few unqualified students expressed interest in the CSEMS, but they were not invited to apply. Less than 5.5% of the students, who were invited to apply, rejected the invitation.

CSEMS Student Support Services

The primary support structure for the CSEMS scholars is the CSEMS colloquia series and career counseling sessions. Outstanding support services are available to all BSC students (e.g. counseling, academic tutoring, advising, library assistance, faculty mentoring, minority student services, office of equity and diversity, etc.). The CSEMS Management Team has an excellent long term working relationship with Career Development Center (CDC), Financial Aid Office, and the Research Foundation. A comprehensive program includes the following:

Advisement, Career Counseling, and Mentoring– Providing individual academic, career and personal advisement sessions with all participants to discuss a plan of action to

successfully complete a degree and to closely monitor that plan to success. The CSEMS Counselor provides ongoing mentoring to scholarship participants, as well as individualized job search assistance.

Corporate Connections – Ongoing linkages in different formats are created for participants with corporate employer representatives from the local technical employment community. Employer connections are made through presentations offered by hiring and technical personnel on topics that include: What are Employers Looking for in Technical Candidates, Inside Hiring Tips, and Career Paths and Opportunities for new Technical Graduates. In addition, mock interviews will be conducted by human resources personnel, and corporate mentors will be available to provide guidance, exposure and advice on succeeding in a technical career.

Employment Skills Programs – Regularly scheduled programs are offered for participants including such topics as Professional Business and Eating Etiquette, How to Network in the Technical Job Search, as well as Writing Effective Resumes and Cover Letters, Career / Job Search and Interviewing to name a few. Special programs, such as an Etiquette Dinner where CSEMS students would be given the opportunity to interact with and learn from professionals are regularly organized.

Other Programs - Financial Planning, Dressing for the interview, Etiquette during the interview, What the first job is like, Entrepreneurship in the first job, How to get along with your boss (MBTI), Building professional networks, Public Speaking, Ethics in the workplace are samples of topics included in our colloquia series.

A dedicated counselor is available to maintain and enhance the CSEMS support program and handle the administrative details of the grant including recruitment activities. The CSEMS Counselor/Advisor supervised by the CSEMS management team. Regular contact will be made with grant participants by phone, email, mail, website updates and monthly group meetings.

While this seems to be a subtle component, counseling was the most liked component by CSEMS students at Buffalo State. This value added component that has greatly enhanced the educational experience of the CSEMS students that were involved. Evaluations and written student comments of the individual counseling services and support programs have been consistently rated high in terms of helpfulness, resources and information. On a large public college campus it can be difficult to find the necessary service and/or individual to assist with your academic, personal, and/or career needs. Having the CSEMS support program located in the CDC has proven to be a great success.

According to the 2004 Job Outlook survey published by the *National Association of Colleges and Employers*, national employers are looking for a well rounded candidate who has the following: top personal qualities/skills: oral and written communication, honesty/integrity, interpersonal, motivation/initiative, strong work ethic, teamwork, analytical, flexibility/adaptability, well mannered, and leadership. In addition, technical candidates must have these qualities developed to guarantee corporate survival as a new

professional, no longer is a degree the guarantee for success in the business world. To help the CSEMS students gain these life/career skills, a support program is essential. It is a natural fit on our campus to provide opportunities for personal skill development through the CDC.

Significance and Outcomes of the CSEMS Grant

Closer collaboration between Mathematics, Computer Information Systems, and Engineering Technology faculty is a result of the CSEMS colloquia. Students from all three disciplines benefit from the CSEMS colloquia, which describe solutions to common problems involving all three disciplines. Since under-represented groups participate in the CSEMS program, the opportunity exists within the CSEMS colloquia to offer programs that will be significant to them. Financial aid is expected to permit students to focus more on their education and less on financial concerns. The career counseling allows the students to achieve their potential both academically and professionally.

Program outcomes include:

- Improved education for CSEMS recipients from ET, CIS, and Mathematics - closer collaboration between the three departments will serve to strengthen and enhance the strong interrelationships already in place. *Scholar performance and graduation rates are maintained.*
- Increased retention of students to degree achievement - *retention records are maintained that clearly document the participation and progress of the CSEMS students.*
- Improved professional development and employment or further higher-education placement of participating students. *Surveys of previous CSEMS students are conducted yearly.*
- Strengthened partnership between BSC and local industry - Industry representatives are invited to participate in the colloquia series. *A database of mentoring industrial representatives are kept, listing discipline and the necessary contact information of these individuals.* Engineering Technology currently has industrial advisory committees, and those advisory committees are utilized during student selection and the design of the CSEMS colloquia series.
- Decreased time to graduation – Students benefit from the financial benefits of this award. *Graduation rate and time to graduation are kept for the CSEMS scholars.*

Table 5. Number of CSEMS Scholarships, by semester, Awarded at Buffalo State College

Semester	Students
Spring 2000	24
Fall 2000	31
Spring 2001	28
Fall 2001	35
Spring 2002	43
Fall 2002	48
Spring 2003	40
Fall 2003	49
total	298

Summary

Table 5 shows that the number of students participating in the CSEMS program has increased from the initial levels. The CSEMS students benefited not only from the financial support but also from the useful information presented at the many colloquia. CSEMS students at Buffalo State College meet several times a semester, to listen to and discuss career-related topics with industry experts. Additionally, the Career Development staff at Buffalo State offers CSEMS students individualized attention to help them succeed in their pursuit of a degree and with career planning. The colloquia were designed to provide the CSEMS students with information that will enhance success after graduation. They were carefully selected to better-prepare students for graduation by developing interviewing skills and locating jobs in Western New York. A summary of colloquium topics include:

- Brainstorming
- Employer panel
- Problem-solving skills
- Team building
- Leadership styles
- Interacting with employers
- Interviewing skills (repeated)
- Public speaking
- Job searching/locating
- Financial planning
- Ethics and corporate culture
- Resume and cover letter preparation
- Communication skills
- Interview techniques
- Locating computer-related jobs in Western New York
- Using a personality model (MBTI) in the workplace
- Resume and cover letter preparation (repeated)
- Entrepreneurship
- Federal Jobs
- Building networks with technical professionals
- Views of NY State Senator on the Future of NY
- MBTI and leadership

The CSEMS students evaluated each colloquium, and their evaluations were very positive. Colloquia evaluations are presented in the BSC CSEMS webpage at <http://tech2.buffalostate.edu>

Some Written Student Comments

- Just wanted to let you know I thought the program was great and expect to be back next year. I appreciate all the help with getting my career on the right track. The meetings were great especially the personality assessment. I look forward to some sight tours. Your interview session was splendid. I think I have made a great contact in the career development center. Thank You for all your help and plan on seeing me in the near future. Thank You, *Daniel Bender*
- Hi! I think the CSEMS Program is GREAT! What a way to show students what they should expect when entering the job force. By showing an inside perspective of people who are currently working in the various fields represented by the CSEMS program, some prior recipients of CSEMS themselves, it gives current students the confidence they need to know that they can succeed once their stay at Buffalo State College is complete. I salute you and your staff for the hard work in providing this service to all of us. I look forward to next semester. Thank you very much. *Jason Lavin*
- The CSEMS program was a great experience that I'm grateful to be a part of. Academics is only one part of the college experience, the CSEMS program is a second part that helps people acclimate themselves to the professional environment. Anyone who has been asked to participate in the CSEMS program is at a greatly higher advantage, personally and professionally, than those who have not. I hope to be asked to participate again next semester, regardless of the outcome of winning the scholarship. *Gerald Laventure*
- CSEMS has been a great learning experience that complements the MET program so well. The three sessions were so informative, very helpful to hear from speakers who had such pertinent information to share. All information and support will be carried with us and put to use during our entire time at college and throughout our careers. I hope to see this program continued thru the years as it is a great support and learning experience that contains information, sources and skills that are not present in a classroom but complement our education here so well and prepare us for life long careers. I value my involvement in CSEMS as an important addition to classroom learning. Thank you, *Colleen Tappan*

- I am truly sorry I did not get a response back to you before the 4th. There are many times I go a while without checking my E-mail. I know this is past your deadline but I'm going to tell you what CSEMS has meant to me. As a non traditional student going back to school was tough. Not only did I average almost 20 years older than my classmates, but the financial burden almost made it not worth it. However, I am a person who strives to be the best at whatever I do. Obtaining above average grades is one of those areas where I strive. Doing well in school doesn't always reap immediate benefits though. CSEMS changed that. For once in my life my dedication to obtaining good grades and not just getting by, has paid off. And not with the traditional congrats with a pat on the back; I was awarded money! Not that I'm greedy or anything but receiving cash for good grades was alright by me. It also came at the time when I needed it most. I was struggling to make ends meet and had to spend what little money I had saved for Xmas on tuition. Two weeks before Xmas and I had no gifts for my daughter. Now she is the kind of kid who would understand but I just wouldn't have felt like a decent father if she had nothing to open Xmas morning. Anyway, like an answer to my prayers, CSEMS provided me with the money to pay my tuition. My daughter had her Xmas and everyone was happy. Along the way I did pick up some really helpful info as well as networking skills to help me upon graduation. To me however, I will always remember how CSEMS helped me prevent the Xmas that almost never was. All I had to do was get good grades!

Michael Johnson

Figure 1 shows the ethnic make-up of the CSEMS Scholars at Buffalo State. As can be seen, the CSEMS program is made up of a very diverse population. When comparing the CSEMS ethnic makeup to that of the college as a whole (see Table 6) the group of CSEMS scholars is more diverse than the BSC population. However when comparing the gender make-up of the college (38.1% male, 61.9% female) to that of the CSEMS program (See Figure 2), the gender make-up of the CSEMS program is different than the make-up of the college. However the CSEMS gender make-up is very similar to the classroom make-up of the courses offered by the various departments. Males tend to make up a large percentage of the students enrolled in these technical areas. The retention and graduation rates of the CSEMS Scholars are in excess of 95%, however these exceptional rates cannot be credited entirely to the CSEMS program, rather to the quality of the student that participates in the program. Figure 3 shows a year classification of students; here one sees more seniors than juniors. This may be explained by the fact that the typical student takes more than four years to finish a bachelor's degree in a technical field. Additional results were summarized in Kukulka, Barker, Favata and Sanders³.

CSEMS Demographics: Ethnicity

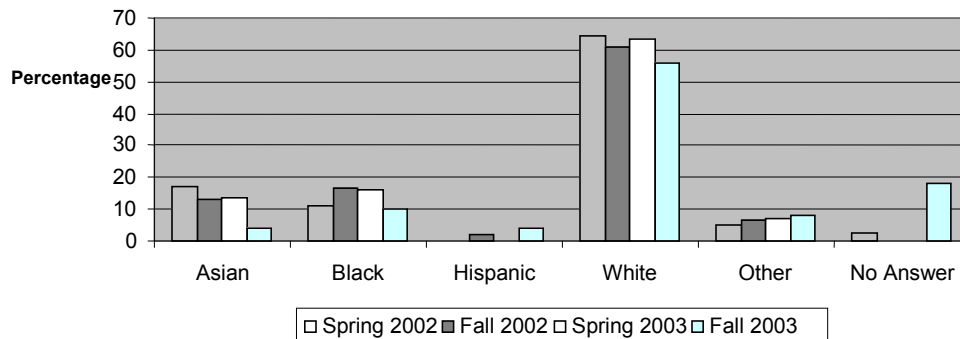


Figure 1. A Comparison of CSEMS Scholar Ethnicity at Buffalo State during 2002-2003

BSC	African American	Asian	Caucasian	Hispanic	Native American	Non Res Alien	Undisclosed
	10.4%	1.3	69.2	3.7	0.5	0.8	14

Table 6. A Comparison of Buffalo State College Student Ethnicity during 2002-2003

CSEMS Demographics: Gender

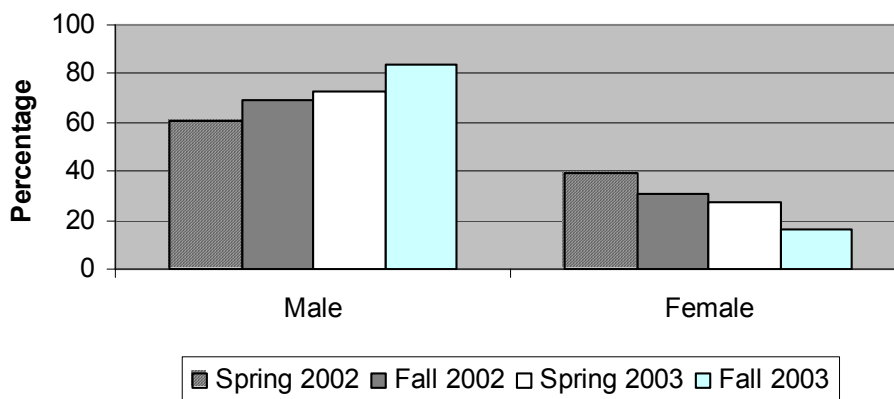


Figure 2. A Comparison of CSEMS Scholar Gender at Buffalo State during 2002-2003

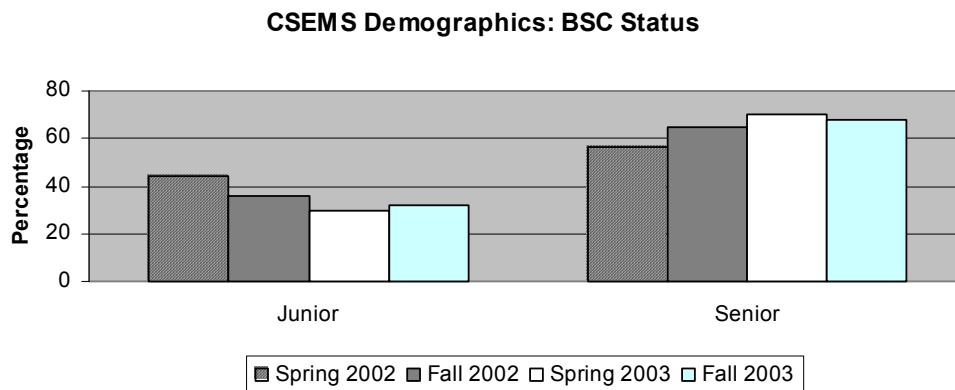


Figure 3. A Comparison of CSEMS Scholar Class Status at Buffalo State during 2002-2003

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