

Interventions to Promote Degree Completion in Science, Technology, Engineering, and Mathematics

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Abstract - This paper describes efforts, through the National Science Foundation's Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP), to increase the number of women and underrepresented minorities who complete degrees in these fields at The Community College of Baltimore County, under a sub-award from the University of Maryland Baltimore County in 2003. Interventions used included: non-need based scholarships of \$1,000 per year, a summer bridge program at UMBC in August 2003, and faculty mentoring of awardees. Scholarship awardees were also given the opportunity to complete a 120-hour paid internship in their intended field of study. Scholarship award and renewal criteria included full-time student status and a required minimum Grade Point Average, in addition to U.S. citizenship, or status as permanent resident alien or refugee alien. Data on awards made, scholarship retention, internships completed, associate degree attainment, and transfers to four-year institutions are presented.

Key Words - computer science, engineering, internships, mentoring, minorities, NSF, scholarships, transfer rate, women

WOMEN AND MINORITIES IN STEM FIELDS

Less than half of the freshmen intending to major in science and engineering fields complete a bachelor's degree in those fields within 5 years, and underrepresented minorities drop out of those majors at a higher rate than other groups [10]. Women especially face negative societal pressures when pursuing careers in science, computer science, engineering, and mathematics. Many women who have academic skills in these areas choose not to major in the sciences, and those who do may not finish a degree. In 2003, although women were 46% of the total U.S. workforce, they were 26% of the college educated science and engineering workforce [9]. African Americans, Hispanics, and other non-Asian/Pacific Islander ethnic groups were 24% of the U.S. population in 2003, but 10% of the college educated science and engineering workforce [9]. Collectively, these underrepresented minorities constituted 11% of engineering graduates in 2003 [8], and women constituted 20% [11]. Students who drop out of science, engineering, and mathematics programs often do so within their first two years of college. The percentage of foreign-born college graduates (including both U.S. and

foreign degreeed) in science and engineering jobs increased from 11.2% in 1980 to 19.3% in 2000 [9]. It has been projected that in 2010, 47.9% of the workforce will be female and 26% will be African American or Hispanic [2]. To meet the need for qualified computer scientists and engineers in the U.S., women and underrepresented minorities must be encouraged and educated to join the science and engineering workforce.

INSTITUTIONAL BACKGROUND INFORMATION

The Community College of Baltimore County (CCBC) is a public three-campus system serving the greater Baltimore metropolitan area. Fall 2006 credit enrollment at CCBC overall was 19,446 students of which 35% (6,846) were full-time students. In Fiscal Year 2006, 40% of the credit students were enrolled in transfer programs, 63% were female, and 31% were African American. The percentage of African American students has increased over the past 5 years from 26% to 31%. In FY 2006, the total number of Associate's degrees awarded at CCBC was 1,451 of which 56% were Transfer Degrees, and 44% were Career Degrees. Of the 1,782 graduates who earned either Associate degrees (1,451 graduates) or certificates (331 awards) in FY 2006, 61% were female and 23% were African American. The institutional rate of Pell awards provides one indication of the amount of financial need. At CCBC in the 2004-05 academic year, 25% of the credit students received a Pell grant. Of these Pell awardees, 53% were African-American, and 73% were Female. Sixty-five percent (65%) of students received some type of financial aid. In FY 2006, tuition and fees at CCBC were 43% of those at Maryland public four-year institutions.

Full-time Credit Enrollment at CCBC has varied less than 4% from Fall 2002 to Fall 2006. CCBC data on Full-Time Enrollment and Associate's Degrees in Computer Science (CMSC) and Engineering (ENGR) are provided in **Table I**. Such data for Biology (BIOL), Chemistry (CHEM), Physics (PHYS), and Mathematics (MATH) are not available. The number of Full-Time students majoring in CMSC at CCBC decreased 48% from Fall 2002 to Fall 2006, while the number majoring in ENGR has not shown such a decrease. Although females have consistently represented the largest portion of CCBC graduates and credit students over the past 5 years, the percent of women in CMSC has decreased during that time, as shown in **Table I**.

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STEP PROJECT SUB-AWARD AT CCBC

In recent years, an informal consortial arrangement has developed between the University of Maryland Baltimore County (UMBC), a public research university recognized for its science and technology offerings, and CCBC, a public two-year college system. This arrangement was enhanced to increase Science, Technology, Engineering, and Mathematics (STEM) program articulation and student transfer as one of the initiatives of a three-year pilot project, *STEM Talent Expansion Program (STEP)*, (DUE-0230148), funded by the National Science Foundation at UMBC, in which CCBC was sub-awarded [6]. A project goal was to increase the enrollment, retention, and graduation of students, particularly underrepresented women and minorities, in STEM programs at UMBC and CCBC, and to determine the relative effectiveness of several interventions: a summer bridge program, a scholarship program, and an internship program. One of the project's elements was the establishment of a student internship program, particularly for students in STEM programs, at CCBC where there had not been one before.

STEP SCHOLARSHIP PROJECT AT CCBC

This STEP pilot project included funding for 48 scholarships per year, for two years beginning in Fall 2003, with 24 scholarships awarded to UMBC students and 24 awarded to CCBC students. Each scholarship was for \$1,000 per year. Awards were made for \$500 on a semester basis. Scholarships were renewable for up to 4 semesters provided the student met the renewal criteria. At CCBC, the 7 targeted Associate's degree programs were the BIOL, CHEM, CMSC, ENGR, Environmental Science (ENVS), MATH, and PHYS Transfer Programs. Although these NSF-funded STEP scholarships were not need-based, scholarship recipients had to be: United States citizens, or Permanent Resident Aliens, or Refugee Aliens, at the time of application. Scholarships were awarded to full-time students in the targeted degree programs.

I. Recruiting and Selecting Awardees at CCBC

Recruiting for the STEP scholarship program at CCBC began upon notification of funding in Spring 2003 and continued through the CCBC Web pages and cable television, campus Financial Aid offices, the multicultural affairs office, counselors, on-campus open houses, and faculty. **Table II** provides Guideline Criteria for STEP Scholarship Eligibility at CCBC. A Grade Point Average of 2.5 or higher is required for scholarship eligibility and renewal. To increase their retention in STEM programs, awardees had to demonstrate readiness to take MATH 083 Intermediate Algebra. (Seventy percent of students entering CCBC require at least one non-credit developmental mathematics course.) A STEP Scholarship Board, including a representative from the Financial Aid Office and faculty representatives from the eligible programs, met before each semester to evaluate applicants based on these criteria and select awardees. The Financial Aid officer screened applicants for citizenship status, and full-time student status, and posted awards to the Bursar's office. The \$500

semester award went to the student's college account and could be applied to tuition, books, or fees. After those expenses were paid, any remainder was sent directly to the student to be used as needed. This met many indirect educational expenses including transportation, childcare, and the basic living costs of food and shelter.

II. Summer Bridge Program at UMBC

In August 2003, a two-week full-day Summer Bridge program was held at UMBC for 12 of the Fall 2003 STEP Scholarship awardees from UMBC and 12 from CCBC. Topics included overviews of the STEM degree programs, lunches with professionals from various STEM fields, campus and library tours, and information about student services such as mentoring, financial aid, internships, and advising.

III. Renewal and Probationary Awards

Each awardee's progress was monitored to determine whether they had maintained eligibility from semester to semester. We established a probation procedure for students who came close, but did not meet renewal criteria. The semester probation option gave students who fell just short of completing 12 credits, or whose semester GPA fell slightly below 2.5, another semester of scholarship aid while being tracked more closely. Each semester several recipients whose academic performance was significantly lower than required for renewal lost their scholarships, and replacement scholars were found among new applicants. **Table III** shows the number of new awardees for each semester of the project.

IV. Transfer Emphasis

The project encouraged transfer to 4-year institutions for continued study by targeting strictly transfer programs. This feature drew attention to the possibility of transfer to a four-year school for students who otherwise might not have considered transfer. Awardees began transferring as early as Fall 2004 when six of the initial 24 scholarship awardees transferred. Awardees lost their STEP scholarship awards when they transferred to four-year institutions.

V. Other Support Services for Awardees

Each semester before classes began, a required STEM Career Day was held to provide an orientation to the STEP scholarship program, an overview of program requirements, and bonding activities for awardees through the use of guest speakers or panelists from STEM occupations. Before the semester, awardees completed mentoring agreement forms and a Likert-scale Attitude Assessment Questionnaire provided by Claudia Morrell, Director of the Center for Women & Information Technology at UMBC, and met with their mentors. The focus was on career and transfer information. At about the midpoint of the semester, awardees and mentors attended a Luncheon Seminar featuring resume writing sessions, guest speakers, and discussions of the job and transfer application process.

TABLE I
NUMBER OF FULL-TIME PROGRAM MAJORS, PERCENT FEMALE ENROLLMENT, AND ASSOCIATE'S DEGREES AWARDED
IN CMSC AND ENGR PROGRAMS 2002-2006 AT CCBC

Program	Number of Full-Time Program Majors					Female Enrollment (Percent)					Associate's Degrees Awarded				
	Fall 2002	Fall 2003	Fall 2004	Fall 2005	Fall 2006	Fall 2002	Fall 2003	Fall 2004	Fall 2005	Fall 2006	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Computer Science	175	145	106	108	91	27%	27%	21%	23%	19%	8	13	6	4	11
Engineering	105	103	112	113	105	15%	15%	15%	15%	14%	5	3	1	4	9
All CCBC Credit Programs	6,919	7,026	7,093	7,049	6,846	61%	63%	63%	63%	63%	1,156	1,304	1,357	1,422	1,451

TABLE II
GUIDELINE CRITERIA FOR STEP SCHOLARSHIP ELIGIBILITY AT CCBC

Award Criteria for STEP Scholarship Students at CCBC			
Category	Type of Applicant	Criteria for Consideration	Application Deadline
A	Current High School Senior	<ul style="list-style-type: none"> Current High School GPA of 2.5 or higher Completion of Algebra II with C or higher Completion of 3 high school science courses with C or higher 	June 1 for Fall December 1 for Spring
B	Recent High School Graduate (within 3 years)	<ul style="list-style-type: none"> High School GPA of 2.5 or higher at graduation Must have CCBC Math Placement test level of MATH 083 or higher 	
C	Current CCBC Student	<ul style="list-style-type: none"> 12 credits earned within last 3 years; 2.5 GPA or higher 6 credits of STEM (Science, Technology, Engineering, Math) coursework Must have completed MATH 082 or higher, or have CCBC Math Placement test level of MATH 083 (Intermediate Algebra) or higher 	
D	Transfer Student from Other Two-Year or Four-Year Institution	<ul style="list-style-type: none"> 12 credits earned within last 2 years; 2.5 GPA or higher 6 credits of STEM (Science, Technology, Engineering, Math) coursework Must have completed MATH 082 or higher, or have CCBC Math Placement test level of MATH 083 (Intermediate Algebra) or higher 	
Note: Awardees who maintain 2.5 semester GPA and all other criteria, including successful completion of at least 12 credits per semester, will continue the award to the next semester.			

MENTORING OF SCHOLARSHIP AWARDEES

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" [1]. Cohoon found that mentoring and providing encouragement to persist were effective interventions for retaining women in computing majors at the undergraduate level [3]. Mentoring was an important aspect of the STEP program aimed at increasing retention by creating extra connections between students and faculty. The pilot project involved 10 UMBC faculty and a total of 7 CCBC faculty mentors from its three campuses (Catonsville, Dundalk and Essex). CCBC faculty mentors were from these STEM disciplines: BIOL, CMSC, ENGR, MATH, and PHYS. The responsibilities of each student mentee and faculty mentor were outlined during the semi-yearly meetings of all students and faculty involved in the program. At CCBC, students are not assigned specific academic advisors, so the mentorship program was a major benefit for awardees. Students' lives at the community college are often full of external pressures and sudden changes that can take them off course to completing their degree. Some students have simply never had anyone reach out to them to encourage and offer advice that can help them gain perspective and manage their course load. 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.

Each STEP awardee was assigned a CCBC faculty mentor based on the student's major and campus. Faculty mentors were to meet at least once a month with their 3 or 4 student mentees. Early in the semester, meetings were more frequent so that obstacles to success could be overcome before they became insurmountable. The greatest loss of students in courses occurs early in the semester and often is because students do not know where to go for help. To emphasize the importance of mentoring, all mentors and mentees submitted monthly mentoring logs. Once assigned a set of students to mentor, schedules were exchanged between student and mentor so that regular meeting times could be set up. Sometimes the meeting was as simple as an update on course progress, or was used to work on time management, discussions of student services, or schedule planning. Some students have external situations that interfere with their coursework and early intervention can help them change their schedule or figure out a way to refocus their energy to stay on task. Even when faculty cannot offer a specific solution, they can be a resource to direct students to those who can help, and then follow up on their progress.

Each awardee created an individually designed academic plan with the guidance of the faculty mentor, making sure that all general education and major course requirements were met. These Individual Academic Learning Plans were modified and updated until graduation, and beyond for transferring awardees. This "learning plan" 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 attainment of the associate's degree. Mentors also helped the student research options for transfer to four-year institutions. The partnership between UMBC and CCBC created many bridges for that transfer. Many mentor/mentee interactions were informal, with an update on courses taken, projects underway, and attitudes toward college life.

STEP SCHOLARSHIP AWARD DISTRIBUTION

Beginning in Fall 2003, approximately 24 scholarships per semester were awarded to a total of 45 full-time students at CCBC. The following STEP scholarship awards were made at CCBC: 24 awards in Fall 2003, 22 awards in Spring 2004, 19 awards in Fall 2004; 22 awards in Spring 2005, 6 awards in Fall 2005; and 3 awards in Spring 2006. A total of 45 different CCBC students from six Associate degree programs received awards. Specifically, 12 awardees were in ENGR, 12 in BIOL, 6 in CMSC, 6 in CHEM, 5 in MATH, and 4 in ENV. **Table III** provides the distribution of STEP scholarship awards from Fall 2003 through Spring 2006 by degree program, semester, and gender. **Table IV** shows the distribution of STEP awardees by racial/ethnic group as self-described at course registration. Forty-two percent (42%) of the awardees were White, 36% were African American, 9% were Asian, 7% were Hispanic, and 7% were Other. Both African American and Hispanic minority groups were represented among STEP scholarship awardees in numbers greater than their population percentage at CCBC. In addition, 47% (45/96) of the semester STEP scholarship awards were made to women, and 44% (20/45) of awardees were women.

STUDENT OUTCOMES

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. At CCBC, the 4-year transfer and graduation rate (which counts those who transferred to a four-year institution and/or graduated with an associate's degree) of all 2,328 new full-time freshman matriculating in all programs in 2001 (the most recent year for which 4-year data is available) was 32% (25% transferred and an additional 7% graduated but did not transfer), 12% were

still enrolled at a Maryland community college, and 56% had dropped out without transfer or graduation [7]. For the state of Maryland, the 4-year rate of all 12,919 new full-time freshmen matriculating in public community colleges in 2001 was 34% (25% transferred and an additional 9% graduated but did not transfer), 11% were still enrolled, and 55% had dropped out. Among the 16 public community colleges in Maryland, the four-year transfer and graduation rate ranges from a low of 15% to a high of 48%. Transfer and graduation rates for African American and Hispanic students in Maryland community colleges remain below the rates for White and Asian students. In the 2001 state cohort the four-year rate for African American students was 21%, and the rate for Hispanic students was 28% [7].

For the 44 students (one of the 45 awardees died in Spring 2004) who received STEP awards at CCBC in the period from Fall 2003 through Spring 2006, the transfer and graduation rate had reached 73% after 3.5 years (66% had transferred and an additional 7% graduated but did not transfer), and 4% were still enrolled in STEM programs at CCBC in Spring 2007. Details in **Table V** show that of the 20 female awardees, 90% transferred and 10% had dropped out. Of the 24 males, 46% transferred, another 21% had earned associate degrees or were still enrolled at CCBC, and 33% had dropped out. Of the 29 awardees who had transferred, 16 (12 females and 4 males) had also received an associate's degree. Of the 29 awardees who had transferred to 4-year institutions, 14 transferred to UMBC, 4 to University of Maryland College Park, 3 to Towson University, 2 to University of Baltimore, and 1 to each of 7 other institutions (3 of which were out of state).

INTERNSHIPS COMPLETED BY AWARDEES

Students do not always have a clear idea of what they will do when they graduate with a degree in science, mathematics or engineering. This is especially true for economically disadvantaged students and women, who often have no role model in their family to tell them about jobs for which they could qualify. Students without this visible goal may find it easier to give up a STEM major when coursework becomes difficult for them. For this reason, an integral part of the project was to provide funding for students to complete a paid internship that would give them both experience in the field

TABLE III
CCBC STEP SCHOLARSHIP AWARDS FALL 2003 THROUGH SPRING 2006 BY PROGRAM, SEMESTER AND GENDER

CCBC Associate Degree Program	Fall 2003		Spring 2004		Fall 2004		Spring 2005		Fall 2005		Spring 2006		Totals	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Biology	2	2	3	1	6	1	6	1	2	0	2	0	21	5
Chemistry	3	1	2	1	0	3	0	2	0	0	0	0	5	7
Computer Science	0	5	1	4	1	2	1	2	0	0	0	0	3	13
Engineering	3	2	3	1	2	3	2	5	0	2	0	1	10	14
Environmental Science	1	1	1	1	1	0	2	0	1	0	0	0	6	2
Mathematics	0	4	0	4	0	0	0	1	0	1	0	0	0	10
Total Semester Awards	9	15	10	12	10	9	11	11	3	3	2	1	45	51
New Awardees	9	15	3	2	4	6	3	2	1	0	0	0	20	25

TABLE IV
CCBC ENROLLMENT AND STEP SCHOLARSHIP AWARDEES FALL 2003
THROUGH SPRING 2006 BY RACIAL/ETHNIC GROUP

Racial/ Ethnic Group	% of CCBC Fall 2006 Credit Enrollment	Number of STEP Awardees	% of Total STEP Awardees	Average Length of STEP Award (semesters)
White	57%	19	42%	2.16
African American	31%	16	36%	2.13
Asian	5%	4	9%	2.25
Hispanic	2%	3	7%	2.33
Other	5%	3	7%	1.67
TOTAL:	100%	45	100%	2.13

TABLE V
OUTCOMES FOR 44 CCBC STEP SCHOLARSHIP AWARDEES
AS OF SPRING 2007 BY RACIAL/ETHNIC GROUP AND GENDER

Racial/ Ethnic Group	Transferred to Four-Year Institution *		Graduated with Associate's Degree		Still Enrolled at CCBC		Dropped Out	
	F	M	F	M	F	M	F	M
White	7 (3)	4 (2)	0	3	0	1	1	3
African American	7 (7)	3 (0)	0	0	0	0	0	5
Asian	2 (0)	2 (1)	0	0	0	0	0	0
Hispanic	1 (1)	1 (1)	0	0	0	1	0	0
Other	1 (1)	1 (0)	0	0	0	0	1	0
TOTAL:	18 (12)	11 (4)	0	3	0	2	2	8
% of Females	90%		0%		0%		10%	
% of Males		46%		13%		8%		33%
% Combined	66%		7%		4%		23%	
* Note:	Numbers in parentheses show how many of those who transferred also earned associate's degrees.							

for which they were training, and also an idea of what jobs might be available to them. To give students an accurate impression of careers in STEM fields, we tried to choose internships that would give the interns some research experience. Cohoon recommended engaging women in research to increase undergraduate persistence [4].

Up to 24 students could receive a stipend of \$1,800 if they completed a 120-hour internship. Students were considered eligible for an internship as long as their grades were high enough to continue their STEP scholarship, or if they had previously received a STEP scholarship at CCBC and had already transferred to a four-year school in a STEM major and were in good standing at their four-year school. Financially disadvantaged students often must work to support themselves or family or to earn money for school expenses. The \$1,800 stipend was intended to compensate students for salary they had to give up to complete the internship. Students could be additionally compensated by the firm or organization for whom they did the internship, as long as they received less than \$17 per hour for the same 120-hour period for which they were receiving their \$1,800 internship stipend. Eight interns received such additional compensation.

Table VI lists the internships the students completed and the research experience they gained. Internship placements included commercial firms as well as academic research institutions. In addition to the 21 students who completed internships, one other student started an internship but had to stop because she had no social security number, and a second did not complete the internship because he moved away. The completion rate for internships was high: 21 out of 23 starting an internship finished it. Of these 21 internships, 13 (62%) were completed by females, and 8 (38%) were completed by males. Students were very enthusiastic about the experience afforded them by the internships. One student received an offer of employment after he completed his four-year schooling. Here is a quote from one student who wrote to us after her internship: "I would like to thank STEM scholarship and all the professors. Thanks to you, this summer I participated in an internship at UMBC. It was one of the most extraordinary experiences that I ever had. At UMBC I worked in the Chemical and Biochemical Engineering Department under the supervision of Theresa Good, Ph.D. and Inhong Yang, Ph.D. They let me be a part of their team. They have as a goal to find a cure for Alzheimer's Disease. I had to make a hypothesis and carry (out) the scientific method to get a solution to the problem."

By Spring 2007, all but 2 of the 21 students who completed an internship had transferred, earned an associate's degree, or both. NSF funding provided released time for a biology professor at CCBC to serve as STEM Internship Coordinator for this project. After her careful examination of products from several vendors, *Interfase* software from CSO Research, Inc. was licensed at CCBC as a web-based career-services tool for students and employers to use in posting resumes and advertising available internships [5].

CONCLUSIONS

CCBC's sub-award portion of the NSF-STEP project at UMBC provided \$1,000 per year scholarships, monthly mentoring by faculty, and an opportunity for paid 120-hour internships to 45 students in STEM fields beginning in Fall 2003. These interventions at CCBC were successful with both female students and underrepresented minority (African American and Hispanic) students in these fields. Forty-four percent (20/45) of CCBC STEP scholarship awardees were female, and 43% (19/45) of scholarship awardees were African American or Hispanic. Of the 45 CCBC scholarship awardees in the project, 29 (64%) had transferred to a four-year institution to continue their education by Spring 2007. In particular, 90% of the female awardees had transferred. By comparison, the four-year transfer rate for the 2001 cohorts of full-time CCBC freshmen, and full-time freshmen at all Maryland public community colleges, was 25%. Almost half (14/29) of the awardees who transferred chose to transfer to UMBC, the partner institution. Because of the success of the student internship awards, CCBC will continue the internship program, but without stipends unless the employer pays for it.

TABLE VI
 INTERNSHIPS COMPLETED BY CCBC STEP SCHOLARSHIP AWARDEES FALL 2004 THROUGH SUMMER 2006

Type of Internship	Research Experience for the Intern
Johns Hopkins University Department of Environmental Engineering	Intern assisted in several projects including diffusion of substances in various soils.
Johns Hopkins University, Department of Environmental Engineering	Intern assisted in project on subsurface pollution abatement.
Local Construction Engineering firm	Intern adapted CADD program for firm to use.
Wind Systems (alternative energy company)	Intern researched small scale wind turbine applications for pilot school project.
Special Project at Co-op Engineering firm	Intern studied cancer and toxic effects at a particular site and compared them to previous risk assessments.
Local pre-cast concrete company	Intern researched quality control methods for a construction process and wrote an employee manual.
Ensafe, Environmental Engineering firm	Intern provided computer support for various environmental pollution abatement projects.
Veterinarian Assistant – special research project	Intern compared several treatments for the same disease, following patients to determine outcomes.
Johns Hopkins Medical Institute	Intern participated in a summer research program for medical students that gives students experience in various research laboratories.
Johns Hopkins School of Public Health	Intern participated in research on tuberculosis.
Kennedy Krieger Institute, Johns Hopkins University	Intern contributed to psychiatry research project.
Forensics Laboratory, Baltimore County Police	Intern provided support services for forensic laboratory.
Pharmacy Assistant	Intern used pharmacy records and work experience to determine the effect of federal drug program for the elderly.
Pharmacy Assistant	Intern used pharmacy records and work experience to determine what percentage of people who were taking Vioxx stopped taking the drug after it was reported to increase heart attack risk, and what other drug, if any, they switched to.
Computer support local private school	Intern evaluated donated equipment, carried out periodic maintenance and complete database project.
Computer help desk, Black and Decker Inc	Intern staffed computer help desk.
Computer Support, Local Fitness Company	Intern developed tracking software program for patrons of the fitness facility.
National Park Service	Intern determined ozone levels at Assateague National Seashore, compared them to national standards and correlated them with wind direction and solar radiation.
EMBARC – Summer Residential Research Internship Towson University	Intern worked in molecular biology laboratory doing research related to Alzheimer's disease.
Isle of Shoals Marine Laboratory, Cornell University	Intern completed Research in Marine Biology Course which included marine research project.
Isle of Shoals Marine Laboratory, Cornell University	Intern completed Research in Marine Biology Course which included marine research project.

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