

# NEW YORK CITY ALLIANCE

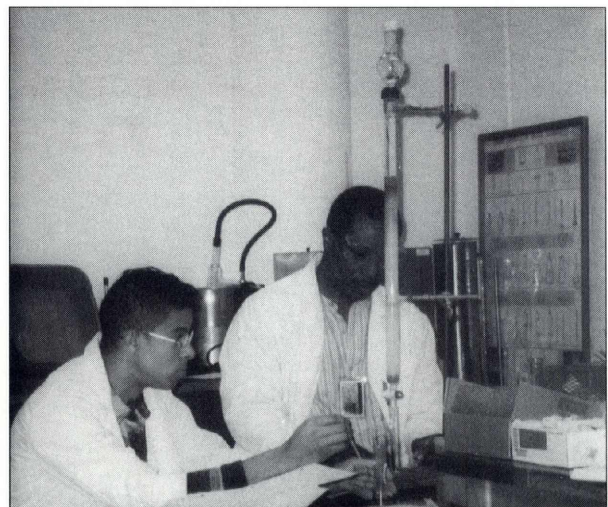


ALLIANCE FOR MINORITY PARTICIPATION IN SCIENCE, ENGINEERING AND MATHEMATICS

**A**s the New York City Alliance embarks on the fifth and final year of its cooperative agreement with the National Science Foundation, it is noteworthy that the NYC AMP Governing Board recently approved the CUNY AMP Institutionalization Policy Commitment Statement. In this statement, CUNY and its constituent colleges agree to establish levels of university and individual contributions for sustaining Phase I AMP activities and outcomes; continue to maintain an AMP central office, individual campus learning centers, and activity coordinators; institutionalize AMP restructured SEM courses; continue to support two- and four-year collaborative research projects; support underrepresented SEM research scholars; formulate individual AMP campus advisory committees; continue governmental and private sector partnerships, as well as establish new partnerships; and set SEM enrollment and degree goals for Phase II of AMP that exceed Phase I figures.

Looking to the future, we see expanded horizons for Phase II of NYC AMP such as SEM teacher preparation, a social and behavioral science supplement, expanded undergraduate and graduate research, individual campus research centers, and an interdisciplinary initiative. Most importantly, however, there is a sense that the constituent colleges of the university are working more and more effectively as a coherent whole, a continuing development which bodes well for our products, the students.

*Neville A. Parker, Kayser Professor of Civil Engineering, City College of New York, AMP Principal Investigator*



**ANNUAL REPORT 1995-1996**

**National Science Foundation, Alliance for Minority Participation**

**William McHenry, Program Director**

**CUNY Central Administration**

**W. Ann Reynolds, Chancellor**  
**Anne L. Martin, Acting Vice Chancellor for Academic Affairs**  
**Allan H. Clark, Acting President of the Research Foundation of CUNY and University Dean for Research**

**Project Directors**

**Neville Parker** City  
**Louise Squitieri** New York City Technical  
**Leon Johnson** Medgar Evers

**Project Administrator**

**Frank Scalzo** Queensborough

**Senior Administrative Assistant**

**Jeanette Schnabel** City

**Administrative Assistant**

**Maria Colabella** City

**Steering Committee**

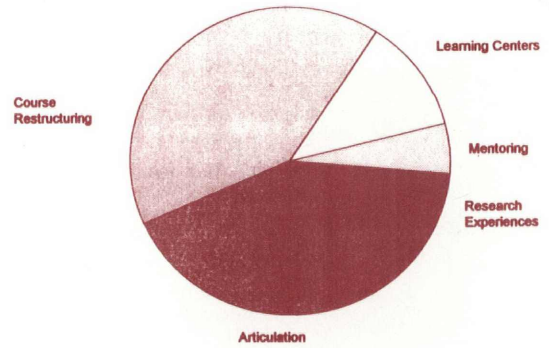
**Baruch** Edward Tucker  
**BMCC** Sadie Bragg  
**Bronx** Nasser Abdellatif  
**Brooklyn** Louise Hainline  
**City** Charles Watkins  
**College of Staten Island** Martel Zeldin  
**Hostos** Humberto Canate  
**Hunter** Erwin Fleissner  
**Kingsborough** Thelma Malle  
**LaGuardia** Clifton Clarke  
**Lehman** John Chute  
**Medgar Evers** Doris Withers  
**NY City Technical** David Entin  
**Queens** Norman Goldman  
**Queensborough** Miguel Cairol  
**York** Ted Hanley

**Activity Coordinators**

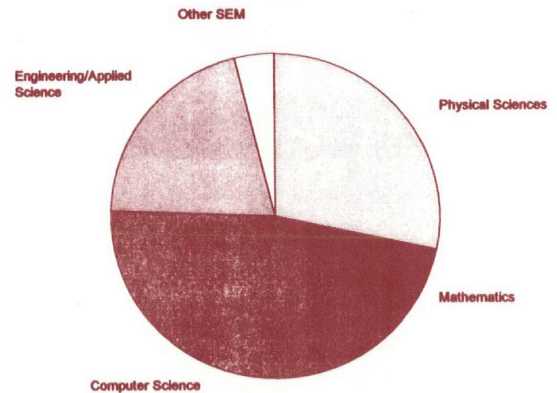
**Baruch** Anthony Wiley  
**BMCC** Winston Smith  
**Bronx** Lysbeth Germain  
**Brooklyn** Ghisco Sonthonax  
**City** Otto Marte  
**Afræen Hossain**  
**College of Staten Island** To Be Named  
**Hostos** Thomas Joyce  
**Hunter** Marilyn Rothchild  
**Kingsborough** To Be Named  
**LaGuardia** Femi Jones  
**Lehman** Stephen Providence  
**Medgar Evers** Gaye Gordon-Davis  
**New York City Technical** Basil Watson  
**Queens** Michele Sedlitz  
**Queensborough** Sandra Peskin  
**Stuart Asser**  
**York** Frantz Olivier

The New York City Alliance for Minority Participation is funded under a cooperative agreement with the National Science Foundation.

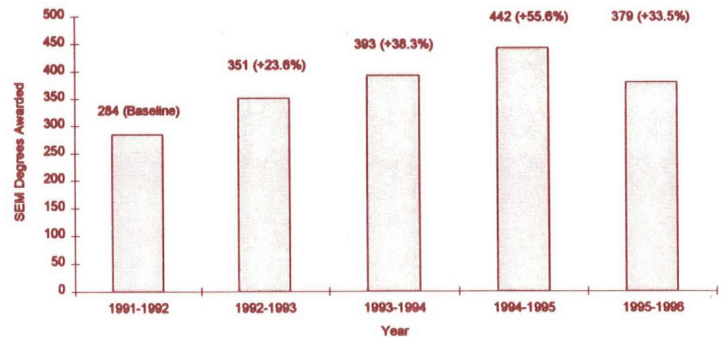
**Alliance-Wide AMP Activities**



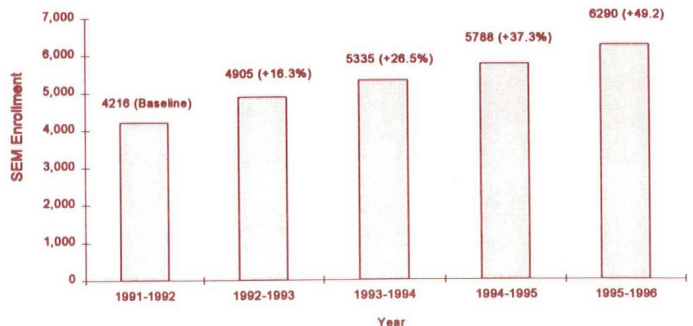
**Alliance-Wide Disciplines for 1995-1996 BA/BS Degrees**



**Baseline Minority SEM Degrees (with % increase over 91/92 levels)**



**Baseline Minority SEM Enrollments (with % increase over 91/92 levels)**



## The Alliance's Fourth Year.....

The New York City Alliance is a consortium of sixteen senior and community colleges at the City University of New York (CUNY). Its primary goal, over a five-year period, is to double the 1992 baseline number of minority students who obtain SEM baccalaureate degrees. To this end, the Alliance is bringing about permanent systemic change in science, engineering, and mathematics education at CUNY. It is supported by a \$5,000,000 grant from the National Science Foundation and matching funds from the University.

### 1. Adding Value to the Inter-Institutional Program

(a) **The Alliance Course Restructuring** of gatekeeper calculus, chemistry, and physics includes an emphasis on collaborative learning, a non competitive approach to problem solving, and workshops conducted by specially trained peer tutors. The following AMP restructured courses have been institutionalized:

COLLEGE	COURSES
BMCC	MAT 301 (Calculus I), MAT 302 (Calculus II), MAT 303 (Calculus III)
CSI	MTH 229 (Calculus Computer Laboratory), MTH 230 (Calculus I), MTH 231 (Calculus II), MTH 232 (Calculus III)
HUNTER	PHYS 151 (Physics I), PHYS 152 (Physics II), PHYS 153 (Physics III)
LAGUARDIA CC	MAT 200 (Precalculus), MAT 201 (Calculus I), MAT 202 (Calculus II), MAT 203 (Calculus III)
LEHMAN	MA 155 (Calculus I Lab), MA 156 (Calculus II Lab)
MEDGAR EVERS	CHM 201 (Chemistry I), CHM 202 (Chemistry II), PHY 211 (Univ. Physics I), PHY 212 (Univ. Physics II), PHY 213 (Univ. Physics III)
NYCTC	MA 375 (Precalculus), MA 475 (Calculus I), MA 575 (Calculus II), CH 110 (Chemistry I), CH 210 (Chemistry II), SC 441 (Calculus-based Physics)
QUEENS	Math 101 (Calculus & Analytic Geometry), Math 110 (Precalculus), Chem 113 (Chemistry I)
QCC	MA 440 (Precalculus), MA 441 (Calculus I), MA 442 (Calculus II), MA 443 (Calculus III), IS 101 (Introduction to Research)
YORK	Math 184 (Calculus I)

(b) **NYC AMP Science Engineering and Mathematics Research Articulation (SEMRAP) Program** has developed a cadre of senior college research faculty who undertake research projects with faculty from community colleges. Community college faculty members mentor undergraduates at their own institutions. By linking faculty through research, SEMRAP creates pathways which enable talented SEM students to progress from community to senior colleges within CUNY. Each of the six SEMRAP projects funded during the 1995-1996 academic year led to funding from other sources.

(c) **The NYC AMP Undergraduate Research Program** continues to be the heart of the Alliance. The four-pronged program includes: pre-research courses for community college students, research experiences on or off CUNY campuses (85 research scholars and 45 faculty mentors), research enrichment and career development, and research coordination.

(d) **Science and Mathematics Learning Centers** supporting students in SEM studies have been established on each of the 16 partner campuses. These centers serve as the hub of all Alliance activities and provide students with a "home base" which is often lacking in a commuter university.

(e) **The Alliance Peer and Faculty Mentoring Program** has created mentoring relationships throughout CUNY. Peer tutors are one of the key elements in SEM course restructuring, and faculty

*"Over the past four years, through course restructuring, undergraduate research, learning centers and activity coordinators, AMP has had a tremendous impact on retention and graduation rates for SEM students at CUNY. The challenge will be to maintain this level of success in the face of the increases in tuition and decreases in financial aid which result from cuts in education funding at the state and federal levels."*

*Leon P. Johnson, Professor of Physics, Medgar Evers College, AMP Project Co-Director*

*"Our four years at AMP have had a major impact on the University. Like scientific research, our activities have raised more questions and and we now realize that there is much more to do. In particular, we know that the three crucial points in the SEM pipeline - the precollege transition, the move from a two-year to a four-year college, and the leap to graduate school - need continuous strengthening and will engage us for years to come."*

*Louise Squitieri, Dean of Funded SMET Programs, New York City Technical College, AMP Project Co-Director*

*"The value of AMP fellowships in allowing students at two-year colleges to do research is obvious. What is not obvious is the effect. One of our AMP BMCC Research Scholars came back from the 1996 NSF AMP Student Research Conference with a plaque, having won first place for his research. He told me, 'Now I must go to graduate school.'"*

*Lawrence Sher, Professor of Mathematics, Borough of Manhattan Community College, AMP Faculty Mentor*

mentors are crucial in keeping students in SEM to the baccalaureate level and beyond (master's, doctorate, and SEM careers).

(f) **The NASA Goddard Institute for Space Studies (GISS)**, NYC AMP, and CUNY signed a three year cooperative agreement to create the NASA GISS Institute on Climate and Planets (ICP). The ICP involves AMP students and faculty from five CUNY campuses and minority students and faculty from four New York City high schools in research projects with NASA scientists. The NASA data and multimedia courseware based on ICP research findings are being placed on the Internet for dissemination to all CUNY campuses and NYC high schools, as well as for national distribution. CUNY/NASA collaboration has led to two additional NASA grants: Science and Technology Teachers for the Next Millennium (MASTAP) and Minority University Space Interdisciplinary Network (MUSPIN).

## 2. Promoting a Coherent Program Across the University

(a) **The NYC Alliance** has a number of committees which foster CUNY-wide consistency. These committees include: the AMP Governing Board (chaired by Chancellor Reynolds/members include CUNY's Vice Chancellor for Academic Affairs, five CUNY college presidents, USI's PI, and industrial representatives), AMP Steering Committee (CUNY Academic Deans), AMP Activity Coordinators' Committee, Course Restructuring Committees (calculus, chemistry, physics), Mathematics Department Chairs Committee, and individual campus AMP and course restructuring committees.

(b) **CUNY-Wide Faculty Development Program.** The University has sponsored a number of AMP faculty development colloquia or short courses such as: *Mentoring in the Urban University, Restructuring SEM Courses, A Short Course in Critical Thinking, Multimedia Courseware Development, and NASA/CUNY Collaborative Research.*

(c) **The CUNY Pipeline Program** for Careers in College Teaching and Research, which is sponsored by the Diamond Foundation, includes a summer institute at CUNY's Graduate School and University Center and a three semester program which prepares students for graduate school. Participants receive a \$1,000 summer stipend and a tuition waiver for CUNY's graduate school.

## 3. A Four Year Effort to Enhance Student Participation and Performance in SEM Disciplines

**Table 1** indicates the increase in minority SEM BA/BS degrees and enrollment from the baseline year (1992) through the fourth year of NYC AMP (1996).

### SEM Degrees and Enrollment

	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996
<b>Baseline* Minority (BA/BS)</b>	284	351	393	442	379
<b>Expansion** Minority (BA/BS)</b>	404	488	514	575	549
<b>Baseline* Non-Minority (BA/BS)</b>	442	461	536	443	509
<b>Expansion** Non-Minority (BA/BS)</b>	775	821	863	803	884
<b>Community College (AS)</b>	110	98	156	96	176

	Fall 1992	Fall 1993	Fall 1994	Fall 1995	Fall 1996
<b>Minority Enrollment</b>	4216	4905	5335	5788	6290
<b>Non-Minority Enrollment</b>	3195	3357	3714	3612	3579

\*Baseline: Brooklyn, City, Hunter, Lehman, Medgar Evers, and New York City Technical Colleges

\*\*Expansion: Six Baseline Campuses and Baruch, Staten Island, Queens, and York Colleges

*"AMP has been very important to sustaining and developing SEM education at CUNY's community colleges. The program has provided access to SEM disciplines for underrepresented minority students whose high school preparation often needs bolstering. It has stimulated community college SEM faculty by creating opportunities for research and by supporting innovative methodologies such as collaborative learning and peer-led workshops. Finally, AMP has facilitated communication between faculty across the University, creating ways in which instructors can interact productively with their peers at community and senior colleges."*

*Thelma Malle, Dean of Academic Programs, Kingsborough Community College, AMP Steering Member*

*"My most rewarding experience is when a student who feels hopeless and lost finally starts to connect with science. People learn in different ways. It is my job to help them find their own individual strengths. AMP is great for students."*

*Dominique Shaw, AMP Peer Tutor, LaGuardia Community College*

**Table 2** compares the performance of AMP versus non-AMP students enrolled in Precalculus, Calculus I, Calculus II, and Chemistry at New York City Technical College

**New York City Technical College Three-Year Distribution Report: AMP versus Non-AMP SECTIONS**

**AMP Sections**

COURSE	A, B, OR C	D, F, or WU	W	TOTAL
Precalculus	203 (52.1%)	138 (35.4%)	48 (12.3%)	390
Calculus I	151 (54.3%)	83 (29.9%)	43 (15.5%)	278
Calculus II	53 (62.4%)	7 (8.2%)	22 (25.9%)	85
Chemistry I*	106 (79.7%)	19 (14.3%)	6 (4.5%)	133
<b>TOTAL</b>	<b>513 (57.9%)</b>	<b>247 (27.9%)</b>	<b>119 (13.4%)</b>	<b>886</b>

*At an NSF AMP site visit Dr. William McHenry, National Science Foundation AMP Program Director, asked:*

*"How important is your mentor?"*

*Reginald Parker, Brooklyn College AMP Research Scholar, answered:*

**Non-AMP Sections**

COURSE	A, B, OR C	D, F, or WU	W	TOTAL
Precalculus	1068 (44.6%)	873 (36.4%)	456 (19%)	2397
Calculus I	1025 (47.8%)	664 (31.0%)	455 (21.2%)	2144
Calculus II	235 (58.9%)	86 (21.6%)	78 (19.5%)	399
Chemistry I	265 (61.2%)	101 (23.3%)	67 (15.5%)	433
<b>TOTAL</b>	<b>2593 (48.3%)</b>	<b>1724 (32.1%)</b>	<b>1056 (19.7%)</b>	<b>5373</b>

\*Indicates a three-semester report rather than a three year report

**4. Strengthening the SEM Pipeline: High School and Community College Articulation Agreements**

(a) **The Transfer, Retention, and Achievement at City College (TRACC) Program** improves retention in the City College School of Engineering through summer and academic year programs that ease the transition of community college students who enter from other CUNY campuses.

(b) **The NASA GISS/CUNY/AMP Institute on Climate and Planets** (described in 1f) has a number of community college student and faculty participants.

(c) **The NASA/AMP lecture series** presents workshops for community college and high school students.

(d) **The CUNY on line transfer bulletin** provides information for the transferring of credits from community to senior colleges.

**5. Supporting Students On Their Pathway Through CUNY**

(a) **Bridge Programs** include the TRACC Program at City College (described in 4a) and the CUNY Pipeline Program (described in 2c) at the CUNY Graduate School.

(b) **Research Internships and Mentoring.** The NYC AMP is currently supporting 85 research scholars and 45 faculty mentors, who conduct research projects on CUNY campuses and at outside partner locations such as NASA/GISS, the U.S. Food and Drug Administration, Brookhaven Laboratories, and AT&T Bell Laboratories.

*"When an undergraduate student enters college or university for the first time he or she is like a mighty ship which has just embarked on a midnight journey through very turbulent waters. Like the ship, undergraduate students are in need of a lighthouse which will illuminate the environment so that they will be aware of the potential dangers which await them on the journey.*

*Without a lighthouse both the student and the ship, regardless of how powerful they may be, will simply struggle in the darkness, making no progress towards their journey, or worse crash against the side of a mountain or rock in their path and be destroyed.*

*A mentor serves in the capacity of a lighthouse for an undergraduate student. The knowledge, wisdom, and understanding of the mentor are the light which guides the undergraduate student through the times of darkness. Once the environment has been illuminated and the darkness yields to that light, then undergraduate students, like the ship, can safely follow their own course and eventually guide themselves."*

(c) **Student Support Groups.** As previously stated, the NYC Alliance provides for a learning center coordinator at each of the 16 partner campuses, as well as specially trained peer tutors, who conduct collaborative learning workshops for AMP students.

(d) **Tracking.** One of the duties of an AMP learning center coordinator is to track the graduate school and employment careers of AMP students.

## 6. Academic Performance Indicators

NYC AMP's cooperative agreement with the NSF is to double the number of minority SEM BA/BS degrees. The following table indicates the increase in SEM degrees (baseline and expansion) by listing the percentage of increase in SEM degrees during AMP's first four years.

### *Increases in NYC AMP Minority SEM Data*

	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996
<b>Baseline* BA/BS Degrees</b>	—	23.6%	38.4%	55.6%	33.5%
<b>Expansion** BA/BS Degrees</b>	—	20.8%	27.2%	42.3%	35.9%
<b>Community College AS Degrees</b>	—	-10.9%	41.8%	-12.7%	60.0%

\*Baseline: Brooklyn, City, Hunter, Lehman, Medgar Evers, and New York City Technical Colleges

\*\*Expansion: Six Baseline Campuses and Baruch, Staten Island, Queens, and York Colleges

## 7. Institutionalizing AMP Initiatives

The New York City Alliance's Governing Board formulated a NYC AMP Institutionalization Policy Commitment Statement and the academic deans from each of the 16 partner campuses prepared an AMP Individual Campus Institutionalization.

## 8. Preparing Teachers in SEM Disciplines

The NYC AMP was recently awarded a \$103,691 teacher preparation supplement for the 1996-1997 academic year. Our teacher preparation initiative will provide a new group of AMP SEM majors with the opportunity and skills to become K-16 teachers of science and mathematics in an urban multicultural environment. This teacher preparation program will be implemented with the USI, CETP, and NASA MASTAP grants. The CUNY Council of Deans of Education will assist in the formulation of all NYC AMP teacher preparation initiatives.

## 9. Cost Sharing

The following table lists the cost sharing (above \$1,000,000 a year in NSF funding) for the New York City Alliance.

	1993-1994	1994-1995	1995-1996	1996-1997
<b>CUNY</b>	\$1,165,249	\$1,058,560	\$1,121,429	\$1,308,303
<b>CUNY (tax levy funds)</b>	(304,100)	(350,000)	(350,000)	(350,000)
<b>NASA/GISS</b>	—	333,000	418,889	387,441
<b>Outside Agencies</b>	—	60,000	60,000	60,000
<b>TOTAL</b>	\$1,165,249	\$1,451,560	\$1,600,318	\$1,755,744

*"The 1995-1996 academic year was active and productive for AMP at Queens. Collaborative learning and peer mentoring proved useful and effective tools in Calculus, Precalculus, Introduction to Chemistry, and Introduction to Physics. These new methodologies enriched the educational experience of both mentors and students and led to better performance. AMP's Undergraduate Research component has been particularly rewarding. Students have done excellent work in our laboratories. The opportunity to participate in research has given them incentive to pursue SEM graduate studies and careers and a far better chance of succeeding."*

*Norman Goldman, Dean of Faculty, Division of Mathematics and the Natural Sciences, Queens College, AMP Steering Committee Member*

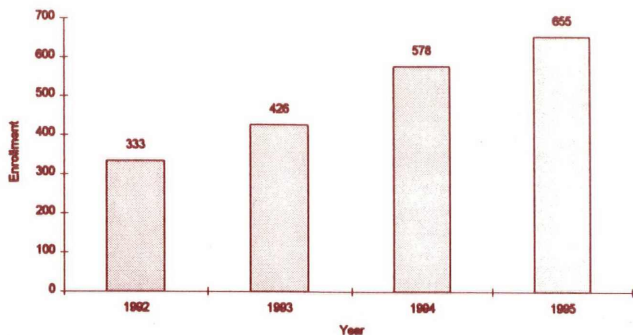
*"The term 'workshop' is exemplified by students' no-nonsense approach in attending the sessions and working physics problems in a group setting. As a workshop leader, being able to motivate and stimulate students' thought processes in understanding physics concepts and applying them to problem solving is most gratifying."*

*A comment that best sums up my experience as a workshop leader is students asking 'Can we do this more often?' This shows that AMP is achieving its objective of motivating and encouraging underrepresented students in SEM disciplines."*

*Lincoln Grant, AMP Workshop Leader, New York City Technical College*

# Alliance Accomplishments on CUNY Campuses.....

**Baruch College Change in Minority SEM Enrollment**



## Baruch College

Located in the heart of New York's central business district, Baruch College has evolved from the School of Business and Civic Administration established in 1919 by the Trustees of City College. In 1968, the School was reorganized as a separate senior college in CUNY.

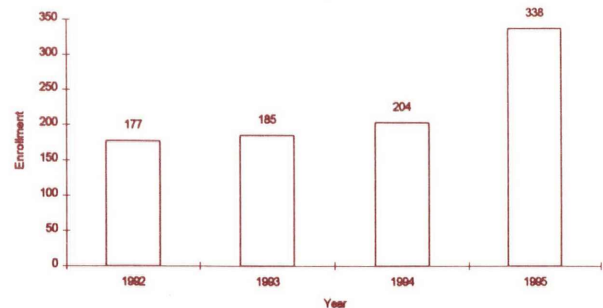
Baruch offers a combination of specialized and liberal arts and sciences studies providing high quality education for students who are preparing for careers in business, public service, and related fields. The City University programs leading to the Ph.D. in Business and in Industrial and Organizational Psychology are based at Baruch.

### AMP Accomplishments

Graduates of the AMP Undergraduate Research Program have met with great success: two former research scholars enrolled in the University of Iowa to pursue doctorates in mathematics. A third is expected to follow suit at the end of the 1996 academic year. A former research scholar continues to collaborate with his AMP mentor. They expect to submit their second research paper for publication at the end of the summer of 1996.

During 1995-1996, over one hundred students took advantage of Learning Center resources including the computer laboratory, which has proved invaluable. A multimedia workstation will soon be added to Learning Center facilities. This will permit authoring and recording on video tape and CD ROM of interactive lessons in mathematics and science. A lending library for this material will be established so that students with access to a computer with CD ROM or a VCR can view interactive lessons in mathematics and science at home. The goal is to have complete courses in math and science on CD and video tape. Faculty in both departments will prepare course material for recording.

**Borough of Manhattan Community College Change in Minority SEM Enrollment**



## Borough of Manhattan Community College

BMCC was founded in 1963 as a primarily business-oriented community college whose programs were aimed at the midtown business community. Its original educational focus was to prepare students for business careers and to provide a general liberal arts education for those who wished to transfer to four-year colleges. Over the past thirty years the college has adapted to meet the needs of non-traditional students, and its offerings have become more diversified, responding to the emergence of new technologies and changes in business and industry.

Today, BMCC's wide range of degree programs prepares skilled workers for employment in business and health careers and students for transfer to four-year colleges. Its facilities include a multimillion dollar Media Center which is among the finest and most technically current in the country.

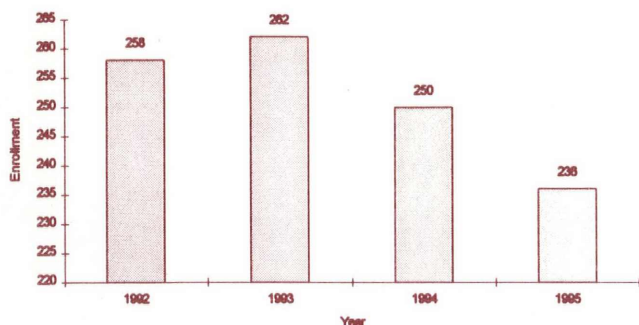
### AMP Accomplishments

Restructured sections of math, chemistry and physics were offered during both semesters of 1995-1996. Math and science workshops included the use of graphing calculators. Two peer collaborative Calculus III workshops and several study skills workshops addressing concepts in math and science were conducted under the guidance of the Activity Coordinator. Much time was devoted to collaborative computer calculus with students producing projects, portfolios, and animated movies. In chemistry, collaborative learning tutorials took place during the class hour. In physics, tutorial sessions were established as an additional hour.

BMCC is making undergraduate research experience an integral part of the SEM curriculum: nine BMCC

students took part in the AMP Undergraduate Research Program during 1995-1996. BMCC AMP continues to develop new research opportunities for students and to facilitate mentor/student relationships.

**Bronx Community College Change in Minority SEM Enrollment**



## Bronx Community College

Established in 1957, Bronx Community College (BCC) occupies a 50-acre campus overlooking the Harlem River. BCC provides a sound general education for all students; University parallel transfer education in the liberal arts and sciences; career education in business, health sciences, the technologies, and public service occupations; continuing education for students of all ages; and a comprehensive counseling program.

The college seeks to be responsive to community needs and is committed to aiding in the redevelopment of its borough and the development of a skilled workforce for the metropolitan region. Over the past fifteen years, BCC has intensified its outreach to New York City's economic, educational, and cultural institutions through partnerships with business and industry and collaborative programs with the Board of Education.

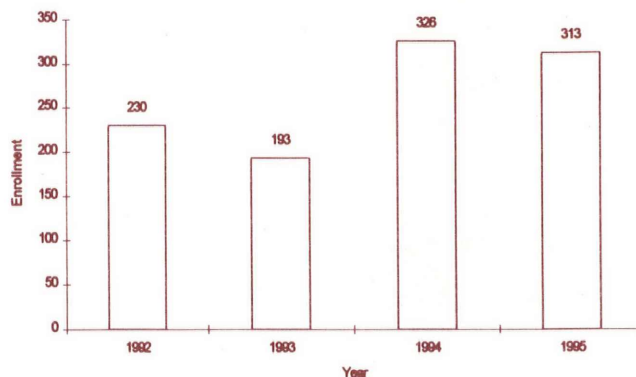
## Brooklyn College

Located on a twenty-six acre campus in the Midwood section of Brooklyn, Brooklyn College was established in 1930 and became the first public coeducational liberal arts college in the City of New York. The college is committed to providing the highest quality education to an ethnically, religiously, and economically diverse student body.

Brooklyn College has an exceptionally distinguished faculty and has been praised by the National Endowment for the Humanities and the Carnegie Foundation for the Advancement of Teaching for its clear vision of what constitutes an educated person and its success in the realm of general education.

The college confers undergraduate and graduate degrees. Its Division of Graduate Studies offers more than seventy

**Brooklyn College Change in Minority SEM Enrollment**



graduate and certificate programs and continues a fifty-eight-year tradition of enabling qualified students of diverse backgrounds to acquire an advanced education of superior quality at a modest tuition.

## AMP Accomplishments

A new Steering Committee for Undergraduate Science Programs is coordinating leadership of AMP with other funded science programs on campus. The committee will leverage activities in support of science education and develop strategies for recruiting undergraduates into the sciences and increasing undergraduate involvement in research. As the college implements the NSF Collaborative for Excellence in Teacher Preparation grant, the heavy participation of mathematics and physics faculty in that project should improve entry level science and mathematics courses in line with the course restructuring advocated by AMP. Efforts will be made to move the AMP agenda forward more aggressively in chemistry.

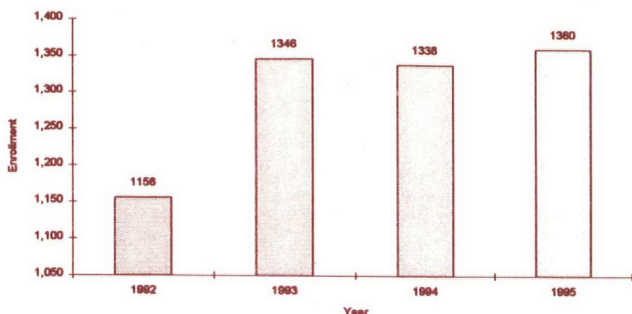
The college strongly supports the AMP Learning Center. It funds the Learning Center Director position and provides some funds for peer tutoring. Minority science students at Brooklyn College have a very high graduation rate. This reflects AMP's successful efforts in the realms of tutoring, mentoring and overall retention. Mentoring undergraduate research scholars is a high priority. The College sponsors a Science Research Day which allows students from high school through graduate school to present posters of the work they have done under their mentors' guidance. The College is furthering AMP aims by encouraging faculty to include funds for minority undergraduate research in their budgets and to take full advantage of "supplements" for minority student support associated with federal grants.

## City College

City College was founded in 1847, with a mandate to offer the best education possible to the children of the poor and to open to new immigrants the opportunities of America. It is located on a thirty-five acre site in the St. Nicholas Heights section of Manhattan and has a student population of 15,000.



### City College Change in Minority SEM Enrollment



City College offers a rich program of undergraduate and graduate study through its College of Liberal Arts and Science and five professional schools. It is a major center for research and scholarship whose distinguished faculty attracted over \$21 million in grant support in one year alone.

Throughout its history City College has stressed the dual goals of offering access to higher education combined with academic quality. It is the nation's fourth leading source of undergraduates who have gone on to earn doctorates; is among the top dozen schools in producing members of the National Academy of Sciences; counts eight Nobel Laureates among its graduates; and is one of the nation's leading sources of minority engineers and of African American graduates who are admitted to medical school.

#### AMP Accomplishments

The Engineering and Science Learning Centers provide tutorial services in calculus, physics, chemistry, biology, introductory and upper engineering courses. They serve as meeting places for career seminars offered through the Office of Student Programs in the School of Engineering and the CCAPP Program in the Science Division. Students who attend the Centers show significant improvement in their analytical, problem-solving, communication, and professional skills. The dropout rate for freshman and sophomore minority students in engineering and science has declined, and students are better integrated into academic life thanks to the effective peer and faculty mentoring provided through AMP. The commitment to mentoring at City College is very strong: one third of the engineering faculty is mentoring minority students in a variety of research activities.

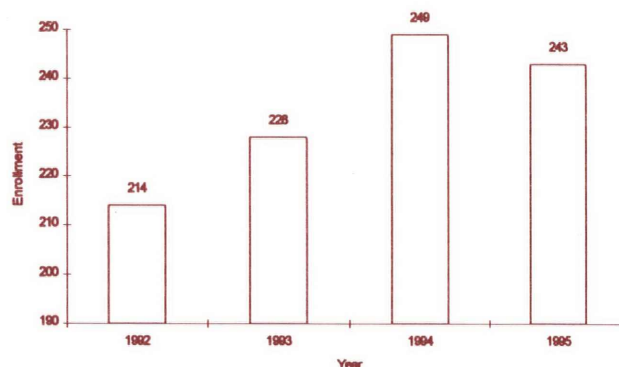
During the 1995-1996 academic year, restructured sections of Calculus I and Calculus II were offered, with the use of graphing calculators integrated into the labs. Restructured sections of Chemistry I and II were offered using the workshop approach.

Four AMP research scholars from the School of Engineering have gone on to graduate school, and nine undergraduate engineering students are currently participating in research under AMP auspices. The

research experience at City is enhanced by the CCNY PORT (Professional Opportunities for Research and Teaching) Scholars' Day which provides research information and opportunities for collaboration between students and faculty.

AMP has been instrumental in promoting articulation between community colleges and City College: three AMP Research Scholars who transferred from community colleges are now doing research in the School of Engineering. The College has entered into a formal calculus articulation agreement with Borough of Manhattan Community College and is negotiating a similar agreement with Bronx Community College. Faculty members are serving on CUNY-wide mathematics committees and are participating in the development of chemistry workshop materials with representatives from six other CUNY campuses and the Urban Systemic Initiative.

### College of Staten Island Change in Minority SEM Enrollment



#### College of Staten Island

The College of Staten Island (CSI) was founded in 1976 through the union of two existing colleges - Staten Island Community College and Richmond College. It is the only public college on Staten Island and sits on a 204 acre campus which is the largest site for a college in New York City.

CSI is a comprehensive, four-year senior college which offers programs in the traditional liberal arts and sciences, professional studies, health sciences, and the technologies. It grants associate's and bachelor's degrees and, in selected courses, the master's. CSI's student population is heterogeneous, ranging widely in cultural background, aspirations, age, and academic skills. The college views the quality and success of its educational endeavor not in the qualifications of entering students but in the qualifications of those who receive degrees.

#### AMP Accomplishments

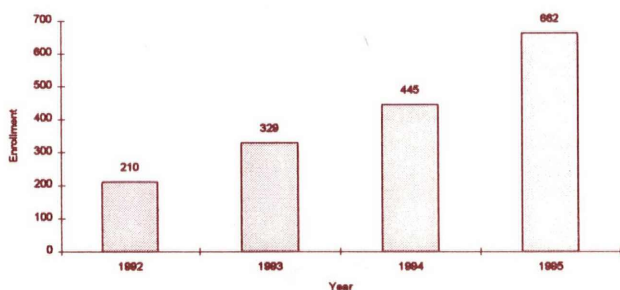
Participation in the AMP Undergraduate Research Program is solid, with nine research scholars and seven

faculty mentors involved. Their projects cover physics, engineering science, chemistry, and biology. Two AMP student research symposia were held in the course of the year so that research scholars could present their work to the college's SEM community. AMP tutoring is underway, with twelve tutors assisting their peers in biology, chemistry, physics, mathematics, and engineering science.

As part of the overall program of restructuring calculus, a fully equipped mathematics laboratory with on-line software has been established with support from a Title III grant. The lab is staffed by peer tutors, and calculus training workshops have been held. General chemistry and general physics are in the initial phases of restructuring.

An analysis of the grade performance of research scholars, peer tutors and students participating in the AMP program is underway.

### Hostos Community College Change in Minority SEM Enrollment



## Hostos Community College

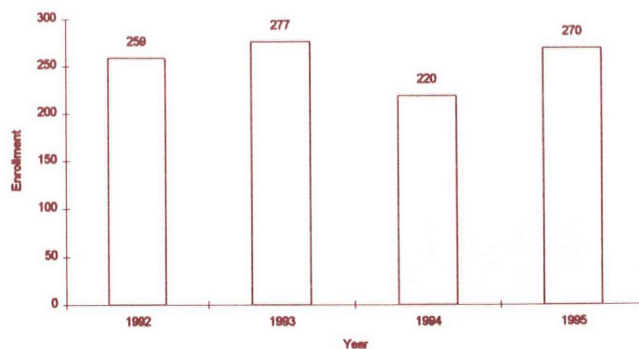
Hostos Community College was created in 1968 to serve the needs of the South Bronx. It is in the final stages of a \$144 million building plan to enhance its Grand Concourse Campus.

The college's mission is to provide "educational opportunities leading to social-economic mobility for first and second generation Hispanics, African-Americans, and other residents of New York City who have encountered significant barriers to higher education." Hostos is committed to fostering a total bilingual-multicultural environment in which students can develop proficiency in English, maintain and develop abilities in Spanish, and become more appreciative of the different cultural backgrounds of their peers.

## Hunter College

Founded in 1870 as the Normal College to educate young women who wished to be teachers, Hunter College is the second oldest college in the City University of New York. Coeducational since 1964, Hunter is located in Manhattan, and has an enrollment of over 19,500 students divided

### Hunter College Change in Minority SEM Enrollment



between degree, non-degree, and graduate programs.

The Hunter College Senate recently stated the college's educational goals in the following terms, "While preparation for specific careers is actively encouraged in many programs, the fundamental aim of the college experience as a whole is to develop a student's rational, critical, and creative powers." Hunter's undergraduate programs provide students with skills to attain competence in a specialized field as well as a foundation of general knowledge. The college offers over forty master's degree programs in the arts and sciences, education, and the Schools of Health Sciences, Nursing and Social Work. Hunter College Elementary School and Hunter College High School serve as demonstration schools and research facilities for the teacher education program.

Hunter's faculty has included many distinguished scholars, educators, and creative artists. The college counts two female Nobel laureates among its distinguished graduates.

### AMP Accomplishments

Course restructuring at Hunter continues apace. In 1995-1996, sections of Calculus I and II were again offered and are now perceived as an established feature of the curriculum rather than an educational novelty. Workshop sections of general physics continued. A member of the physics faculty piloted the teaching of General Physics I and II using Mathematica-based computer exercises to demonstrate physical laws. Peer tutor-led study groups were again conducted in chemistry.

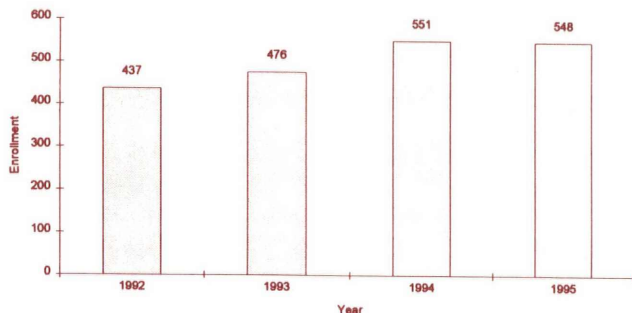
The Learning Center is being expanded. Seven Pentium stations have already been installed, and eight more are awaiting installation. Materials from physics and chemistry instructors, such as problem sets with answers, will be scanned into the workstations. These materials will help accustom students to the style in which a particular course is taught and to the format of exams.

In an important move toward institutionalization, the position of Coordinator of the Science Learning Center was put on the college budget, freeing up AMP funds for the start-up and maintenance of more sophisticated

computer applications.

A permanent home for the Science Learning Center has been identified and renovation monies are being sought. The supplement to Hunter's MBRS grant should provide \$40,000. An additional \$120,000 will have to be raised from private sources, industrial donors, and CUNY.

### Kingsborough Community College Change in Minority SEM Enrollment



## Kingsborough Community College

Founded in 1963, Kingsborough is located on an attractive campus in Manhattan Beach, surrounded on three sides by the waters of Sheepshead Bay, Jamaica Bay, and the Atlantic Ocean. Appropriately, the college is home to the Center for Marine Development and Research.

Kingsborough grants associate's degrees in three areas, Arts, Science, and Applied Science. It focuses on liberal arts transfer programs as well as on career programs in business, human and public service, health and related services, and the fine and performing arts. It aims to provide programs that contribute to a balanced university educational system without duplicating needs already being met by other university units. The college is committed to meeting the needs of the dynamic urban area in which it is located. It introduces new programs and reexamines existing ones in light of shifting economic, social, occupational, and recreational requirements of the community.

### AMP Accomplishments

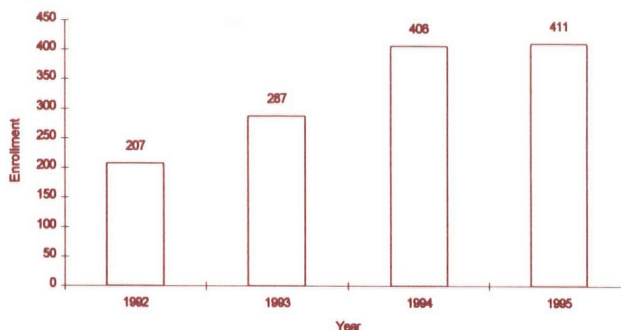
During 1995-1996, a faculty member from the Mathematics and Computer Science Department created a manual for the workshop sessions of Math 15. It incorporates the Casio graphing calculator into the study of functions. Resources from the college augmented AMP funds to provide released time so that faculty could pilot test the materials during the spring semester. For the first time, an overhead projector linked to a graphing calculator was used in Calculus I.

Kingsborough faculty took part in the Collaborative Computer Calculus Workshop held at BMCC in the spring.

The pedagogy presented will be incorporated into the AMP calculus section in the fall of 1996.

Workshop sections provided important support for the instructional program, particularly in chemistry.

### LaGuardia Community College Change in Minority SEM Enrollment



## LaGuardia Community College

Located in Western Queens, LaGuardia was founded in 1970. It serves matriculated students through associate's degrees and certificate programs. Through its non-credit continuing education programs on and off campus, LaGuardia responds to the educational needs of groups such as the homeless, senior citizens, prisoners, deaf adults, recent immigrants, and the unemployed.

The college's twenty-nine academic majors meet the needs of students who want to transfer to four-year colleges as well as those who seek immediate employment. It offers innovative English as a second language programs and developmental skills programs in reading, writing, speaking, critical thinking, and mathematics.

LaGuardia hosts two model high schools on its campus. Middle College High School serves students who are at risk of dropping out and International High School provides recent immigrants from numerous countries with a comprehensive secondary curriculum which develops their oral and written competence in English.

### AMP Accomplishments

Precalculus and calculus courses combined lectures, collaborative learning, problem solving and review workshops. One hundred and fifty students participated in the restructured sections which incorporated the use of TI 82 graphing calculators and Maple and Derive software. The approach was so successful that the number of sections is expected to be expanded in 1996-1997. There is considerable faculty support for adopting the methodology in mainstream courses.

In the fall of 1995, workshops were incorporated into the

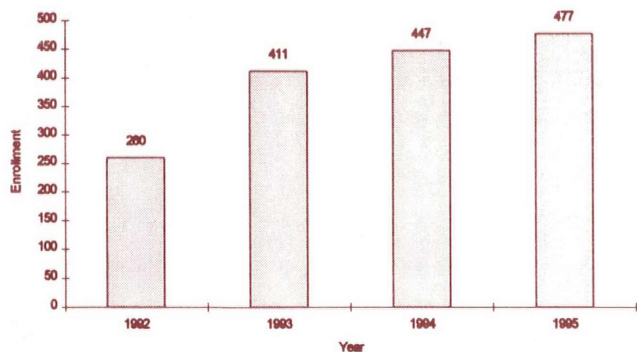
teaching of biological and general chemistry. There is ongoing discussion about formulating a calculus-based physics sequence using the concepts which have been applied to restructured physics courses on other CUNY campuses. Efforts are underway to recruit more students into the sciences and possibly to reactivate LaGuardia's pre-engineering and mathematics programs in the fall of 1996.

An SEM Learning Center will be in place in the fall of 1996. The College is providing personnel and funding. Internet access will be supported by the MUSPIN grant. An Activity Coordinator and peer tutors will staff the Center. They will help students resolve academic difficulties and enhance their SEM skills.

Working together the Mathematics, Computer Science, and Natural Science Departments are offering an interdisciplinary pre-research activity. Thanks to AMP funding, students in the Computer Science Department are engaging in research via the Internet. Four LaGuardia students have been accepted into the AMP Undergraduate Research Program for 1996-1997.

AMP is promoting articulations between LaGuardia and other colleges: the Science Department mentor works closely with Brooklyn College, and discussions are under way between the the Computer Science Department mentor and Hunter College.

### Lehman College Change in Minority SEM Enrollment



### Lehman College

Established in 1968, Lehman College, is the only senior public college in the Bronx and serves a region that includes southern Westchester County. Its demanding curriculum seeks to build a strong background in the liberal arts and sciences and offers advanced and specialized study in professions such as teaching and nursing.

Lehman College collaborates with other institutions in the area, such as the New York Botanical Garden and Montefiore Medical Center, in offering programs that serve the needs of students and community members. It is in charge of the academic program and campus

administration of CUNY's outpost in Japan, CUNY Lehman, near Hiroshima. Lehman is home to the Bronx Regional and Community History Institute and the Institute for Literacy Studies.

### AMP Accomplishments

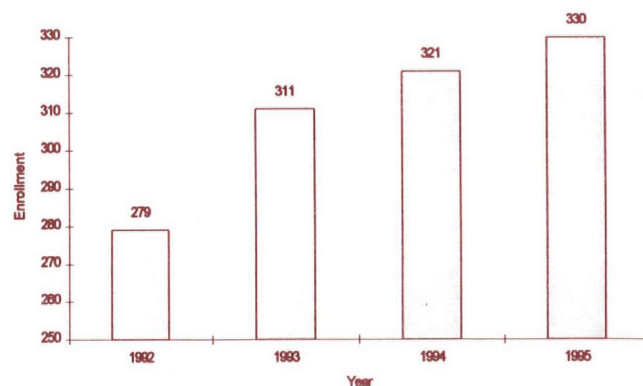
The following steps have been taken in institutionalization: Calculus I Labs and Calculus II Labs have been assigned their own course numbers: MAT 155 and MAT 156 respectively; in chemistry, one AMP chemistry workshop has been conducted and at least ten have been funded by the CUNY Workshop Chemistry Initiative.

Calculus I and II, General Chemistry I and II, General Physics I and Introduction to Geology are tutored in the Learning Center and remotely on campus. An IBM PS/2-70 386 computer, equipped with Physics Academic Software, Maple V and RAS Mole, is being used by peer tutors to demonstrate solutions to problem sets in calculus, chemistry, and physics.

Four Lehman students took part in the Undergraduate Research Program in 1995-1996. Research enrichment seminars were offered through AMP. Lehman faculty and SEM chairs are discussing the implementation of a research preparation course.

Articulation in physics is well established between Lehman and Hunter. Lehman students do research at Hunter, and a Hunter physics professor teaches at Lehman. The Lehman AMP coordinator is working with Bronx Community College AMP to enhance BCC's position as a feeder school for Lehman.

### Medgar Evers College Change in Minority SEM Enrollment



### Medgar Evers College

Named for the martyred civil rights leader Medgar Wylie Evers, the college was established in 1969 to meet the educational and social needs of Central Brooklyn.

Medgar Evers seeks to provide students with the knowledge and skills necessary for career advancement and professional mobility, maintaining flexibility in the

incorporation of students' experiential resources as the building blocks for the discovery of new knowledge and excellence in achievement of academic skills. The college grants both baccalaureate and associate's degrees with articulation between its two- and four-year programs. Non-degree educational, social, economic, and cultural programs serve a broad population of community residents. These emphasize adult and continuing education, basic literacy and high school equivalency, and community advocacy.

### AMP Accomplishments

The AMP Learning Center contains four Macintosh SE/30 computers. It promotes AMP activities, and its career corner provides information on scholarships, internships, and resume-writing.

The Undergraduate Research Program is growing. Three new research scholars will join three reappointees. Former research scholars are pursuing graduate studies at Hunter College and Pennsylvania State University, and a current scholar is doing a summer internship in Singapore. The first annual Research Day, supported by AMP and NASA grants, was held on June 6, 1996. It featured oral and poster presentations by students from the Physical Science Department.

AMP students participated in the NASA/MUSPIN workshops held at City College in April, learning about the Internet and related topics.

An advanced computing lab will be operational in July of 1996. Sponsored by NSF AMP, NYC GRTI, and NASA MUSPIN grants, it will provide the infrastructure necessary for e-mail and for access to NASA data.

Medgar Evers has institutionalized a significant number of restructured courses. The following courses now contain workshop hours: CHM 201 (General Chemistry I), CHM 202 (General Chemistry II), PHY 211 (University Physics I), PHY 212 (University Physics II), PHY 213 (University Physics III). Workshop sections of Calculus I and Calculus II will be held in the fall of 1996.

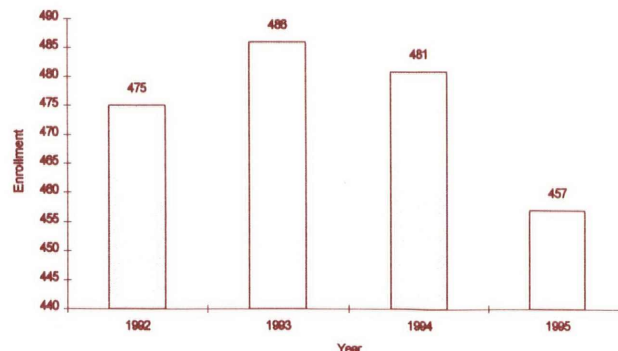
In the area of curriculum development, two innovative courses were offered in the spring of 1996. They are: PHS 301, Special Topics in Climate and Planets and PHS 201, Research Methods and Laboratory Instrumentation.

## New York City Technical College

Located at the foot of the Brooklyn Bridge in the governmental, legal, and business center of the Borough of Brooklyn, New York City Technical College is the only technical college in the City University of New York.

City Tech's mission is to meet the needs for technical and career education of New York City's culturally diverse

## New York City Technical College Changes in Minority SEM Enrollment



population. The college's enrollment of 11,000 is 81% minority. It offers thirty-six curricula leading to the associate's degree and five leading to the baccalaureate.

### AMP Accomplishments

Restructured sections of Precalculus, Calculus I and Calculus II took place each semester. They featured a class size limited to twenty-four students, the application of TI-82 graphing calculators, and a mandatory, weekly two-hour workshop session conducted by a peer workshop leader.

Chemistry restructuring is being fueled by an alliance between City Tech AMP and the NSF-funded Workshop Chemistry initiative. Chemistry sessions offered through AMP consist of seven or eight small groups, each facilitated by a peer leader. The program has yielded excellent results.

Physics restructuring began in the spring semester. Sections included two-hour workshop sessions in which students delivered individual or group presentations on current course topics.

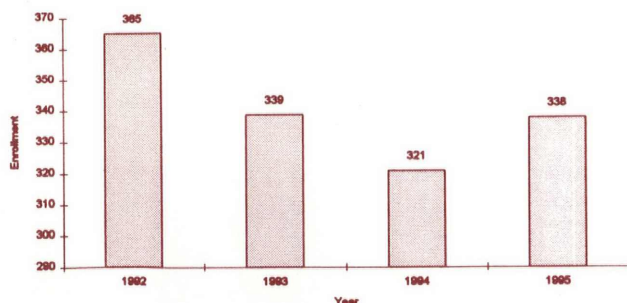
An Introduction to Research Course was offered in the spring of 1996. It was taught in a seminar-like setting. Thirteen students attended the course. Seven were officially registered and six participated out of interest.

A newly formed college Steering Committee has been promoting AMP aims since September 1995. The City Tech study "Final Grade Distribution for AMP versus Non-AMP Sections" showed impressive results for sections using the workshop approach.

## Queens College

Established in 1937, Queens College sits on a seventy-six acre campus where it serves a student population of 18,000, including 3,000 graduate students. It is dedicated to the idea that a great education should be accessible to talented young people of all backgrounds - ethnic and

### Queens College Change in Minority SEM Enrollment



financial. Its distinguished faculty is committed to both teaching and research. Involving undergraduates in research projects is a top priority at Queens. This allows them to gain important insights into potential career paths and to prepare for graduate training. Queens College students regularly receive prestigious fellowships and scholarships and go on to the country's leading graduate schools.

Queens College marries its commitment to the value of a strong liberal arts education with an awareness of its mission in the broader community. The two are well expressed by the college's motto, "We learn so that we may serve."

Special programs exist for honors students; students in pre-law, pre-med, and business; adults; "fresh start" students; and foreign language speakers. The college is home to a large number of distinguished centers dedicated to study, innovation, and implementation in areas as diverse as the Biology of Natural Systems, Jewish Studies, and Labor Resources

#### AMP Accomplishments

Course restructuring continued in mathematics. In AMP calculus and precalculus sections, additional scheduled hours were devoted to collaborative learning. Though other sections did not have officially scheduled collaborative hours, College free hours were used for the purpose. Graphing calculators have become an essential tool in the teaching of calculus. Beginning in the fall of 1996, they will be used in all calculus courses offered at Queens.

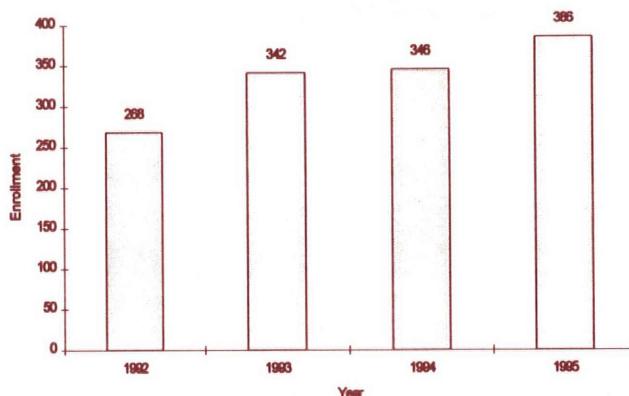
The Department of Chemistry and Biochemistry completed the third semester of its study of the effectiveness of collaborative learning versus recitation in the first semester of introductory chemistry, Chemistry 113. Students were divided into recitation and collaborative learning workshop groups. Those participating in the workshop groups averaged exam grades 5% to 7% higher than students in recitation groups.

Workshops were introduced in Physics 121, the general course for science majors, and Physics 1, conceptual

physics. The experience was termed an unmitigated success.

Awareness of AMP on campus is being heightened through cooperation with other on-campus science and mathematics organizations. Faculty members are supportive of the program and more are becoming AMP mentors, engaging students in their research.

### Queensborough Community College Change in Minority SEM Enrollment



### Queensborough Community College

Located in Bayside, Queens, Queensborough Community College offers associate degree curricula in the liberal arts and sciences and in career and pre-professional areas as well as specialized certificate and non-credit community service programs. The college prepares its students for transfer to four-year institutions or for entry into the job market. It provides a network of developmental education and student support services designed to enable students to succeed in their studies.

Queensborough is committed to serving the community and enriching its cultural resources. The College Art Gallery is open to the public and college departments sponsor performances in dance, music, and drama.

The college's Continuing Education Program provides a wide variety of noncredit remedial, vocational, recreational, and cultural courses for people of all ages. The Office of Continuing Education assists groups and organizations in developing programs, conferences, or courses of special interest.

#### AMP Accomplishments

Course restructuring at Queensborough reached 750 students. A total of thirty-five sections which included workshop hours were offered. They encompass the following courses: General Chemistry I, Calculus Physics I, Calculus Physics II, Calculus Physics III, Precalculus, Calculus I, Calculus II, and Calculus III. There is strong support among mathematics, physics, and chemistry faculty for integrating restructured courses into the

mainstream curriculum. The QCC Senate has approved the restructuring of Calculus I, II, and III. Beginning in the fall of 1996, all calculus sections will have one scheduled hour per week in the computer lab and four recitation hours. A computer classroom, equipped with funds from an NSF-ILI grant, will support curriculum restructuring in calculus.

QCC provides space for the AMP Learning Center. The Center offers tutoring for all mathematics and physics courses and supplies workshop leaders for AMP math, physics, and chemistry courses. The college plans to continue its support for the Center and the Coordinator position. There were twenty AMP workshop leaders in 1995-1996. Four, who transferred to City College, continued as workshop leaders at QCC.

The list of QCC AMP research projects is ambitious and includes participation in the NASA/GISS climatology project. There were twenty-three AMP research scholars at QCC in 1995-1996. They were mentored by ten faculty members who met with them at least twice a week. The QCC AMP Coordinator has been instrumental in helping QCC research scholars transfer to City College.

QCC faculty members have written laboratory manuals for Calculus I, II, and III which support the restructured calculus curriculum. An AMP faculty member will be working with NASA/GISS on multimedia courseware and dissemination projects. An interdepartmental introduction to research course was offered in the spring of 1996. It will be offered again in the spring of 1997.

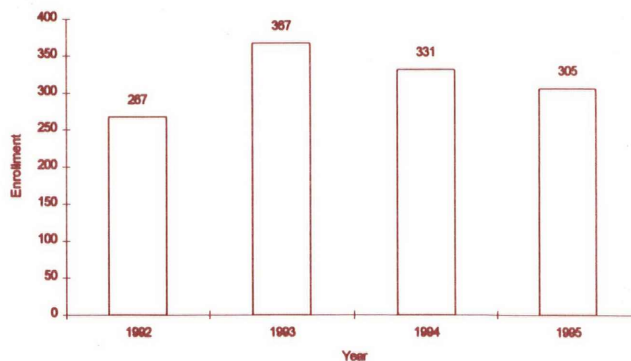
AMP activities are publicized through a semi-annual QCC/AMP newsletter produced by the QCC AMP Coordinator.

## York College

Established in 1966 and located on a 50-acre campus in Jamaica, Queens, York College offers over forty majors, conferring baccalaureate degrees in the liberal arts and in a broad range of career programs in the fields of accounting, business, computer studies, education, health, and social work.

The college welcomes students from the widest range of backgrounds and provides opportunities that maximize

## York College Change in Minority SEM Enrollment



each student's intellectual, professional and personal growth. It has recently instituted a First Year Program for entering students, a Faculty Resource Center, and comprehensive Student Support Services.

York's Office of Continuing Education is committed to addressing the needs of the Jamaica community.

### AMP Accomplishments

All Calculus I sections are using Maple software. Students are required to use the software for mathematics laboratory assignments.

Physics is being restructured to include computer laboratory exercises and workshops led by peer tutors. During both semesters of 1995-1996, Chemistry 101 included two one-hour workshops per week run by peer tutors. These benefitted both the tutors, who increased their knowledge of chemistry, and students whose interest in the subject increased.

Two AMP physics students and a Physics Department faculty member are doing climatological research at the Goddard Institute for Space Studies under the auspices of the CUNY/AMP/GISS partnership. They are using the Global Circulation Model, a computer simulation of the earth's atmosphere, to predict future weather and climate changes.

An AMP research scholar has been working on the antiviral for HIV and Hepatitis B. She hopes to pursue graduate studies in chemistry. A former York College AMP student has been accepted into the University of Maryland's mathematics Ph.D. program with a full scholarship.

**A**MP is a great program because it allows students like me to get experience in lab techniques and gives us opportunities to work with great scientists. At this moment, I'm getting first class teaching and gaining a lot of knowledge about new research techniques. For a minority student like me, the opportunity given by AMP is part of a dream coming true.

**Jose Gutierrez, AMP Research Scholar, Queens College**

**I** am currently working as an AMP research scholar in the area of bio-medical engineering. This has allowed me to practice the theories I am learning in class and has given me the opportunity of linking technology and medicine.

In doing my research, I have developed my interpersonal skills. I have learned to become a team player. This skill will be very important when I start looking for a job or applying to graduate school. I also have acquired more knowledge about the different areas and applications within my chosen field.

My research experience has been very wonderful. Now, I know that an electrical engineer can save lives. I thank AMP for giving me this opportunity.

**Lisset Arevalo, AMP Research Scholar, City College School of Engineering**

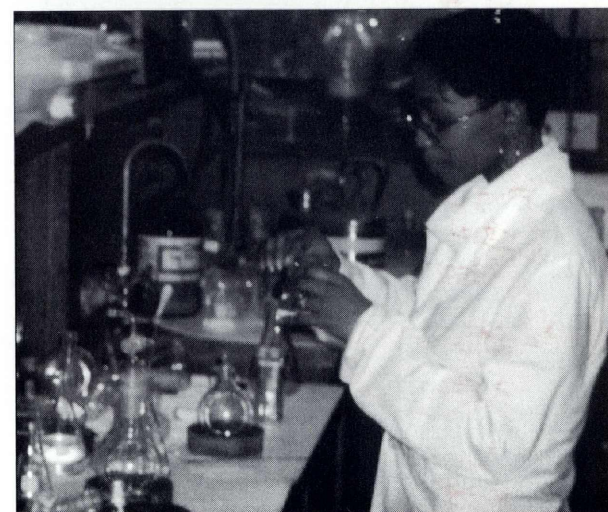
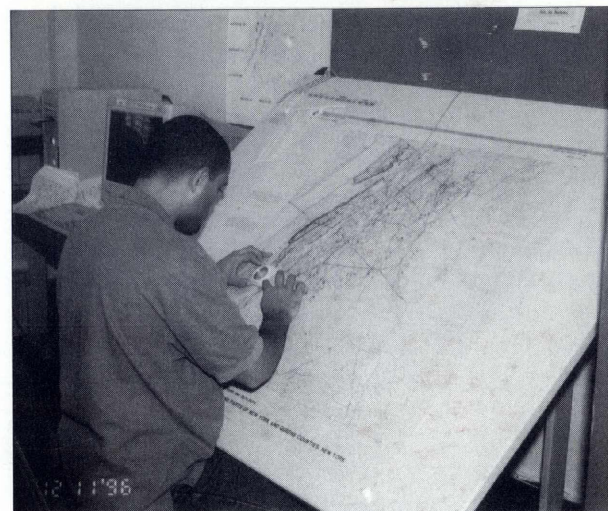
**I**nitially my AMP experience gave me the idea for my major. Leading workshops gives me more insight into concepts. It helps reinforce previous learnings. I sometimes learn from the students. I am able to deal with students individually and to identify their needs. Hopefully I will use my experience as an AMP tutor and workshop leader in my teaching career.

I used my AMP stipend to buy textbooks and pay for tuition. AMP has had a positive influence on my personal and academic life.

**Leopold Momplaisir, AMP Tutor and Workshop Leader, LaGuardia Community College**

**A**s an AMP math workshop leader, I am constantly communicating with the instructor and my workshop group. This has enabled me to have a better grasp of the subject and to become more confident in motivating students to become more actively involved in completing assignments and working in groups. AMP has brought out leadership qualities I never realized I had.

**Mbye Jobe, AMP Workshop Leader, New York City Technical College**



*Photos: Front cover, top: Ray Devonish (left) tutoring chemistry at Brooklyn College; bottom, from left to right: Jose Perez, chemistry workshop leader and Fednol Presume, AMP research scholar in the lab at New York City Technical College. Back cover, from top to bottom: Queensborough Community College AMP faculty mentor, Jerry Sitbon (left) works with research scholar Ryan Daniels; research scholar Kenneth Arroyo at Lehman College; Queens College research scholar Tessie October in the chemistry laboratory.*