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Author: Susanne Bachtel at ostp
Date: 7/22/94 2:10 PM
Priority: Normal
TO: Mail List - #ASSOCIATE DIR'S
TO: William Wells
TO: Angela Phillips
TO: Holly L. Gwin
TO: Barbara A. Ferguson
TO: Timothy L. Newell
CC: Mail List - #Schedulers
CC: Lisa Duffey
CC: Sandra J. Toomey
TO: zALL
Subject: Nat.Action Council for Minorities in Engineering

----- Message Contents -----

Following JHG's presentation at the Annual Convocation of Professional Engineering last May (NAE), he spoke with

Dr. George Campbell
President
National Action Council for Minorities in
Engineering
(NY, NY)(202) 279-2626, Ext. 225 (Betty Wagner, Ass't)

JHG has scheduled an appointment to meeting with Dr. Campbell x 30 minutes on Friday, August 5, at 10:00 (at the close of the regular A/D's meeting that starts at 9:30) in Room 422.

He encourages A/D's, others on the "To" list above to join the meeting. Subject: "diversity in science and engineering; problem of underrepresentation in the R&D community's agenda; how to keep momentum of progress maintained in the current downsizing environment (both public/private sector); about NACME's work in general."

JHG earlier received a letter/NACME annual report from NACME - copy will be circulated to you. Tx. Sue

May 18, 1994

Dr. John Gibbons
Director, Office of Science and Technology Policy
Old Executive Office Building, Room 424
Washington, D.C. 20506

Dear Dr. Gibbons:

I very much enjoyed your presentation at the Annual Convocation of Professional Engineering Societies at the National Academy, and I particularly appreciated your interest in the issue of diversity in science and engineering.

As you know, we've made tremendous progress over the past two decades in engineering—significantly more than in other technical areas—and the problem of underrepresentation remains high on the R&D community's agenda. Further advances, however, are challenged by the current downsizing environment. Ensuring that the appropriate level of effort is maintained now is an important challenge for both government and the private sector.

Following-up your invitation to talk at greater length about this issue and about NACME's work, I'll contact your office to arrange an appointment.

Enclosed is a copy of our 1993 Annual Report, which briefly describes NACME's programs and strategies for increasing access to engineering careers. I've also attached copies of my recent editorial in *APS News* and a forthcoming editorial in the *Chronicle of Higher Education*, which outline some of my perspectives.

Sincerely,

George Campbell Jr., Ph.D.
President

enclosures

National Action Council
for Minorities in
Engineering, Inc.

3 West 35th Street
New York, New York 10001
212/279-2626

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Engineering: A Silver Lining for the Dark Cloud

Since 1971, there has been an order of magnitude increase in the annual number of African American, Hispanic and American Indian engineering graduates. Between 1986 and 1992, minority freshman enrollment grew almost 60 percent. No other profession — not the physical or social sciences, medicine, law or teaching — can claim that kind of progress. But this year's 5.2 percent drop in minority freshman enrollment suggests that future gains are jeopardized by what the news portrays as a field in decline. Headlines broadcasting the monthly loss of 20,000 jobs in the defense industry, heretofore the largest employer of engineers, steadily bombard students now making career decisions. A total of 120,000 defense-related engineering jobs, 40 percent of the 1987 workforce, will have been eliminated by 1997. Aerospace has been hit hardest. Aerospace Industry Association data show that, by the end of 1994, employment will have declined 33 percent in five years. In 1993, aerospace companies lost a total of 131,000 jobs, 12,000 in science and engineering.

Among other technology-intensive companies, the persistent recession, rising global competition and disappointing corporate profits triggered vigorous "muscle-building" exercises — fat trimming, achieved in part by massive staff reductions or by divesting lines of business — to increase productivity, improve the quality of goods and services and expand profits. The leading company on the *Fortune* 500 list in virtually every segment has eliminated significant numbers of jobs in recent years. AT&T's workforce dropped from 435,000 in 1984 to 308,700 in 1993. IBM with 406,000 employees in 1985, now has 267,000. Since 1981, General Electric has almost halved its workforce, to 222,000. In 1993 alone, Kodak eliminated 17 percent of its jobs; DuPont, nine; Boeing and Goodyear, six; General Motors five; and Exxon and Johnson and Johnson, four percent.

Alarming anecdotal reports of the difficulties experienced by promising young Ph.D.s abound. Some have moved sequentially through several post-doctoral positions with no permanent opportunity in sight. We hear that others have given up and are driving taxis, selling real estate, or working in restaurants.

What does this mean, particularly for minorities, in a profession that has traditionally been the dominant route to upward mobility? Half of the *Fortune* 500 CEOs were engineers when NACME was established 20 years ago to address the under-representation issue. While two decades of progress has substantially altered the industrial landscape, it has not yet brought parity. African Americans, Hispanics and American Indians, now 28 percent of the college-age population and 40 percent of the birth rate, comprised only 7.9 percent of the bachelors level engineering graduates in 1993. Yet, in the face of today's job market, should we continue to encourage students from underrepresented groups to pursue engineering studies? I've been asked less delicately, "Why are you offering minority children a profession in decline?" Should we

pull back our efforts, perhaps jeopardizing the impressive, but fragile structures in place to complete the task?

These questions warrant a closer look at the job situation. Restructuring sometimes conceals as well as reveals. The dismantling of large corporate research and development laboratories, for example, can be illusory, as engineering responsibilities get integrated into smaller business units. Moreover, the metamorphosis of mature businesses does not tell the whole story. Small start-up companies generate the bulk of new jobs. *Fortune* 500 companies with high annual employment growth, some exceeding 100 percent, are disproportionately high-tech, with names like Dell Computer, Intel, Quantum, AST, EMC, Gateway 2000, DSC and Loral. Total engineering jobs declined only 2.86 percent between 1987 and 1992, from 1,641,000 to 1,594,000.

Because engineering graduates have traditionally been highly recruited, spot checks of college placement offices uncovering changes are newsworthy. No longer are the previously prized engineering students choosing between multiple offers. Few are waltzing into plum jobs at the blue chip companies. What often goes unreported, however, is that engineering graduates still fare much better than others. In 1991, the College Placement Council reported that engineering students comprised only eight percent of the degree candidates, and collected 40 percent of the job offers. Overall unemployment in engineering today, though almost twice what it was during the 1980s, is still only 3.8 percent.

It's important, too, that bachelor's level engineering graduates have a wide range of options. Many go on to medical or law school, enroll in MBA programs or pursue advanced degrees in their field. Of the graduates who take jobs, typically only about half go to work in an engineering or science-based discipline. The other half compete very favorably for good jobs in traditionally unrelated fields. Advanced mathematics, information processing and sophisticated computer technologies are becoming increasingly valuable in virtually every profession. And there is a growing need for trained scientists and engineers in non-traditional jobs, including journalism, pre-college teaching, management and public policy analysis. Now more than ever, in every job classification, employers are looking for recruits who have been rigorously educated, who have highly developed, portable intellectual capabilities, who have exceptional analytical skills, who are problem-solvers. Engineers fit the bill.

A good measure of how society values an engineering education is how well graduates are paid. Analysts have argued that the "sluggish" growth in starting salaries for engineers — barely keeping pace with inflation — is the result of oversupply. Bachelor's degree candidates in engineering, however, continue to command the top starting salaries, averaging over 70 percent higher than liberal arts graduates and 40 percent higher than business administration graduates. The National Science Board reports in *Science and Engineering Indicators* that in 1993, chemical and petroleum engineering majors led the way with starting salaries of \$39,500 and \$38,400, respectively. In all

engineering fields, average initial salaries exceeded \$30,000, a milestone matched only by the nursing profession. Average overall professional engineering salaries are exceeded only by that of lawyers, physicians and pharmacists. Going beyond salary, the *Jobs Rated Almanac* by Les Krantz ranks jobs based on six quality criteria, including employment outlook. Engineering jobs are overwhelming favorites, with the subdisciplines occupying eight of the top 50 positions.

So recent headlines proclaiming the demise of engineering have, at best, been misleading. But what about the future? Projections, whether about labor markets or stock markets, are rarely reliable. Nonetheless, qualitative results from comprehensive workforce analyses deserve some attention.

The Bureau of Labor Statistics, taking attrition into account, projects 700,000 new engineering jobs between 1992 and 2005, half of the current workforce. Selected subfields, such as computer engineering where the number of jobs is expected to more than double, are likely to have substantial shortages. The National Science Board projects that employment in technical occupations will grow faster than in other areas, but estimates that the overall supply of natural scientists and engineers will slightly exceed the demand. A report by the Oak Ridge Institute for Science Education covering 1991-1997 projects a slight shortage of natural scientists and engineers. Most importantly, none of the predictions show a major gap, either a surplus or a shortage.

The engineering profession has not been unscathed in this period of change, but is far better off than one might deduce from a casual reading of the news. New jobs in high-tech industries are expanding rapidly. Exciting new technologies, from nanometer robots to high temperature superconductors are emerging from the laboratories. Biomedical research, genetic and environmental engineering, the search for efficient, renewable energy sources and information, telecommunications and computer technologies offer the promise of entirely new industries.

Beyond economics, we're confronted with a world replete with hunger, disease, homelessness and other social problems. Can we afford a lapse in the intellectual infrastructure of science and technology, which can be brought to bear on these issues? Can we seriously afford to think that we have an oversupply of people rigorously educated in engineering, with the career flexibility such an education offers?

The downsizing of defense, rather than flooding the job market with engineers, offers us an opportunity to redirect some of the most highly trained professionals working at the frontiers of technology toward efforts that have enormous potential for stimulating private sector economic growth — notwithstanding the proven difficulties in beating missiles to microchips, the modern equivalent of swords to plowshares. This perspective occupies a central role in the Clinton administration's science and technology policy, as manifested by the proposed 1995 budgets for the Advanced Technology Program, the

Technology Reinvestment Program and the Cooperative Research and Development Agreements.

The effort to maintain American leadership in critical technologies, however, demands another ingredient which corporate executives understand very well. A recent NACME survey of corporate donors, including those in a downsizing environment, reaffirmed their singular commitment to building a more diverse engineering workforce. According to the Workforce Solutions Company, seven out of ten corporate executives rank recruiting, managing and valuing diversity critical to maintaining a competitive edge and to their very survival. That the effective use of diverse teams can yield a distinct competitive advantage has been quantified in studies at the University of Western Ontario's School of Business Administration. Using objective measures of group performance in international business, the research shows that groups characterized by a high level of diversity have considerably higher potential than homogeneous groups.

Should we continue to urge African Americans, Hispanics and American Indians to consider an engineering career? The answer is unequivocally, yes. Our ability to capitalize on the vast richness of cultural diversity, while breaking down the barriers separating population groups, has emerged as a central issue of our time. A preeminent engineering workforce, one that utilizes the full potential in every segment of our society, is essential not only to our nation's economic growth, but to our political needs, our social objectives and our global leadership responsibilities.

To be published, May 1994

* NACME FAX * NACME FAX * NACME FAX * NACME FAX*

For Fri. 8-5(10)am mtg
Lm-122

NATIONAL ACTION COUNCIL FOR MINORITIES IN ENGINEERING, INC.

3 West 35th Street

New York, New York 10001-2281

212/279-2626 ext. 218, (Fax) 212/629-5178

Date Rec'd 8-2-94

ACTION to

INFO to JHG

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Navell

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~~Wells~~

Stationer Ferguson

DATE DUE

TO Mrs. Lisa Dufley
COMPANY OSTP
PHONE # (202) 456-7116 FAX # (202) 456-6021

FROM RONNI DENES, Vice President, Communications and Public Affairs

DATE 8/2/94 TIME 10:45 AM/PM
NUMBER OF PAGES EXCLUDING COVER SHEET 2

MESSAGE: Following are my bio and Dr. Campbell's
as well as a brief fact sheet about
NACME.

George Campbell Jr.

George Campbell Jr. is president of NACME, Inc., a non-profit corporation dedicated to improving access to careers in science-based disciplines. NACME conducts research and public policy analysis, develops and operates precollege and university enrichment programs, publishes original educational materials and is America's largest privately funded source of scholarships for engineering students from underrepresented ethnic groups.

Campbell earned a Ph.D. in theoretical physics from Syracuse University and a B.S. in physics from Drexel University. He is also a graduate of the Executive Management Program at Yale University. As an undergraduate, he was a Simon Guggenheim Scholar and earned membership in $\Sigma\Pi\Sigma$, the national physics honor society. Dr. Campbell is a Fellow of the American Association for the Advancement of Science (AAAS) and a recipient of the George Arents Pioneer Medal in Physics, the Drexel University Centennial Medal and the Synthesis National Engineering Education Coalition Medallion.

Dr. Campbell has conducted research in theoretical high energy physics and in magnetospheric physics. During his twelve years at AT&T Bell Laboratories, he developed models of the earth's radiation environment, studied radiation effects on satellite components and held management positions in satellite and international telecommunications technology development. For seven of those years, he was a United States delegate to the International Telecommunications Union. Earlier in his career, Dr. Campbell spent two years on the faculty of Nkumbi International College in Zambia. He has published papers in mathematical physics, high energy physics, satellite systems, digital communications and science and engineering education policy.

Dr. Campbell recently served a two-year term on the United States Secretary of Energy's Advisory Board. He is currently a member of the Board of Trustees of Rensselaer Polytechnic Institute, chairing the Student Affairs Committee; the Board of Trustees of the New York Hall of Science; the Board of Directors of the Oak Ridge Associated Universities; the National Commission for Illinois Institute of Technology; the AAAS Committee on Science, Engineering and Public Policy; the National Academy of Science's Committee on Women in Science and Engineering, several other national advisory boards on science and education policy and the Board of Trustees of Crossroads Theater Company. Dr. Campbell is an advisor to the WGBH-TV series, *Discovering Women*, and is a regular guest commentator on PBS-TV's *Nightly Business Report*. In 1993 he chaired the New York City Chancellor's Commission on Science Education.

Campbell has been married for 26 years to Dr. Mary Schmidt Campbell, dean of the Tisch School of the Arts at New York University. They have three sons and live in Harlem.

Ronni Denes

Ronni Denes is vice president for Communications and Public Affairs of NACME, Inc., a non-profit corporation dedicated to increasing access to careers in science-based disciplines for African Americans, Hispanics and American Indians. Ms. Denes is responsible for NACME's national information network, which serves students and their parents, the education community, government and engineering-intensive industry.

NACME circulates more than 250,000 published pieces annually, encouraging students to pursue careers in engineering, providing public policy analysis on issues that impact education for the technical workforce, and disseminating research and best practices to educators, legislators and industry supporters. Denes has also engaged the electronic media, serving as executive producer of the PBS broadcast, *America 2000: Education for a Competitive Workforce* and the children's video, *The Challenge, A Kid's Introduction to Engineering*.

Before joining NACME in 1985 as director of communications, Ms. Denes was a consultant in advertising and public relations as well as in education. She has written speeches, policy papers, testimony and articles for the chancellor of New York City's Board of Education and has created advertising and public relations campaigns for such companies as Martex, West Point Pepperell and Mark Cross.

Ms. Denes began her career as an elementary school teacher and curriculum development specialist in the New York City Public Schools. During her tenure, she proposed and established the first hands-on science lab for elementary school students in the Bronx which became a city-wide model. She also pioneered innovative programs in literature, the social sciences, cancer education and drug abuse prevention.

Ms. Denes has written for *Parents* magazine, developed science activities for *Silver Burdett Science*, created a *Mathematics Curriculum for the Gifted and Talented Preschool Child*, and conducted workshops for the New York Alliance for the Public Schools and Women in Communications, Inc. (WICI).

Denes is a member of the board of directors of JETS, the Junior Engineering Technical Society, a member of the AAES Engineers' Public Policy Council, and serves on the advisory boards of the award-winning series *Futures* and *Crisis, Who Will do Science?* She is a member of the International Association of Business Communicators and WICI.

Ms. Denes received her MA in educational technology, media and instructional systems from Columbia University's Teachers College and her BA in elementary education from The American University.

National Action Council
for Minorities in
Engineering, Inc.

3 West 35th Street
New York, New York 10001
212/278-2826

NACME

NACME

The Organization

NACME's mission is to increase the number of African Americans, Hispanics and American Indians in the nation's engineering workforce. A not-for-profit corporation with a commitment to excellence in education, we believe that technical strength will determine world economic leadership into the coming century, that global competitiveness rests on the quality of the scientists and engineers we produce, and that neither our technical goals nor our viability as a nation can be maintained without broad access to careers in high technology fields.

Now in our 20th year, NACME celebrates the growth of diversity in engineering unmatched by any other professional field. Our goal for the future is to create parity. Through highly effective partnerships with industry, government and the academic community, NACME has developed strategies that yield significant return on investment. We conduct research and public policy analysis in education, provide comprehensive scholarships, develop and operate model demonstration programs, and publish original educational materials.

The Scholarship Process

NACME is the nation's largest private source of scholarships for minority engineering students, having provided more than \$42 million in financial aid since 1978. Our three scholarship initiatives--the Incentive Grants Program (IGP), the Corporate Scholars Program (CSP) and the NACME Engineering Posse Program--are designed to promote genuine diversity on the university campus while fostering individual achievement among NACME scholars.

- *Since 1978, NACME has delivered more than 5,400 minority engineers to American industry, 10 percent of the cumulative minority engineering graduates during that time period.*
- *The retention rate for NACME Incentive Grants Scholars is twice the national average for minority engineering students and our Corporate Scholars are retained at a remarkable 94 percent.*

Summer Employment

Students in NACME's Corporate Scholars Program gain valuable R&D experience as summer interns with their sponsoring companies. And our *Summer Engineering Employment Project Directory* introduces participating companies to more than 2,000 Incentive Grants recipients each year. By providing access to a select pool of minority undergraduates, the *SEEP*

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Directory allows our donors to build working relationships with the students whose scholarships they support while helping students finance their engineering education.

- *A survey of NACME alumni indicates that 82% of IGP graduates accepted their first professional positions in private industry.*

Research

As the country's primary source of data on factors that build minority participation in engineering, NACME Research identifies and analyzes national trends, defines assessment strategies and analyzes programs, develops the principles that underpin effective intervention, and disseminates information through workshops, training and the widely circulated *NACME Research Letter*.

- *This year, NACME's commitment to research yielded a comparative analysis of 20 Minority Engineering Programs conducted in cooperation with the Educational Testing Service.*

Program Development

NACME's program development strategies center on developing a small number of comprehensive, research-based models for systemic change--stressing the development of nurturing learning environments--from elementary school through engineering school.

- *The NACME Diversity Seminars, piloted at Rensselaer Polytechnic University and University of Cincinnati, allow faculty and students to examine deeply held attitudes toward race, class and gender and facilitate cross-cultural communication.*
- *The TechForce Partnership for Scientific Learning introduced a new paradigm for educational development to 110 teachers, administrators and staff enhanced by professional development workshops in math and science teaching.*

Communications and Public Affairs

NACME's national communications network assures that essential information reaches stakeholders in industry, government and the academic community. Through publications, video, broadcasts and conferences, NACME encourages youngsters to pursue careers in engineering, and offers educators and industry supporters the blueprints for replicating the nation's most effective programs.

- *This year, NACME produced The Challenge, A Kid's Introduction to Engineering, a self-contained educational video kit with 17-page Presenters Guide.*
- *To disseminate current research and best practices to the legislative community, NACME plays an active role in public policy analysis and advocacy. Through briefings, white papers and testimony, NACME informs congressional leaders, the mission agencies and the executive branch.*

Background for

8/5/94 Mtg

May 18, 1994

W/PHG

10:00 am after

AID's Mtg

Date Rec'd 5/25/94

ACTION to

18700

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Wells
Greenwood

Dohas

Newell

Watson

Wales

Phidips

Cowan

Dr. John Gibbons
Director, Office of Science and Technology Policy
Old Executive Office Building, Room 424
Washington, D.C. 20506

Dear Dr. Gibbons:

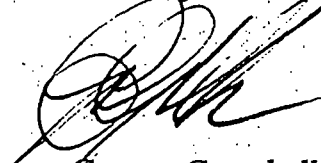
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Sincerely,



George Campbell Jr., Ph.D.
President

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The Boeing Company

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Human Resources and Adm
Hughes Aircraft Company

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Vice Chairman and Directo
General Electric Company

Technology Reinvestment Program and the Cooperative Research and Development Agreements.

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To be published, May 1994

Engineering: A Silver Lining for the Dark Cloud

Since 1971, there has been an order of magnitude increase in the annual number of African American, Hispanic and American Indian engineering graduates. Between 1986 and 1992, minority freshman enrollment grew almost 60 percent. No other profession — not the physical or social sciences, medicine, law or teaching — can claim that kind of progress. But this year's 5.2 percent drop in minority freshman enrollment suggests that future gains are jeopardized by what the news portrays as a field in decline. Headlines broadcasting the monthly loss of 20,000 jobs in the defense industry, heretofore the largest employer of engineers, steadily bombard students now making career decisions. A total of 120,000 defense-related engineering jobs, 40 percent of the 1987 workforce, will have been eliminated by 1997. Aerospace has been hit hardest. Aerospace Industry Association data show that, by the end of 1994, employment will have declined 33 percent in five years. In 1993, aerospace companies lost a total of 131,000 jobs, 12,000 in science and engineering.

Among other technology-intensive companies, the persistent recession, rising global competition and disappointing corporate profits triggered vigorous "muscle-building" exercises — fat trimming, achieved in part by massive staff reductions or by divesting lines of business — to increase productivity, improve the quality of goods and services and expand profits. The leading company on the *Fortune* 500 list in virtually every segment has eliminated significant numbers of jobs in recent years. AT&T's workforce dropped from 435,000 in 1984 to 308,700 in 1993. IBM with 406,000 employees in 1985, now has 267,000. Since 1981, General Electric has almost halved its workforce, to 222,000. In 1993 alone, Kodak eliminated 17 percent of its jobs; DuPont, nine; Boeing and Goodyear, six; General Motors five; and Exxon and Johnson and Johnson, four percent.

Alarming anecdotal reports of the difficulties experienced by promising young Ph.D.s abound. Some have moved sequentially through several post-doctoral positions with no permanent opportunity in sight. We hear that others have given up and are driving taxis, selling real estate, or working in restaurants.

What does this mean, particularly for minorities, in a profession that has traditionally been the dominant route to upward mobility? Half of the *Fortune* 500 CEOs were engineers when NACME was established 20 years ago to address the underrepresentation issue. While two decades of progress has substantially altered the industrial landscape, it has not yet brought parity. African Americans, Hispanics and American Indians, now 28 percent of the college-age population and 40 percent of the birth rate, comprised only 7.9 percent of the bachelors level engineering graduates in 1993. Yet, in the face of today's job market, should we continue to encourage students from underrepresented groups to pursue engineering studies? I've been asked less delicately, "Why are you offering minority children a profession in decline?" Should we

pull back our efforts, perhaps jeopardizing the impressive, but fragile structures in place to complete the task?

These questions warrant a closer look at the job situation. Restructuring sometimes conceals as well as reveals. The dismantling of large corporate research and development laboratories, for example, can be illusory, as engineering responsibilities get integrated into smaller business units. Moreover, the metamorphosis of mature businesses does not tell the whole story. Small start-up companies generate the bulk of new jobs. *Fortune* 500 companies with high annual employment growth, some exceeding 100 percent, are disproportionately high-tech, with names like Dell Computer, Intel, Quantum, AST, EMC, Gateway 2000, DSC and Loral. Total engineering jobs declined only 2.86 percent between 1987 and 1992, from 1,641,000 to 1,594,000.

Because engineering graduates have traditionally been highly recruited, spot checks of college placement offices uncovering changes are newsworthy. No longer are the previously prized engineering students choosing between multiple offers. Few are waltzing into plum jobs at the blue chip companies. What often goes unreported, however, is that engineering graduates still fare much better than others. In 1991, the College Placement Council reported that engineering students comprised only eight percent of the degree candidates, and collected 40 percent of the job offers. Overall unemployment in engineering today, though almost twice what it was during the 1980s, is still only 3.8 percent.

It's important, too, that bachelor's level engineering graduates have a wide range of options. Many go on to medical or law school, enroll in MBA programs or pursue advanced degrees in their field. Of the graduates who take jobs, typically only about half go to work in an engineering or science-based discipline. The other half compete very favorably for good jobs in traditionally unrelated fields. Advanced mathematics, information processing and sophisticated computer technologies are becoming increasingly valuable in virtually every profession. And there is a growing need for trained scientists and engineers in non-traditional jobs, including journalism, pre-college teaching, management and public policy analysis. Now more than ever, in every job classification, employers are looking for recruits who have been rigorously educated, who have highly developed, portable intellectual capabilities, who have exceptional analytical skills, who are problem-solvers. Engineers fit the bill.

A good measure of how society values an engineering education is how well graduates are paid. Analysts have argued that the "sluggish" growth in starting salaries for engineers — barely keeping pace with inflation — is the result of oversupply. Bachelor's degree candidates in engineering, however, continue to command the top starting salaries, averaging over 70 percent higher than liberal arts graduates and 40 percent higher than business administration graduates. The National Science Board reports in *Science and Engineering Indicators* that in 1993, chemical and petroleum engineering majors led the way with starting salaries of \$39,500 and \$38,400, respectively. In all

engineering fields, average initial salaries exceeded \$30,000, a milestone matched only by the nursing profession. Average overall professional engineering salaries are exceeded only by that of lawyers, physicians and pharmacists. Going beyond salary, the *Jobs Rated Almanac* by Les Krantz ranks jobs based on six quality criteria, including employment outlook. Engineering jobs are overwhelming favorites, with the subdisciplines occupying eight of the top 50 positions.

So recent headlines proclaiming the demise of engineering have, at best, been misleading. But what about the future? Projections, whether about labor markets or stock markets, are rarely reliable. Nonetheless, qualitative results from comprehensive workforce analyses deserve some attention.

The Bureau of Labor Statistics, taking attrition into account, projects 700,000 new engineering jobs between 1992 and 2005, half of the current workforce. Selected subfields, such as computer engineering where the number of jobs is expected to more than double, are likely to have substantial shortages. The National Science Board projects that employment in technical occupations will grow faster than in other areas, but estimates that the overall supply of natural scientists and engineers will slightly exceed the demand. A report by the Oak Ridge Institute for Science Education covering 1991-1997 projects a slight shortage of natural scientists and engineers. Most importantly, none of the predictions show a major gap, either a surplus or a shortage.

The engineering profession has not been unscathed in this period of change, but is far better off than one might deduce from a casual reading of the news. New jobs in high-tech industries are expanding rapidly. Exciting new technologies, from nanometer robots to high temperature superconductors are emerging from the laboratories. Biomedical research, genetic and environmental engineering, the search for efficient, renewable energy sources and information, telecommunications and computer technologies offer the promise of entirely new industries.

Beyond economics, we're confronted with a world replete with hunger, disease, homelessness and other social problems. Can we afford a lapse in the intellectual infrastructure of science and technology, which can be brought to bear on these issues? Can we seriously afford to think that we have an oversupply of people rigorously educated in engineering, with the career flexibility such an education offers?

The downsizing of defense, rather than flooding the job market with engineers, offers us an opportunity to redirect some of the most highly trained professionals working at the frontiers of technology toward efforts that have enormous potential for stimulating private sector economic growth — notwithstanding the proven difficulties in beating missiles to microchips, the modern equivalent of swords to plowshares. This perspective occupies a central role in the Clinton administration's science and technology policy, as manifested by the proposed 1995 budgets for the Advanced Technology Program, the

Technology Reinvestment Program and the Cooperative Research and Development Agreements.

The effort to maintain American leadership in critical technologies, however, demands another ingredient which corporate executives understand very well. A recent NACME survey of corporate donors, including those in a downsizing environment, reaffirmed their singular commitment to building a more diverse engineering workforce. According to the Workforce Solutions Company, seven out of ten corporate executives rank recruiting, managing and valuing diversity critical to maintaining a competitive edge and to their very survival. That the effective use of diverse teams can yield a distinct competitive advantage has been quantified in studies at the University of Western Ontario's School of Business Administration. Using objective measures of group performance in international business, the research shows that groups characterized by a high level of diversity have considerably higher potential than homogeneous groups.

Should we continue to urge African Americans, Hispanics and American Indians to consider an engineering career? The answer is unequivocally, yes. Our ability to capitalize on the vast richness of cultural diversity, while breaking down the barriers separating population groups, has emerged as a central issue of our time. A preeminent engineering workforce, one that utilizes the full potential in every segment of our society, is essential not only to our nation's economic growth, but to our political needs, our social objectives and our global leadership responsibilities.

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of the National Association of Colleges and Universities (NACME) Board of Directors. Dr. Wells was instrumental in the NACME Diversity Seminars. We are especially indebted to Marjorie Smith, acting director of the University Student Affairs and IGP, and Overtia Enley, coordinator, Science and Technology Entry Program (STEP), for their generous assistance, and we thank each of the students and faculty members who participated with dedication and enthusiasm.

Photos

Page 6: Hongyi Chen, a student at RPI, is a graduate student at RPI, majoring in Materials. He is a member of the NACME Diversity Seminars.

Page 7: Rebecca Mahoney, a CSP student and IGP graduate of Rensselaer University, earned her degree in materials science. On the staff of GE Corporate Research and Development, she is working toward her master's in materials engineering at RPI.

Page 8: Professor Jorge Hachicho, RPI faculty coordinator for the NACME Diversity Seminars, confers with Aurora Kelly, a fourth-year CSP student in chemical engineering, and Anthony Denato, an IGP sophomore studying computer engineering.

Page 11: Robert Weiss and Rosemary Clayton, Dade Middle School students in the STEP program, work in the lab with senior IGP chemical engineering student Gabriel Ruiz.

Page 12-13: Inset photos (left to right) incentive Grants Program students Tammy Sandberg, Sandra Estrada, and Stephen Strong.

Page 14: Fernando Cantorio, an IGP scholar, is a senior in electrical engineering.

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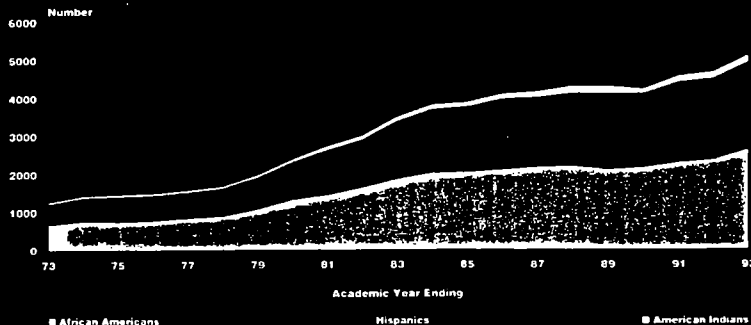
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Strategy:

■ CSP is an enriched scholarship program that combines substantial financial support with corporate mentoring, leadership training and summer internships in industry. ■ Open to exceptional African American, Hispanic and American Indian engineering students. ■ Allows scholars to reach their full academic and leadership potential. ■ Provides corporations with the ability to encourage workforce growth in disciplines where the need is acute or anticipated.

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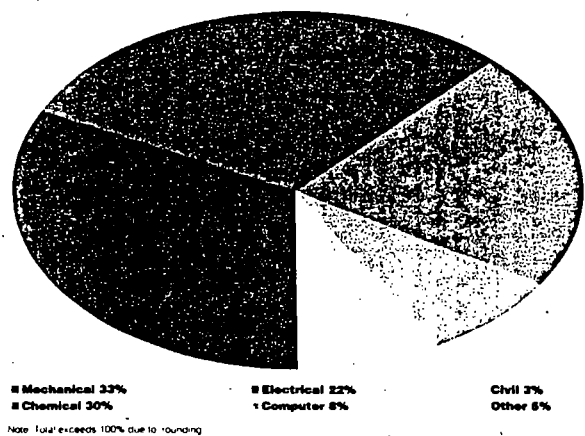
■ 92 students ■ 25 institutions (see facing page) ■ 15 sponsors

Student Eligibility:

■ Second-semester freshman status ■ Nomination by Dean of Engineering ■ High grade point average ■ Demonstrated leadership skills ■ Record of high school achievement and community service.

Major Fields of Study:

CSP Scholars by engineering discipline



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Services:

■ Industry mentors who participate in NACME mentor workshops ■ Leadership development modules designed by NACME in collaboration with corporate sponsors ■ Structured summer internships that build real-world engineering skills and ease the transition to a company environment.

Results:

■ Average GPA, 3.5 ■ Retention, 94 percent

Bachelor's Degrees in Engineering by Ethnicity and Gender*

Academic Year	African American		Hispanic		American Indian		Total Minority		Total	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
1990-91	1,521	783	1,739	386	119	27	3,379	1,196	53,565	9,881
1991-92	1,591	783	1,780	364	131	32	3,502	1,179	53,185	9,902
1992-93	1,808	829	1,886	424	144	31	3,838	1,284	54,153	10,302

*Note: Gender unknowns have been apportioned to the male and female populations in the same ratio as that of the known population.

Figures do not include the University of Puerto Rico

Fall Semester Freshman Enrollments in Engineering*

Academic Year	African American	Hispanic	American Indian	Total Minority	Total Freshmen	Minority
1973-74	1,684	525	40	2,249	51,207	4.4
1974-75	2,447	888	89	3,424	62,582	5.5
1975-76	3,840	1,384	120	5,344	74,558	7.2
1976-77	4,372	1,766	171	6,309	81,652	7.7
1977-78	4,728	2,161	244	7,133	88,256	8.1
1978-79	5,493	2,664	225	8,382	95,171	8.8
1979-80	6,339	3,136	317	9,792	103,090	9.5
1980-81	6,661	3,373	365	10,399	109,314	9.5
1981-82	7,015	3,689	412	11,116	114,201	9.7
1982-83	6,715	3,635	371	10,721	114,517	9.4
1983-84	6,342	3,885	376	10,603	108,763	9.7
1984-85	6,245	3,939	410	10,594	104,374	10.2
1985-86	6,374	3,849	365	10,588	102,285	10.4
1986-87	5,873	3,359	353	9,585	98,298	9.8
1987-88	6,145	3,826	354	10,325	94,814	10.9
1988-89	7,075	4,246	433	11,754	97,379	12.1
1989-90	7,284	4,599	424	12,307	94,791	13.0
1990-91	8,370	5,382	526	14,278	93,705	15.2
1991-92	8,305	5,266	582	14,153	92,308	15.3
1992-93	8,924	5,624	633	15,181	92,699	16.4

Fall Semester Undergraduate Enrollments in Engineering*

Academic Year	African American	Hispanic	American Indian	Total Minority	Total Undergrads	Percent
1973-74	4,869	2,371	204	7,444	183,520	4.1
1974-75	6,319	3,158	360	9,837	197,899	5.0
1975-76	8,258	3,941	317	12,516	228,183	5.5
1976-77	9,828	5,138	446	15,412	254,797	6.0
1977-78	11,388	5,944	618	17,950	286,500	6.3
1978-79	12,954	7,158	625	20,737	308,556	6.7
1979-80	14,786	8,454	759	23,999	337,807	7.1
1980-81	16,181	9,043	903	26,127	362,300	7.2
1981-82	17,611	10,200	970	28,781	384,162	7.5
1982-83	17,598	10,683	1,078	29,359	400,038	7.3
1983-84	17,817	11,599	1,127	30,543	402,561	7.6
1984-85	17,451	12,202	1,186	30,839	391,052	7.9
1985-86	17,994	12,941	1,120	32,055	379,830	8.4
1986-87	16,830	11,913	1,071	29,814	365,161	8.2
1987-88	17,300	12,981	1,136	31,417	352,848	8.9
1988-89	18,227	13,188	1,164	32,579	342,280	9.5
1989-90	18,839	13,761	1,205	33,805	334,723	10.1
1990-91	20,909	15,917	1,468	38,294	335,102	11.4
1991-92	21,891	16,374	1,538	39,803	335,585	11.9
1992-93	23,136	18,088	1,809	43,033	340,271	12.6

Bachelor's Degrees Granted in Engineering*

Academic Year	African American	Hispanic	American Indian	Total Minority	Total Degrees	Percent Minority
1972-73	657	566	32	1,255	43,086	2.9
1973-74	756	636	31	1,423	41,010	3.5
1974-75	734	685	44	1,463	37,835	3.9
1975-76	777	680	41	1,498	37,609	4.0
1976-77	844	702	36	1,582	39,718	4.0
1977-78	894	748	37	1,679	45,753	3.7
1978-79	1,076	841	59	1,976	52,161	3.8
1979-80	1,320	1,003	60	2,383	57,788	4.1
1980-81	1,445	1,193	90	2,728	62,615	4.4
1981-82	1,644	1,270	91	3,005	66,652	4.5
1982-83	1,862	1,534	97	3,493	72,122	4.8
1983-84	2,022	1,683	112	3,817	76,576	5.0
1984-85	2,043	1,731	109	3,883	77,529	5.0
1985-86	2,114	1,864	129	4,107	77,815	5.3
1986-87	2,182	1,840	149	4,171	75,219	5.5
1987-88	2,211	1,920	187	4,318	70,865	6.1
1988-89	2,122	1,996	192	4,310	68,291	6.3
1989-90	2,173	1,957	112	4,242	65,451	6.5
1990-91	2,304	2,125	146	4,575	63,446	7.2
1991-92	2,374	2,144	163	4,681	63,087	7.4
1992-93	2,637	2,310	175	5,122	64,455	7.9

University of Puerto Rico

Academic Year	Freshman Enrollment	Total Undergrads	Total Degrees
1973-74	718	3,185	397
1974-75	862	3,200	375
1975-76	785	3,196	361
1976-77	598	3,038	377
1977-78	524	2,748	338
1978-79	634	2,681	437
1979-80	634	2,681	329
1980-81	835	2,817	320
1981-82	1,079	3,415	338
1982-83	786	3,352	349
1983-84	875	3,583	355
1984-85	875	3,583	363
1985-86	940	4,361	363
1986-87	940	4,359	516
1987-88	639	4,150	521
1988-89	630	3,889	533
1989-90	629	3,806	516
1990-91	641	3,740	540
1991-92	694	3,812	566
1992-93	728	3,855	546

Source: Data collected by the Engineering Workforce Commission (EWC) under a grant from NACME. The EWC does not guarantee absolute accuracy of the numbers reported by engineering schools. Statistics for minorities, other than African Americans, are not available before 1973

* Figures do not include the University of Puerto Rico.

§ Based on estimates of graduates from the University of Puerto Rico in 1975.

Note: Because of differences in processing of data, there may be some variation between NACME figures and EWC reports. For example, NACME continues to aggregate students who are foreign nationals in its figures for total students

NACME Scholarship Programs 1992-93

Corporate Scholars Program, Big Apple Scholarship Program, TechForce Scholarship Program, Incentive Grants Program

Scholarship Programs

Investments by State

Corporate Scholars Program	
Institution	Scholars
California Polytechnic State University	1
University of California, Berkeley	7
Case Western Reserve University	1
Cornell University	4
Florida International University	1
Georgia Institute of Technology	3
University of Houston	1
Howard University	3
University of Illinois, Chicago	3
University of Illinois, Champaign-Urbana	1
Louisiana State University	2
University of Maryland, College Park	4
Michigan State University	3
University of Missouri, Rolla	2
North Carolina A&T State University	14
Pennsylvania State University	5
University of Puerto Rico	1
Prairie View A&M University	3
Purdue University	8
Rensselaer Polytechnic University	1
Stanford University	7
Texas A&I University	1
University of Texas, Austin	10
University of Texas, El Paso	5
Tuskegee University	1
25 Institutions	92

Big Apple Scholarship Program	
Institution	Scholars
City College of the City University of New York	9
Columbia University	1
Cooper Union	4
Manhattan College	1
Polytechnic University	1
Pratt Institute	1
6 Institutions	17

TechForce Scholarship Program	
Institution	Scholars
Alabama A&M University	1
Albany State College	1
Belleville Area College	1
California Institute of Technology	1
University of California, Berkeley	1
University of California, Santa Barbara	2
Colorado School of Mines	1
University of Colorado, Boulder	1
Duke University	1
University of Florida, Gainesville	1
Georgia Institute of Technology	3
University of Maryland, College Park	1
Massachusetts Institute of Technology	3
University of Michigan, Ann Arbor	2

Morehouse College	1
New Mexico State University	1
North Carolina A&T State University	1
Princeton University	1
Purdue University	3
Rensselaer Polytechnic Institute	1
Rice University	1
University of Southern California	1
Stanford University	1
Texas A&I University	1
Texas A&M University	1
Tuskegee University	1
26 Institutions	34

Incentive Grants Program	
Institution	Scholars
University of Alabama, Tuscaloosa	19
Arizona State University, Tempe	13
University of Arkansas, Fayetteville	1
*California Polytechnic State University	34
*California State Polytechnic, Pomona	28
*California State University, Long Beach	39
California State University, Los Angeles	9
*California State University, Northridge	43
*California State University, Sacramento	31
*University of California, Berkeley	14
*University of California, Davis	44
*University of California, Los Angeles	44
*University of California, San Diego	21
*University of California, Santa Barbara	31
The Catholic University of America	1
University of Central Florida	6
*University of Cincinnati	19
*City College of the City University of New York	36
Clemson University	26
*University of Colorado, Boulder	22
*Columbia University	13
*Cornell University	24
University of Dayton	6
*University of Delaware	6
Drexel University	8
*Florida A&M/Florida State University	24
Florida Atlantic University	1
*University of Florida, Gainesville	27
*Georgia Institute of Technology	69
*GMI Engineering & Management Institute	27
University of Houston	3
*Howard University	24
*Illinois Institute of Technology	36
University of Illinois, Chicago	9

Johns Hopkins University	1
University of Kansas	1
*Lamar University	27
Lawrence Technological University	1
Louisiana State University	3
Louisiana Technological University	11
*Manhattan College	10
*University of Maryland, College Park	14
*Massachusetts Institute of Technology	26
University of Massachusetts, Amherst	2
Michigan State University	2
University of Michigan, Ann Arbor	6
University of Minnesota	4
University of Missouri, Rolla	5
*New Jersey Institute of Technology	37
New Mexico Institute of Mining & Technology	3
*New Mexico State University	32
*University of New Mexico	61
*North Carolina A&T State University	56
*North Carolina State University	40
*Northwestern University	39
Pennsylvania State University	9
*University of Pennsylvania	5
*Polytechnic University	29
*Prairie View A&M University	102
Pratt Institute	5
*University of Puerto Rico, Mayaguez	170
*Purdue University	35
*Rensselaer Polytechnic University	29
Rutgers University	7
*San Diego State University	14
San Francisco State University	1
San Jose State University	10
University of South Carolina	13
University of South Florida	26
University of Southern California	3
Southern Illinois University, Edwardsville	7
Southern Methodist University	8
*Southern University	51
*Stanford University	23
State University of New York, Stony Brook	12
*Stevens Institute of Technology	18
Syracuse University	20
*University of Tennessee, Knoxville	30
*Texas A&I University	35
*Texas A&M University	67
University of Texas, Arlington	1
*University of Texas, Austin	54
*University of Texas, El Paso	40
*Tuskegee University	32
University of Utah	2
*University of Virginia	18
University of Washington, Seattle	22
Wayne State University	1
88 Institutions	2,038

*Schools that received 1993-94 initial IGP grants.

State	Dollars
Alabama	\$63,575
Arizona	6,050
Arkansas	500
California	391,550
Colorado	23,750
Delaware	8,250
District of Columbia	56,900
Florida	76,625
Georgia	91,700
Illinois	111,505
Indiana	71,800
Kansas	1,000
Louisiana	68,500
Maryland	34,625
Massachusetts	53,250
Michigan	33,950
Minnesota	2,833
Missouri	11,550
New Jersey	70,931
New Mexico	64,691
New York	282,718
North Carolina	157,050
Ohio	29,275
Pennsylvania	59,000
Puerto Rico	130,250
South Carolina	40,500
Tennessee	28,454
Texas	359,325
Utah	1,650
Virginia	23,200
Washington	18,250
Total	\$2,373,207

Note: Total reflects all NACME scholarship funds awarded during the 1992-93 fiscal year including Corporate Scholars Program, Incentive Grants Program, TechForce Scholarships and the New York Community Trust Big Apple Scholarship Program. The total differs from that shown on the Statement of Revenue and Expenses because of reduced accruals for 1993-94. NACME accrues IGP expenses in the prior year.

Statement of Revenue and Expenses, and Changes in Fund Balances

For the year ended August 31, 1993 (with comparative totals for 1992)
NACME, Inc. (not-for-profit corporation)

ends

Total All Funds

1992	1992
	Revenue:
	Public support—contributions \$4,597,351
\$6,885,022	Revenue—investment income 288,628
	Forum registration fees 66,688
605,529	Other income 12,649
121,935	
8,897	Total Revenue 4,965,316
328,198	
30,000	Expenses:
	<i>Program Services:</i>
\$7,979,581	Incentive Grants and other scholarship programs 2,273,436
	Summer Engineering Employment Project 9,236
	Communications 1,006,786
	Program development 644,605
	Reginald H. Jones Distinguished Service Award 12,449
\$1,662,000	Research 184,204
67,168	
377,597	Total Program Services 4,130,716
2,106,765	
	<i>Supporting Services:</i>
	Resource development 236,368
	Management and general 581,214
5,214,454	
194,164	Total Supporting Services 817,582
328,198	
136,000	Total Expenses 4,948,298
5,872,816	
	Excess (Deficiency) of Revenues over Expenses 17,018
\$7,979,581	
	Fund Balances, Beginning 5,855,798
	Fund Balances, End of Year \$5,872,816

The financial statements are a condensed version of the audited statements of the National Action Council for Minorities in Engineering, Inc. for the year ending August 31, 1993.

NACME will be pleased to provide upon request copies of the complete financial statements from which these condensed financial statements were taken, together with all footnotes and the unqualified report of our independent auditors.

Balance Sheet

As of August 31, 1993 (with comparative totals for 1992)
NACME, Inc. (not-for-profit corporation)

	Total All Funds	
	1993	1992
Assets		
Cash (including interest-bearing accounts of \$2,991,633 in 1993 and \$6,864,284 in 1992)	\$3,053,161	\$6,885,022
Short-term investments	3,554,031	
Pledges receivable	513,357	605,529
Interest and other receivables	125,721	121,935
Prepaid expenses	14,873	8,897
Net capital assets†	252,158	328,198
Security and other deposits	30,000	30,000
Total Assets	\$7,543,301	\$7,979,581
Liabilities and Fund Balances		
<i>Liabilities:</i>		
Awards and grants payable	\$1,257,000	\$1,662,000
Accounts payable and accrued expenses	83,404	67,168
Deferred income—pledges and contributions	320,500	377,597
Total Liabilities	1,660,904	2,106,765
<i>Fund Balances:</i>		
Unrestricted	5,092,614	5,214,454
Restricted	364,825	194,164
Equity in fixed assets	252,158	328,198
Endowments	172,800	136,000
Total Fund Balances	5,882,397	5,872,816
Total Liabilities and Fund Balances	\$7,543,301	\$7,979,581

†Leasehold improvements, office furniture and equipment, at cost, less accumulated amortization and depreciation of \$805,246 in 1993 and \$705,555 in 1992.

PROGRAM DEVELOPMENT

■ Piloted the NACME Diversity Seminars at Rensselaer Polytechnic Institute and the University of Cincinnati, promoting a sea-change in institutional culture. Allowed faculty and students to examine deeply held attitudes toward race, class and gender and facilitated growth in cross-cultural communication.

■ Implemented TechForce Partnership for Scientific Learning in two New York City school districts, in partnership with the Efficacy Institute. Trained 110 teachers, administrators and staff, creating fundamental shift in educational paradigm. Followed with professional development seminars, providing effective math/science delivery strategies and introduction to state-of-the-art learning technologies.

■ Trained more than 200 parents, teachers and students to explore mathematics and science as a community of peers, in an ongoing series of NACME/Say YES workshops, in collaboration with the National Urban Coalition. Offered summer seminars, exposure to science-rich facilities, and overview of historically neglected contributions of many cultures to science and mathematics.

■ Supported model program development in elementary education, curriculum innovation and community college articulation during the second year of our three-year Challenge Grant Program. Partners included: Minorities in Mathematics, Science and Engineering, University of Cincinnati/elementary school outreach component; University of New Mexico/culturally relevant science and mathematics materials for American Indian students; and MESA Community College Project, University of California, Berkeley, with Cabrillo Community College/articulation model.



COMMUNICATIONS AND PUBLIC AFFAIRS

■ Produced *The Challenge: A Kid's Introduction to Engineering*, a self-contained educational video kit with 17-page *Presenter's Guide*. Reached 250,000 children through distribution network of volunteer engineers, deans, faculty, program directors, science museum personnel and community leaders.

■ Completed research and development effort for \$2.3 million, three-year national public service advertising campaign to interest children in pursuing academic-track mathematics and science. Established campaign partnerships with the Advertising Council; volunteer ad agency Tracy-Locke, Dallas; award-winning director Spike Lee; and funding partners IBM, Annenberg/CPB Math and Science Project and Department of Energy.

■ Provided testimony and briefings on engineering and science education policy to House Committees on Science, Space and Technology and on Education and Labor, Departments of Energy and Education, National Science Foundation and National Academies.

■ Convened FORUM '93, *Competitiveness through Diversity*, in Washington D.C., with special guest speaker Secretary of Education Richard Riley. Gathered more than 400 participants from industry, government and the academic community to examine issues of minority participation in the Clinton administration's plans for technology-driven economic growth.

■ Produced and broadcast *A New Institutional Vision: Change from the Inside Out*, for the National Technical University's, Engineering Faculty Seminar Series, downlinked to 80 engineering schools. Presented views on achieving diversity from the Board on Engineering Education, Engineering Deans Council and National Science Foundation.

■ Heightened national awareness of issues impacting education through articles reaching more than 15 million readers, nationwide. Expanded media outreach to television with an *NBC Nightly News* feature and a series of Guest Commentaries on *Nightly Business Report*, broadcast nationally on PBS.

NACME Milestones, 1993

RESEARCH

- Planned a national research symposium, scheduled for fall 1994, to document and analyze the state of knowledge on

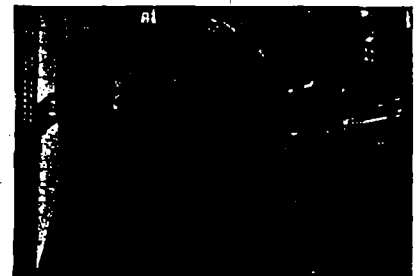


minority participation in mathematics, science and engineering, and develop an action agenda for the coming decade. Funding is being provided by the Alfred P. Sloan Foundation, whose seminal 1974 study *A Blueprint for Action* laid the groundwork for the past 20 years.

- Completed case studies and a comparative analysis of 20 Minority Engineering Programs in cooperation with the Educational Testing Service. Disseminated results in "Minority Engineering Programs: A Case for Institutional Support," *NACME Research Letter*, Volume 4, Number 1, May 1993.
- Conducted assessments of two preeminent national fellowship programs: AT&T's Corporate Research Fellowship Program (CRFP) and its Graduate Research Program for Women (GRPW). Published CRFP results for the program's 20th anniversary reunion.
- Surveyed NACME's corporate donors to determine impact of the current economic environment on commitment to diversify the technical workforce. Found that recruitment and retention of minority engineers remain high priorities with particular focus, across all industries, on identifying recruits who are creative problem solvers with excellent communications skills.

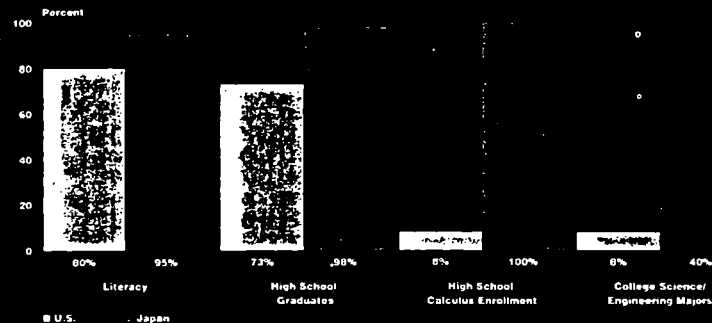
SCHOLARSHIP PROGRAMS

- Developed the Engineering Posse Program in cooperation with metaNetworks. Recruited and began leadership development and academic enrichment for first cohort of ten students who will enter Rice University, en masse, with full tuition scholarships, in the fall of 1994.
- Expanded the Corporate Scholars Program (CSP) to 92 students supported by 15 companies. Developed training modules on mentoring and leadership development in cooperation with corporate partners. Achieved first cohort retention of 94 percent. (See Corporate Scholars Program Databank, page 17.)
- Supported 2,038 scholars at 88 institutions through the Incentive Grants Program (IGP). Convened task force of Minority Engineering Program directors to examine IGP policies and procedures in the context of current university financial aid practices and emerging federal legislation.
- Established the W. Lincoln Hawkins Undergraduate Research Fellowship, honoring former NACME board member and telecommunications industry pioneer. Launched endowment fund drive to support annual competitive award with leadership grant from AT&T and contributions from 22 individuals.
- Provided enriched support to 17 IGP students in New York City through the Big Apple Engineering Scholarship Program. Local foundation funding created opportunities for summer internships and leadership training.
- Presented 20 TechForce Scholarships to high-achieving high school seniors nominated by precollege programs throughout the country. Renamed this prestigious, highly competitive national award the TechForce Pre-Engineering Prize.



NACME'S STRATEGIES CENTER ON DEVELOPING COMPREHENSIVE, RESEARCH-BASED MODELS FOR SYSTEMIC CHANGE, WHILE CREATING DEMAND-SIDE PRESSURE FOR MATHEMATICS AND SCIENCE EDUCATION.

**COMPARATIVE ENGINEERING PIPELINES
U.S. vs. Japan**



Expanding The Pipeline

NACME has been increasing the pool of minority students who enter engineering school for more than 15 years. From our earliest high school guidance efforts, to the decade of the 1980s, when we pioneered and expanded the national network of precollege programs, NACME has recognized that producing minority engineers at one end of the pipeline requires priming the pump at the other.

Now, radical change in demographics—a minority majority in almost all of the nation's largest

Situation-specific, they range from M²AS, a teacher training model in Texas, to the TechForce Partnership for Scientific Learning, a New York initiative that first shifts the educational paradigm for an entire school staff and then offers effective strategies for teaching mathematics and science.

But structural change is a long-term venture and millions of students face academic decisions now. Unlike the Japanese, who educate every

ACCELERATED MATHEMATICS CLASSES OFFERED

By School Racial Composition

Sections per 100 students



■ Middle school (8th grade algebra, 9th grade geometry)

■ High School (calculus)

SOURCE: J. Givens, *Outstanding Achievement: The Promise of Race-Sensitive Guidance and Tutoring in Opportunities to Learn Mathematics and Science* (Santa Monica, CA: The Rand Corporation, 1992). Science & Engineering Education, 1993, 1:107.

school systems—paired with unprecedented demand for a technically literate populace, requires that we escalate both the pace and scope of our work. NACME's strategies center on developing comprehensive, research-based models for systemic change in public education, while creating demand-side pressure for math/science education through aggressive public information campaigns.

Designed to counter the insidious effects of tracking, NACME demonstration programs are innovative, replicable models that revolutionize the ability of educators to teach *all* children.

child through calculus, we allow 55 percent of minority students to take no math beyond Algebra I. NACME's guidance strategies target these youngsters with a hard-hitting message delivered through their media of choice.

Our custom series of Marvel Comics has reached almost 1.5 million children. Our educational video, *The Challenge: A Kid's Introduction to Engineering*, is being carried into classrooms by volunteers, from engineers to faculty, touching more than 250,000 children annually. And in 1994, NACME will use national public service advertising to bring the importance of math and science directly into the homes of America's 200 million children aged seven to 13.

Funding Scholars

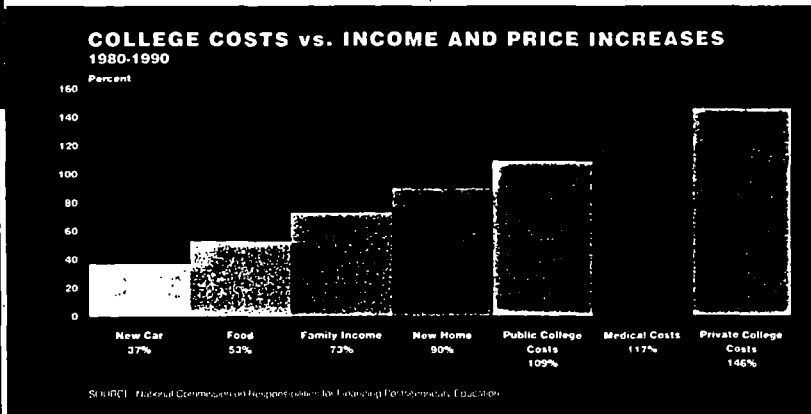
NACME is the nation's leading source of privately funded scholarships for minority students majoring in engineering. Since 1978 our scholarship programs have yielded more than 5,400 African American, Hispanic and American Indian graduates. Right now, NACME supports 2,000 scholars at 88 engineering schools, in 30 states and Puerto Rico.

But our ability to keep pace with the demand is sorely threatened. During the 1980s, the price of attending a private university increased 146 per-

cent, the direct provision of dollars, leveraging funds from other sources to meet the needs of outstanding young men and women already in the academic pipeline.

This year, we focused our public policy efforts on the need for federal undergraduate scholarships to expand diversity in engineering. In briefings with members of Congress, in nationally televised PBS commentaries, and from the podium at our annual Forum—held in Washington, D.C.

THE COST OF ATTENDING COLLEGE HAS INCREASED 146% SINCE 1980. HIGHER EDUCATION A PRIVILEGE OF THE AFFLUENT.



cent, outstripping even the much publicized 117 percent growth in health care costs. This, paired with a tremendous influx of minority freshmen in engineering school—up 58.4 percent over the last six years—has created unprecedented need for financial aid.

Given NACME's limited resources, as well as our research identifying inadequate financial aid as a significant barrier between minority students and an engineering degree, we have gone beyond

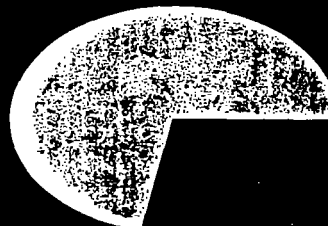
to assure that education for the technical workforce is high among the new administration's priorities—NACME's president urged an annual federal commitment of \$25 million to double the output of minority graduates.

And to assure that students and their parents take advantage of current opportunities in scholarships, grants and loans, we distributed more than 15,000 copies of two NACME publications, *Financial Aid Unscrambled: A Guide for Minority Engineering Students* and *Pasos Para Obtener Ayuda Económica: Guía para Estudiantes de Ingeniería*.

BY LEVERAGING LONG-TERM, EFFECTIVE PARTNERSHIPS WITH
INDUSTRY, GOVERNMENT AND THE ACADEMIC COMMUNITY, NACME SEEKS
TO CREATE PERVASIVE
AND ENDURING CHANGE.

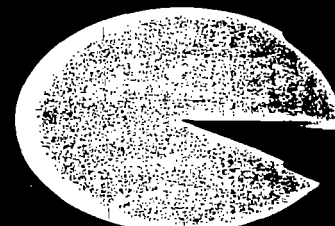
MINORITIES IN ENGINEERING, 1993

College-age population



African Americans, Hispanics, American Indians 28.0%
Others 72.0%

Engineering graduates



African Americans, Hispanics, American Indians 7.9%
Others 92.1%

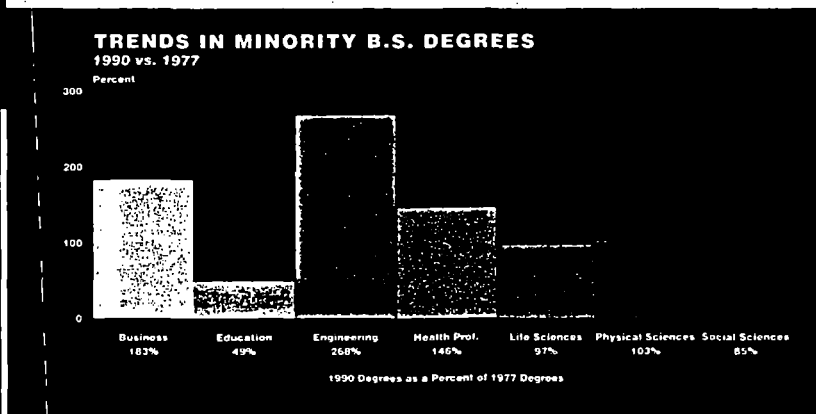
Accelerating Growth

The year was 1971, the aftermath of the Civil Rights Movement. Like much of America, the engineering establishment was reeling, having recognized that it, too, faced the challenge of providing career access to a diverse community of underrepresented people. Of the 43,000 engineers who earned their degrees that year, only 407 were African American, and even fewer were Hispanic or American Indian—scarcely one percent representation for an 18 percent share of the college-age population.

What we have achieved together is extraordinary. The number of African Americans, Hispanics and American Indians earning engineering degrees annually has increased ten-fold, reaching an all-time high of 5,122 in 1993. Recent enrollments have grown explosively, surging 58.4 percent since 1986.

The target, however, is moving. While minorities claimed 7.9 percent of this year's graduating class, these same groups now account for 28

WITH PROFESSIONAL FIELD, THE CHALLENGE



Engineers, however, are problem solvers. Within two years, a fledgling effort united universities, corporations, professional societies, minority organizations, school systems, and local programs. With both philosophical and financial backing from the CEOs of high-tech industry—50 percent of whom were engineers themselves—the coalition's goal was to build an educational pipeline that would yield a steady stream of world-class engineers. At its center was NACME.

percent of the college-age population and 40 percent of all new births.

Now is the time to escalate the pace of access. By leveraging long-term, effective partnerships with industry, government and the academic community, NACME seeks to create pervasive and enduring change... change that will make excellence in education the privilege of every student, from elementary school through engineering school.

Message from the President

This is a time of extraordinary excitement, creativity and innovation at NACME. Precollege and university programs we introduced during the past several years have yielded successful outcomes, led to new ideas and consummated a fundamental shift in NACME's programming strategy.

Our current formula stresses the systemic reform of education over external, often marginalized intervention efforts on behalf of minorities. The term *minority*, after all, has become a misnomer. African Americans, Hispanics and American Indians now comprise 28 percent of the nation's college-age population, 40 percent of the birth rate and a majority in many public school systems. While disproportionately damaging to these groups, endemic problems in American education, such as tracking, negatively impact students from all ethnic groups, all economic strata and both genders. Eliminating such generic deficiencies will create an inherently more egalitarian environment. This objective has shaped NACME's programs and inspired the expansion of our public policy and communications initiatives.

The completion of directly funded projects in 1993 led to a drop in revenues compared to the record high achieved in 1992. While we expect succession grants in the coming year, we're also faced with dramatically growing needs, coupled with declining charitable giving in the United States. To optimize the use of resources we were compelled to develop innovative, highly leveraged partnerships this year.

We forged an unprecedented coalition, combining the strengths of nine minority organizations. Relying on industry partners, we expanded our flagship Corporate Scholars Program. Rekindling our partnership with the Sloan Foundation,

which produced the 1974 landmark report *A Blueprint for Action*, we convened a group of prominent scholars to formulate a new action-oriented research agenda. Two more partnerships led to the Engineering Posse Program and our upcoming public service advertising campaign, possibly the most enter-



prising ventures with the highest payoff potential that NACME has ever undertaken.

As we approach our twentieth anniversary, significant challenges remain, but I'm enormously heartened by the enduring commitment of NACME's supporters and by the dedication, creativity and substantial accomplishments of NACME's staff.

George Campbell Jr.
President
NACME, Inc.

Letter from the Chairman

Today's business decisions are driven by intense global competition producing an increased demand for results and a strong focus on the cost side of the ledger. In this exacting climate, NACME's added value is its success in meeting business objectives, while addressing the larger needs of our society.



enrollment has declined significantly in recent years, minority enrollments and graduations have tripled since the mid-'70s and continue to increase steadily.

While responsibility rests with many dedicated organizations, I do believe such remarkable progress was energized by industry's commitment to a coordinated national strategy, one in which NACME has played a critical leadership role. By developing effective partnerships with educators and employers, and implementing with them a set of comprehensive, high-performance strategies, NACME has made an impact with every dollar spent. It's an impact that must be nurtured by all of us who draw on the nation's technical expertise and depend on its technological infrastructure.

As you establish priorities for success in the new environment, I urge you to think about supporting NACME in terms of doing well by doing good. For Bechtel—and the many companies and organizations like us that share in supporting NACME—this is also an investment in ourselves. My thanks to all of you who have achieved with us in NACME and to those whose partnerships will ensure the future.

William L. Friend
Executive Vice President and Director
Bechtel Group, Inc.

The fact is, achieving diversity in the technical workforce has become—first and foremost—a business imperative. Based on the evolution of the nation's demographics and the heightened expectations of our customers, diversity is a leading priority for any company that wants to remain competitive.

As NACME's chairman, I'm proud to tell you that this organization has made a sustained contribution—spanning almost 20 years—to developing the highly educated technical personnel that our businesses demand.

Since NACME's founding, engineering has made greater strides toward diversity than has any other discipline. Although total engineering

Strategic Solutions

Research

Strategies: ■ Expand the state of knowledge on factors affecting the participation of minorities in science, mathematics and engineering. ■ Maintain NACME's critical contribution as the nation's primary source of data, statistics and analysis on trends that impact education for the technical workforce, by ethnicity and gender. ■ Identify and disseminate best practices in corporate-sponsored programs to improve education. ■ Assist industry and government in determining how to make the engineering environment more conducive to the success of minority professionals.

Program Development

Strategies: ■ Develop long-term effective partnerships with industry, government and the academic community to maximize productivity, achieve economies of scale and expand the number of people we serve. ■ Propagate an engineering school culture that provides satisfying educational experiences for all students and promotes equal opportunity to achieve. ■ Introduce a series of national demonstration programs that offer replicable models for systemic change in public education.

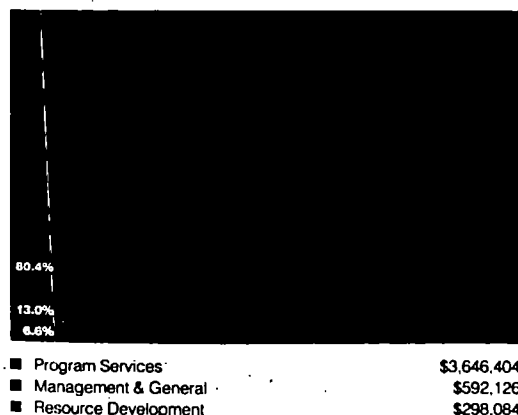
Scholarship Programs

Strategies: ■ Assure the availability of adequate resources to meet the financial aid needs of minority students enrolled in engineering school through partnerships, fund development and policy initiatives. ■ Develop, implement and manage a portfolio of comprehensive, value-added scholarship programs. ■ Enhance scholarships with mentoring, internships in industry and leadership development to create top-tier engineering graduates with the necessary skills for long-term success.

Communications & Public Affairs

Strategies: ■ Assure that essential information reaches stakeholders in industry, government and the academic community through publications, broadcasts, conferences and seminars. ■ Provide effective advice and counsel to government offices and agencies responsible for establishing science and technology education policy. ■ Expand the number of high school graduates with the academic prerequisites to enter engineering by developing national mass media communications programs that address students and their parents directly.

Expenses \$4,536,614

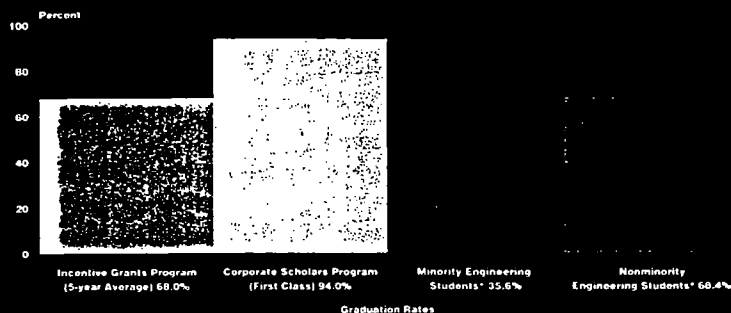


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**RATHER THAN PROVIDE STUDENTS WITH THE SKILLS TO NEGOTIATE
OBSTACLES IN A FLAWED UNIVERSITY CULTURE, NACME HAS FOCUSED ITS
STRATEGIES ON ERADICATING
THE FLAWS THEMSELVES.**

COMPARATIVE RETENTION OF NACME SCHOLARS

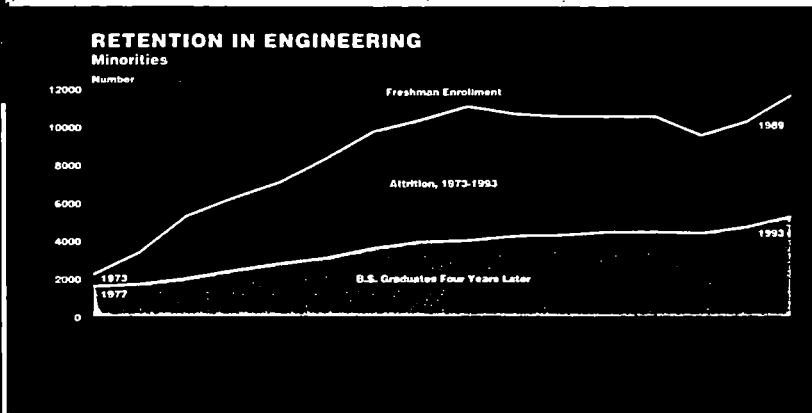


*Data for the 1990-1991 academic year.

Improving Retention

While NACME Incentive Grants Program scholars are retained at twice the national average and our Corporate Scholars at a remarkable 94 percent (see Corporate Scholars Program Databank, page 17), the overall prognosis for minority freshmen is grim. During the past decade, while 40,000 earned their BSEs, almost 80,000 dropped out. NACME research indicates that, far from being academically deficient, these students are high achievers, with grades and SAT scores virtually

On campus, the NACME Diversity Seminars are already having an impact. A set of corporate style workshops for faculty and students, the Seminars recognize the realities of an intensely ethnocentric society. They provide a non-threatening atmosphere, in which the university community can examine attitudes, behavior patterns and communications barriers specific to differences in race, gender and ethnicity. By fostering cross-cultural understanding, this systematic



indistinguishable from those of their peers.

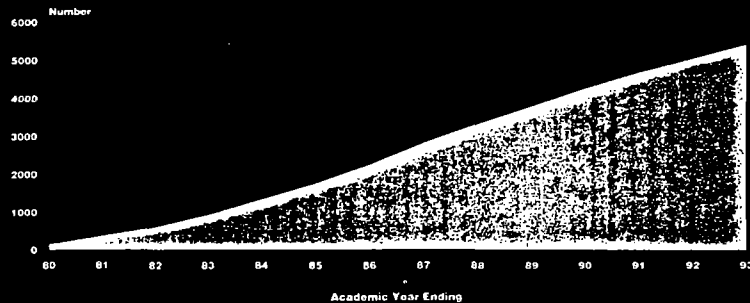
They leave because their financial aid is inadequate and the institutional barriers in engineering school almost insurmountable. Widely acknowledged, this non-nurturing, inhospitable environment has inhibited the success of *all* students and devastated the minority population. Rather than provide students with the skills to negotiate obstacles in this flawed university culture—an enterprise that must be renewed with each incoming class—NACME has focused its strategies on eradicating the flaws themselves.

approach has the potential to eliminate the need for special programs for minority groups.

To inject diversity into the intellectual discourse on campus, however, few efforts hold the potential of NACME's new Engineering Posse Program. This innovative venture sends teams—or posses—of ten students to engineering school, en masse, after a year of intensive workshops to refine leadership skills, develop group cohesiveness, and expand academic proficiency. Selected during their senior year in high school using non-traditional criteria, posses enter college with all the ingredients for success—extraordinary preparation, their own support network and full scholarships. With the first NACME Posse entering Rice University in the fall of 1994, the program promises to alter and enrich the university environment permanently.

**SINCE 1978 NACME SCHOLARSHIP PROGRAMS HAVE YIELDED
MORE THAN 5,400 AFRICAN AMERICAN, HISPANIC AND AMERICAN
INDIAN GRADUATES FOR
THE NATION'S WORKFORCE.**

NACME SCHOLARSHIP PROGRAMS: CUMULATIVE GRADUATES*



*Includes all graduates who received a degree from a NACME program.