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Successful Minority PhD Producing Programs – Bell Laboratories and the Meyerhoff Scholarship Program at UMBC

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CENTER FOR ADVANCED STUDIES IN PHOTONICS RESEARCH

UMBC
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Bell Labs Corporate Research Fellowship Program (CRFP) for Minorities

- Due to the appallingly small number of minority scientists at Bell Labs in the late 60s an effort was started to “grow their own” – this effort was spearheaded by Black researchers Linc Hawkins, Jim West, Jim Mitchell and Earl Shaw
- The CRFP, founded in 1972 was one of the first programs of its kind in the US to address the issue of under-representation of minorities at the PhD level in the fields of mathematics, science and engineering
- The Graduate Research Program for Women (GRPW) was founded in 1974 -- a companion program to CRFP to address the shortage of women scientists at Bell Labs
- To create a pool of undergraduate students eligible to enter the graduate CRFP and GRPW programs, the Bell Labs Summer Research Program for Minorities and Women (SRP) was established in 1974 – this 10-week summer program was for outstanding underrepresented minorities and women who have completed their Jr. year of undergraduate studies. The purpose of SRP was to provide a preview of the lifestyle of an R&D career to impact decisions to earn graduate degrees

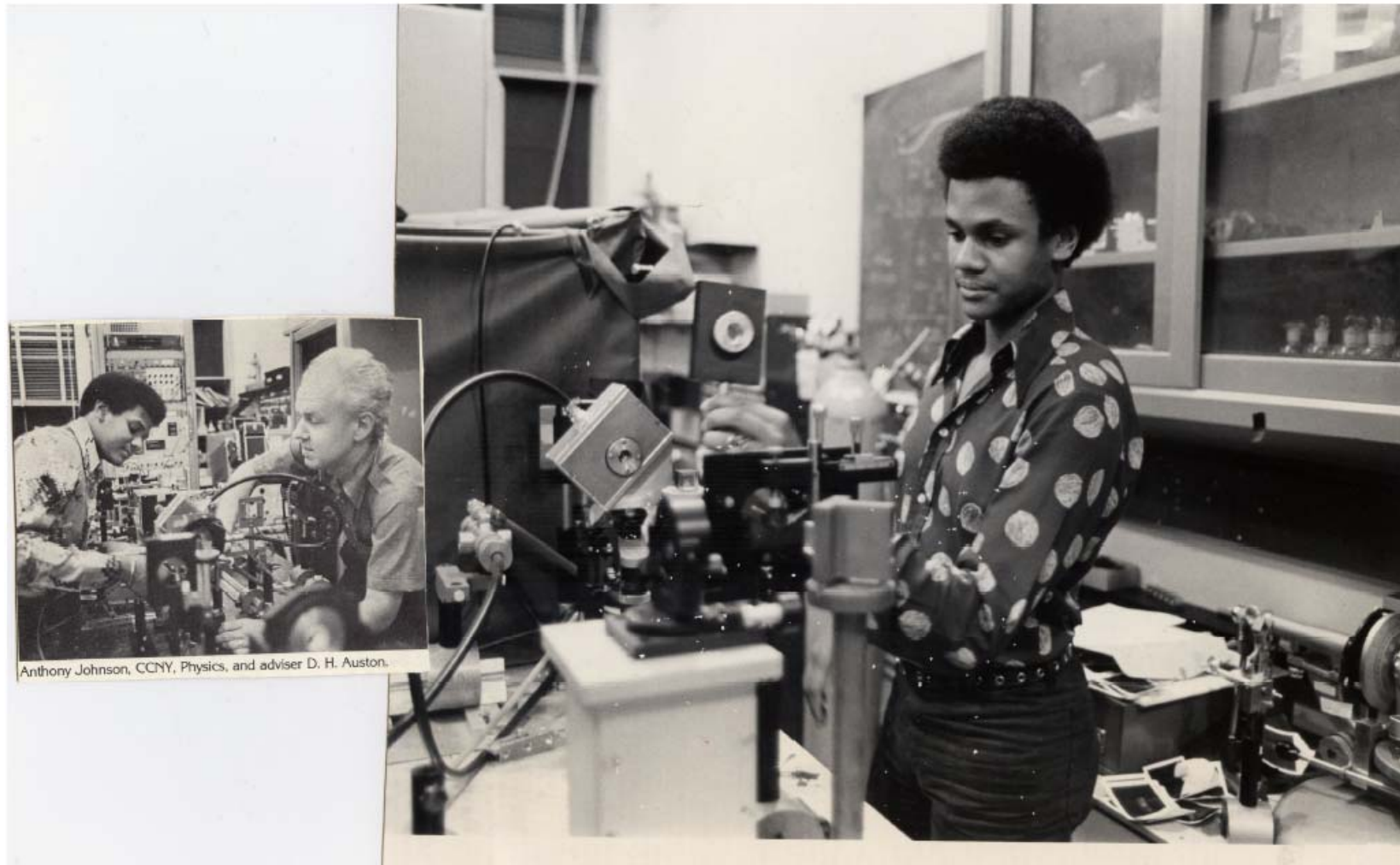
Summer Research Program (SRP) For Minorities & Women (Est. 1974)

- Undergraduates who have completed 3 years of education in mathematics, science or engineering -- provisions include:
 - Summer employment – stipend
 - Housing arrangements – Rutgers University
 - Transportation
 - Individual research project with a Bell Labs scientist as mentor
 - In the early days approx. 60 slots were available across disciplines

Cooperative Research Fellowship Program (CRFP) For Minorities (Est. 1972)

- About 10 students enter each year and spend 5.5-6 years earning the PhD
- The program pays each Fellow's education expenses, including tuition, fees and books, conference attendance, summer employment and an annual stipend
- A mentor is assigned to each Fellow, with the objective of ensuring that Fellows have a substantive relationship with an experienced scientist in a related discipline, a professional who can provide guidance, nurturing, inspiration and advocacy during the doctoral training, and often beyond

1974 Bell Labs Summer Research Program, Murray Hill, NJ



David H. Auston – Lasers and Picosecond Optoelectronics – currently President, Kavli Institute

Robert C. Dynes – Low Temperature Physics and Superconductivity – Past President of UC

COMMENTS FROM PREVIOUS SRP STUDENTS

In answer to the question:

"How did you feel about the work assignment?"

"The work was intellectually stimulating and rewarding. It dealt with an area of . . . that is new and fertile. As a result of my contribution to this area, I will be co-author of two publications in technical journals."

"I feel I've learned more about my future field of interest than I have in years of school."

"To see theory actually working in an experiment makes it easier to understand and learn."

"For me one of the most interesting aspects of this summer was to actually see what sort of things a research position involves and how an advanced degree might be used. I think the things I learned this summer may give more direction to my studies and school work."

**EXAMPLES OF 1992 UNDERGRADUATE STUDENT TALKS
IN THE COMMUNICATIONS SCIENCES RESEARCH DIVISION**

- **Linewidth Measurements on Tunable DBR Lasers**
- **Surface Preparation Techniques for Selective Area Growth by MBE**
- **Flip-Chip Bonding Modulators onto Silicon Chips**
- **Computer Control of CBE Growth: Compositional Ramping**
- **Temperature Dependence of InP-HBT Parameters**

**THE AT&T BELL LABORATORIES
COOPERATIVE RESEARCH FELLOWSHIP PROGRAM
(1972-1992)
A TWENTY-YEAR REVIEW**

Conducted for the AT&T Foundation

by the

**National Action Council for Minorities in Engineering, Inc.
3 West 35th Street
New York, NY 10001-2281**

October 1992

1992 CRFP REUNION

Murray Hill, NJ

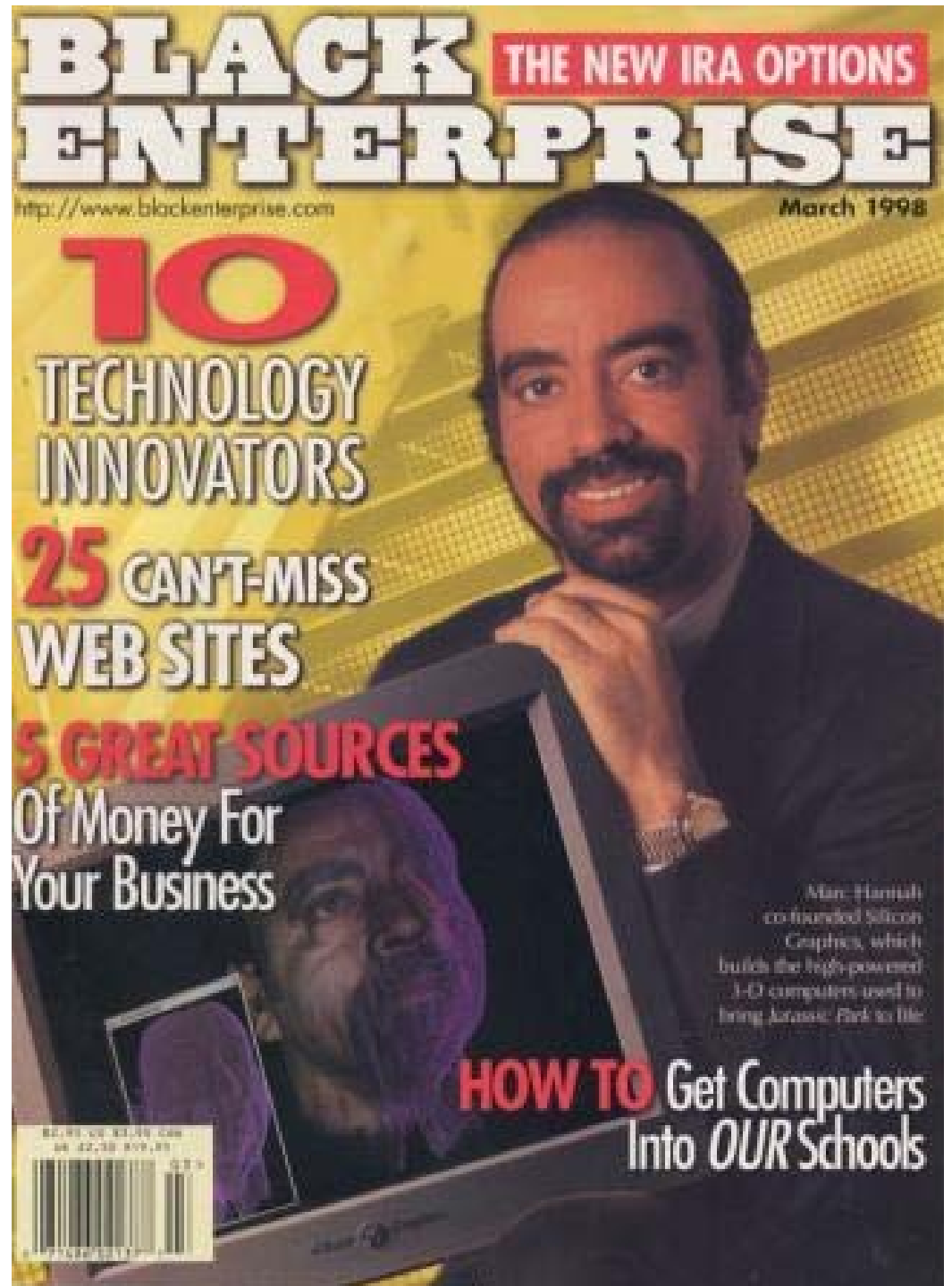


***A founder of
Silicon Graphics, Inc.***

***Dr. Marc Hannah
(CRFP Fellow '77)***

***Received his Ph.D. in
Electrical Engineering
from
Stanford University***

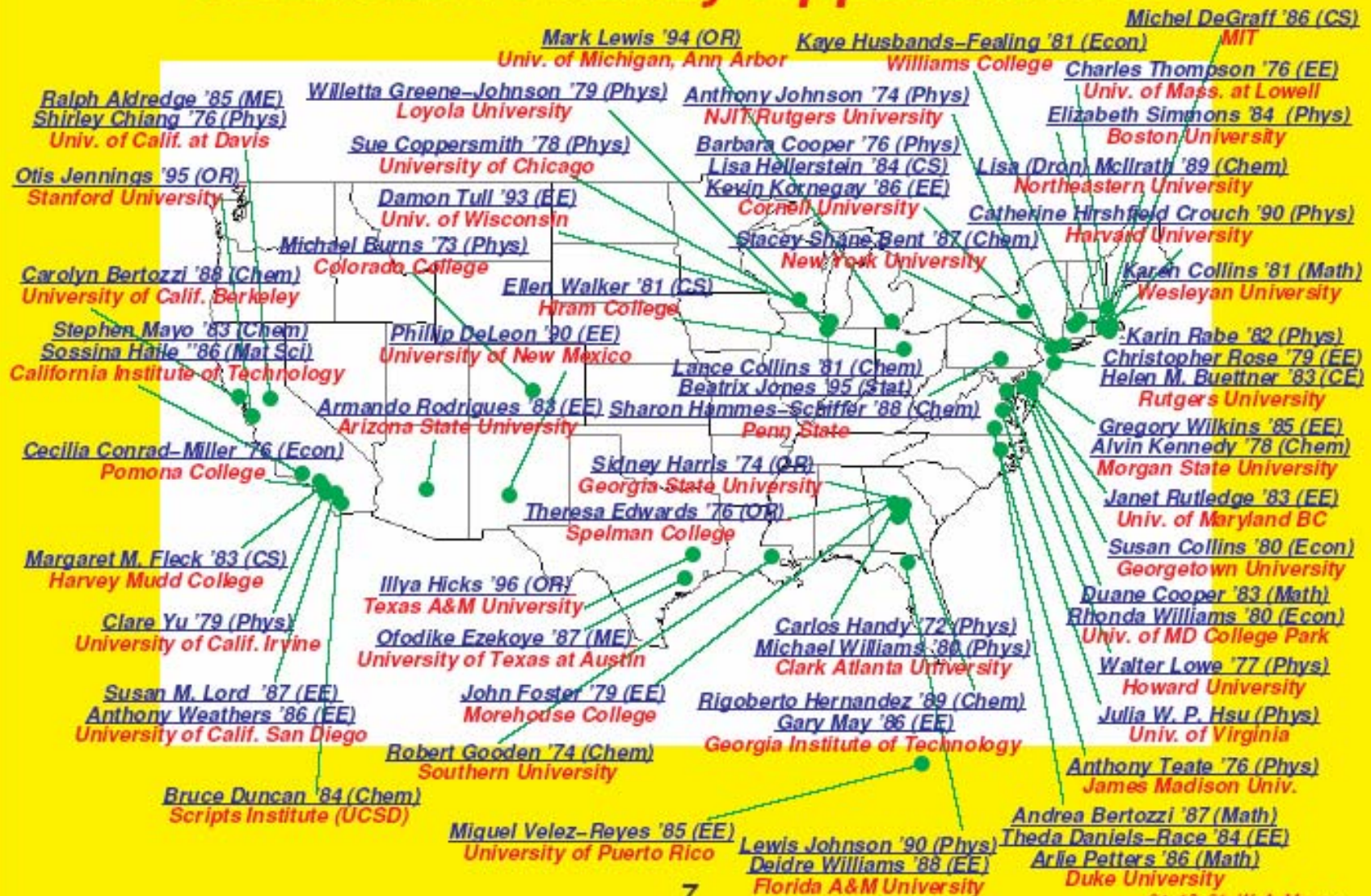
***Silicon Graphics
workstations provided
special effects for
films such as
Terminator 2 and
Jurassic Park***



Some Findings From The 20-Year Review Of CRFP By NACME (1972 – 1992)

- Bell Labs established and maintained a strong program that added significantly to the pool of underrepresented minorities in the nation's scientific and engineering workforce. Nationwide, in 1981, two of four Black PhD physicists were CRFP Fellows. By 1991, 10% of the PhD awards to underrepresented minorities in engineering went to CRFP Fellows.
- Most mentors were found to be extremely effective; they contributed to Fellows' early focus and clarity of professional purpose. Mentoring proved to be an effective strategy for providing support and direction to people facing decisions that will shape their lives.
- Using the time-to-degree as a comparative measure, the CRFP at 5.75 years is on par with the NSF Fellowship Program (the closest program in science), and below the national median of 6.27 years for math and physics. This is attributable in part to the advantage of fellowship funding over other methods, e.g. teaching or research assistantships, but is due in larger part to the mentoring and summer employment made available at Bell Labs.
- As of March 1992, 67 Fellows have received PhDs with CRFP support. 9 were terminated. 35 others entered but later withdrew. These withdrawals may be students who completed their masters' degrees, but chose not to pursue the PhD.

62 Alumni Faculty Appointments



“Cultivating a field of dreams among a minority at NJIT”
by Caroline Brewer, Sunday Bergen Record
April 30, 2000, Living Section, page L-3



The Ultrafast Optics and Optoelectronics Group



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CRFP

- “The AT&T Bell Labs programs are easily the most prominent ones for minorities. Consequently, virtually all of the top scientists and engineers who are minorities have passed through Bell Labs at one time or another. This is truly a remarkable achievement.” – 20-Year Reunion respondent.
- “The climate for minorities in science and engineering is still fairly hostile (perhaps the last of the ‘old boy’ networks). The battle to succeed in this competitive environment is a tough one. The CRFP Program has profoundly influenced me to strive for the top. You should feel very proud for having influenced so many disadvantaged people with your program. My hat’s off to you.” – 20-Year Reunion respondent.
- The CRFP Program has produced well over 100 underrepresented minority PhDs over its lifetime.

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Bell Labs Minority Education Pipeline

Summer Science Program (1970):

- (1) Basic (2 weeks) - 8th Grade
- (2) High-Achiever (2 weeks) - 9th Grade
- (3) High-Step (10 weeks) - 10th-12th Grades

Undergraduate Scholarship Program (1972):

- (1) Engineering Scholarship Program (ESP) → 12th
- (2) Dual Degree Scholarship Program (DDSP) → Grade

Summer Research Program (SRP) for Minorities → College
and Women (1974) → Junior

Graduate Scholarship Program (1972):

- (1) CRFP → College
- (2) GRPW → Senior → Ph.D.

The Meyerhoff Scholars Program at UMBC

UMBC

- Carnegie Classified Research University (no medical school)
- Founded in 1966
- Suburban Campus near BWI Airport
- \$85 M in grants and contracts
 - 450 tenure track faculty; predominately white
- Strong in science, technology, mathematics, and engineering (STEM)
- 12,400 students
 - 10,000 undergraduates
 - 2,400 graduate (750 Ph.D. students in 24 Ph.D. programs heavily weighted to the STEM fields)
 - 35% minority enrollment
(Black 14%, Asian 17%, Hispanic & Native American 4%)

Meyerhoff Scholars History

- **Founded in 1988 – Baltimore Philanthropists Robert and Jane Meyerhoff**
- **Initially, the program addressed the shortage of African American males pursuing terminal degrees in STEM fields.**
- **First Class of 19 African American males arrived in 1989; Women included in 1990.**
- **92% retention rate in 1992.**
- **Open to all high-achieving high school students in 1996.**
- **1998 class Valedictorian.**
- **Program surpasses 2,500 nominations in 2006.**
- **Over 600 Graduates since 1993.**

Major Program Components

- Summer Bridge Program (6 weeks)
- Mentoring
- Summer Research Experience
- Monetary Support
 - Including room and board, tuition and fees, and a book allowance
- Cultural Arts
- Academic Advising
- Scientific Conferences
- Graduate and Professional School Placement
- Staff Support

The Meyerhoff Mission

- To recruit, nurture, and develop a diverse group of high-achieving students who have an interest in pursuing doctoral study (PhD or MD/PhD) in the sciences, engineering, or mathematics (SEM)
- Students also must have an interest in the advancement of underrepresented groups in the sciences and related fields.

Indicators of Success

- Overall 20-Year Retention rate > 95%
- Average grade point average of 3.53 for all current students.
- Broad distribution of majors in science and technology:

Biological Sciences

Biochemistry

Computer Science

Chemical Engineering

Mechanical Engineering

Mathematics

Chemistry

Computer Engineering

Physics

Electrical Engineering

Interdisciplinary Studies

Bioinformatics

Biochemical Engineering

Engineering

Success Indicators

- Since 1993, the Meyerhoff Program has graduated over 600 students and the program enjoys an overall 20-year retention rate of greater than 95%
- 75% currently are enrolled in graduate and/or professional programs (as of December 2008)
- 53 PhDs, 21 MD/PhDs, 74 MDs and 115 MS degrees have been granted as of December 2008
- 250 students are currently enrolled in graduate and/or professional schools
- The program challenges notions about minority achievement. Meyerhoff Scholars have changed the perceptions of those around them – the expectations of faculty who instruct them, the attitudes of students who learn beside them, and the perspectives of scientists who engage them in research.

Graduate School Placements (Ph.D. Programs)

Univ. of Notre Dame

Harvard

Cornell

Rice

Berkeley

Univ. of Pennsylvania

UMBC

Univ. of Massachusetts

Stanford

Columbia University

UCLA

Maryland

MIT

Oxford University

University of Virginia

University of Delaware

University of Penn.

Yale

Duke

NC State

UNC Chapel Hill

Carnegie Mellon

Purdue

Northwestern

Michigan

Rice

Arizona State

Georgia Tech

University of Florida

Johns Hopkins

SUNY-Stony Brook

University of Washington

Graduate School Placements (MD/PhD. Programs)

Case Western Reserve

Brown University

Emory University

Cornell

Duke

North Carolina, Chapel Hill

Harvard

Johns Hopkins University

New York University School of Medicine

University of Maryland, Baltimore

University of Pennsylvania

University of Alabama, Birmingham

Medical University of South Carolina (MUSC)

Washington University (St. Louis)

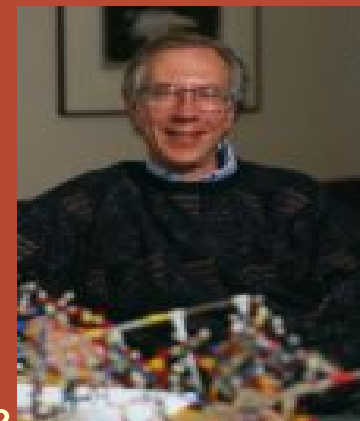
University of California, San Francisco

Uniform Services University (Bethesda, MD)

Meyerhoff Scholars Program at UMBC Where Students - Come Together,



National Recognition



*Dr. Thomas R. Cech -Nobel Laureate in Chemistry &
President of the Howard Hughes Medical Institute*

“The Meyerhoff Program has clearly put UMBC on the national map. In a broader sense, science is such an important and exciting enterprise that we cannot afford to have under-representation of an entire segment of our population, and the Meyerhoff Program provides a great model for addressing this challenge.”



Meyerhoff Scholarship Program at UMBC

