

NATIONAL SCIENCE FOUNDATION



Mentoring for the Development of a Scientific and Technological Workforce for the 21st Century

**1998 Presidential Awards for Excellence
in Science, Mathematics, and Engineering
Mentoring Program Symposium**

**September 10-11, 1998
Washington, D.C.**

*Presidential Awards for Excellence in Science,
Mathematics, and Engineering Mentoring*

1998 Awards Program and Symposium



***Mentoring for the Development of a
Scientific and Technological
Workforce for the 21st Century***

September 10-11, 1998

**ITT SHERATON LUXURY COLLECTION HOTEL
2100 MASSACHUSETTS AVENUE, NW
WASHINGTON, D.C.**

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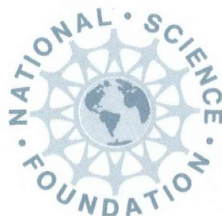
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Any opinions, findings, conclusions, or recommendations expressed in this report are those of the participants, and do not necessarily represent the official views, opinions, or policy of the National Science Foundation.

FOREWORD

Administered by the National Science Foundation on behalf of the White House, the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring Program seeks to identify outstanding mentoring efforts that enhance the participation of groups that are underrepresented in science, mathematics, and engineering. The awardees serve as leaders in the national effort to develop more fully the Nation's human resources in science, mathematics, and engineering.

Nominees must have served in a mentoring role for at least five years. Awards are made to:

- Individuals who have demonstrated outstanding and sustained mentoring and effective guidance to a significant number of students at the K-12, undergraduate, or graduate education levels, and
- Institutions that, through their programming, have enabled a substantial number of students underrepresented in science, mathematics, and engineering to successfully pursue and complete relevant areas of study. For postsecondary levels, these efforts must show that students have been successfully mentored to the baccalaureate, master's, or doctoral degree level.

Awardees receive a commemorative Presidential certificate, as well as a grant of \$10,000 to continue the efforts in the recognized activity. In addition, each awardee is invited to Washington, D.C. for an awards ceremony, recognition events and meetings with leaders in the Federal education and research sector, and focused workshops addressing effective mentoring of students from underrepresented groups.

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A MESSAGE FROM DR. RITA COLWELL

DIRECTOR, NATIONAL SCIENCE FOUNDATION

There is no question that the Nation's competitiveness in the global marketplace rests on our ability to expand our science and technology workforce. Our success in building and maintaining a highly capable workforce will require us to tap into the skills, intellect, and creativity of all groups, including underrepresented minorities, women, and people with disabilities. We must proactively reach out to these individuals, encouraging them to pursue careers in science, mathematics, and engineering and then supporting them in achieving their aspirations.

Mentoring is a key to achieving these goals. Often working beyond their required professional expectations, mentors provide encouragement and wisdom, serve as trusted counselors and guides, motivate, coach, enable smooth transitions, and open doors to networks and resources.

The Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring Program celebrates mentoring at its best. Since 1996, this program, which is administered by the National Science Foundation on behalf of the White House, has recognized nearly 60 exceptional individuals and organizations that have demonstrated their steadfast commitment to this very important activity. Individually, the Presidential Award recipients have profoundly affected the decisions and lives of thousands of individuals at the K-12, undergraduate, and graduate education levels. Collectively, the award recipients have made invaluable contributions to strengthening the Nation's science and technology workforce.



Dr. Rita Colwell, Director, NSF, addresses the award recipients and guests at the White House.

Many of the Presidential Award recipients well-understand the challenges faced by the students whom they mentor because they have “walked in their shoes.” Like their “mentees,” many of the awardees were raised in families with few resources and had little exposure to role models working in science, mathematics, and engineering careers. At some point in their lives, however, one person—perhaps a teacher, friend, or community member—engaged their attention and encouraged them to consider the exciting possibilities for education and careers in these fields. Today, these individuals give back, again and again, to students whose lives they now touch in similar ways.

It is indeed an honor to recognize the 1998 recipients of the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring, an extraordinary group of individuals and programs that positively affect many individuals and the future of our Nation’s workforce.



Secretary of Transportation Rodney Slater and NSF Director Dr. Rita Colwell listen to President Clinton's remarks in the White House Oval Office.

GREETINGS AND INTRODUCTION OF THE 1998 PRESIDENTIAL AWARD RECIPIENTS

*Dr. Roosevelt Calbert
Director, Division of Human Resource Development
National Science Foundation*

Dr. Roosevelt Calbert welcomed the awardees, guests, and other participants to the 1998 Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring symposium. He explained that awards are presented to both individual mentors and to institutions, and that each awardee receives a \$10,000 grant and a commemorative Presidential certificate. Individual awards are given to persons who have demonstrated outstanding, sustained mentoring and effective guidance to a significant number of students at the K-12, undergraduate, or graduate education levels, he said. Institutional awards are presented to organizations that, through their programming, have trained a substantial number of students from groups that are underrepresented in science, mathematics, and engineering and who successfully pursue and complete relevant degree programs.

"As mentors, you have served in many roles, including father, mother, brother, sister, friend, counselor, tutor, confidant, motivator, teacher, coach, and sometimes disciplinarian," Dr. Calbert acknowledged. "Each of you has that special something that compels you to



Dr. Roosevelt Calbert, Director, Division of Human Resource Development, Directorate for Education and Human Resources, NSF.

help your charges to be creative and persist toward excellence, thereby attaining careers in science, mathematics, engineering, and technology."

"This is your day. It is both a time for celebration and a time for this Nation to say thank you," he said.

Dr. Calbert then introduced the recipients of the 1998 Presidential Awards.

RECIPIENTS OF THE 1998 PRESIDENTIAL AWARDS FOR

INDIVIDUAL AWARD RECIPIENTS

- Dr. Winser E. Alexander*, Professor, Department of Electrical Engineering,
North Carolina State University
- Dr. Sheila E. Browne*, Professor, Chemistry Department,
Mount Holyoke College
- Dr. D. Allan Butterfield*, Professor; Director, Center for Membrane Sciences;
and Faculty Associate, Sanders-Brown Center on Aging, Department
of Chemistry, University of Kentucky
- Dr. Billy Joe Evans*, Professor, Department of Chemistry,
University of Michigan
- Dr. Aubrey Gorbman*, Professor of Zoology *Emeritus*,
University of Washington
- Dr. Jesse M. Nicholson*, Professor and Chair, Department of Chemistry,
Howard University
- Dr. Su-Seng Pang*, Jack Holmes Professor, Department of Mechanical
Engineering, Louisiana State University, and Adjunct Professor,
Department of Mechanical Engineering, Southern University
- Dr. Armando A. Rodriguez*, Associate Professor, Department of Electrical
Engineering, Arizona State University
- Dr. Nina M. Roscher*, Professor and Chair, Department of Chemistry,
The American University
- Dr. Herbert B. Silber*, Professor, Chemistry Department,
San Jose State University

EXCELLENCE IN SCIENCE, MATHEMATICS, AND ENGINEERING MENTORING

INSTITUTIONAL AWARD RECIPIENTS

AT&T Laboratories

*Coalition for Excellence and Diversity in Science, Mathematics, and
Engineering Mentoring; University of California, Berkeley*

Department of Mathematics and Statistics, University of Nebraska-Lincoln

Department of Physics, Bryn Mawr College

*Mathematics and Science Education Network,
University of North Carolina at Chapel Hill*

Office of Women's Programs, Stevens Institute of Technology

TIMES² (To Improve Mathematics, Engineering, and Science Studies)

Women in Engineering Initiative, University of Washington

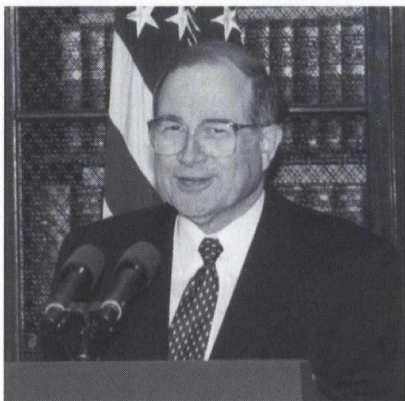


Front row (left to right): Dr. Winser Alexander, Dr. Gerry Madrazo, Dr. Aubrey Gorbman, Dr. Jesse Nicholson, Dr. Nina Roscher, Ms. Susan Staffin Metz.

Center row: Dr. Armando Rodriguez, Dr. Alfonso Albano, Dr. Sheila Browne, Dr. Allan Butterfield, Dr. Billy Joe Evans.

Back row: Dr. Judy Walker, Dr. Su-Seng Pang, Dr. Caroline Kane, Dr. Herbert Silber, Ms. Pat Wirth, Dr. Suzanne Brainard. Not shown: Dr. Ralph Taylor.

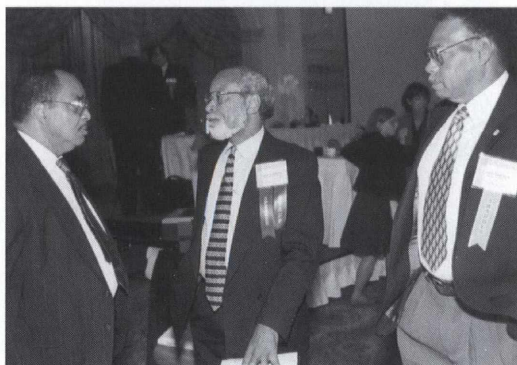
The 1998 Presidential Award recipients accepted their awards at the Old Executive Office Building in Washington, D.C., and then had the opportunity to meet with President Clinton and White House executive staff in the Oval Office.



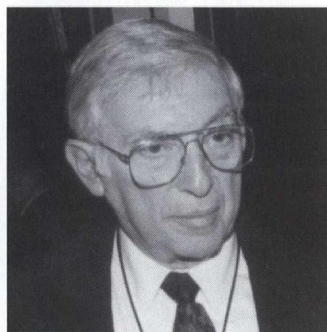
Dr. Neal Lane, Assistant to the President and Director, Office of Science and Technology Policy, presents remarks to the symposium participants at the White House.



President Clinton addresses the Presidential Award recipients and guests in the White House Oval Office.



At the host hotel, Dr. Roosevelt Calbert (left), Director, Division of Human Resource Development, NSF Directorate for Education and Human Resources, talks with Dr. Luther Williams (center), Assistant Director, Directorate for Education and Human Resources, and award recipient Dr. Winser Alexander, North Carolina State University.



Dr. Arthur Bienenstock, Assistant Director for Science, OSTP.

OPENING REMARKS

*Dr. Arthur Bienenstock
Associate Director for Science
Office of Science and Technology Policy
Executive Office of the President*

On behalf of the Executive Office of the President, Dr. Arthur Bienenstock welcomed to Washington the recipients of the 1998 Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring and their families. He then spoke about the value of mentoring, not only to individuals but also to the Nation as a whole.

“Although we know very well the impact of your contributions on those whom you mentor, many of us also will stress the importance of what you are doing for the Nation,” he said. “Your accomplishments in mentoring young people and bringing them into science, mathematics, and technology are indeed very important.”

Dr. Bienenstock noted that as the U.S. population ages, “a smaller number of people will have to support a larger number of people. That means that every individual will have to become more productive. If we are to maintain our economy, maintain our national security, and improve our environment, then it is probably true that an increasing fraction of our population will have to go into some aspect of science or technology. On the other hand, if you look at the demographics, an increasing fraction of our population in the next century will be from groups that historically have not participated heavily in science and technology.”



Dr. Arthur Bienenstock (center), Assistant Director for Science, Office of Science and Technology Policy, Executive Office of the President, talks with Mary Hanson and Lee Herring from the NSF Office of Legislative and Public Affairs.

"It is imperative, therefore, that we begin now to bring more and more people into science and technology, and that we expand the participation of minority groups, women, and people with disabilities," he stated.

"Your role is very important because you encourage the people who will become the teachers and the scientists in industry, who in turn will attract others into science and technology," Dr. Bienenstock told the Presidential Award recipients. "Each of you has seen your 'mentees' as individuals, but it is also important that you recognize that what you are doing is very important to the Nation as a whole."

Dr. Bienenstock said he has "very strong personal feelings about mentors," explaining that he was raised in New York City and was the first in his family to attend college.

"No one in my experience could lead me to become a scientist," he reflected. "I never in my youth expected that I would end up teaching first at Harvard, then at Stanford, and finally coming to Washington to serve in the Office of Science and Technology Policy."

He said that he entered graduate school expecting to become an engineer, but that his freshman physics teacher "took an enormous interest in me and converted me from an engineer to a physicist. I had little sense of what a physicist was until my senior year. Then, the head of the physics department also took an interest in me, encouraged me to leave New York City, go to Harvard, go to graduate school, and become a scientist."

"I do not think there is a single person in this room who is a working scientist who does not have a similar story to tell about how someone came into his or her life at an important time and encouraged him or her to go into science or technology and to do it on a grander scale than he or she had anticipated earlier in life," Dr. Bienenstock continued.

"For most of you, the true reward is probably seeing each year one or two or three young persons succeed and go on to do something exciting," he suggested to the awardees. "There is virtually nothing that we can do in Washington that can match the pleasure and the joy of helping a young person to use his or her talents to the fullest. We are very pleased to recognize your accomplishments."

Keynote Address

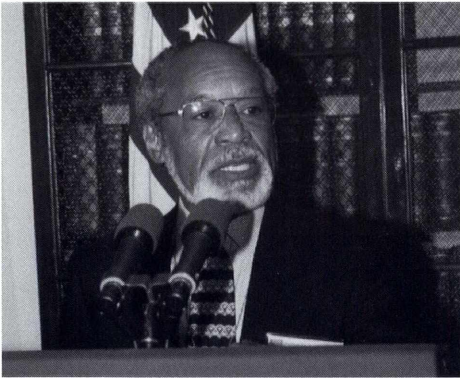
INTRODUCTION OF KEYNOTE SPEAKER

Dr. Luther S. Williams

*Assistant Director for Education and Human Resources
National Science Foundation*

Dr. Luther S. Williams, Assistant Director for Education and Human Resources at the National Science Foundation, introduced the symposium's first keynote speaker, Dr. Richard Tapia, Professor in the Department of Computational and Applied Mathematics at Rice University.

Dr. Williams noted that Dr. Tapia is known internationally for his research in computational and mathematical sciences and "clearly has established himself as a national leader in education and outreach." Dr.



Dr. Luther Williams, Assistant Director for Education and Human Resources, NSF.

received the National Science Foundation's Educator Achievement Award in 1995.

"In summary, I present to you an eminent scientist and engineer," Dr. Williams said of the speaker. "Beyond engaging himself for 30 years in all the joys that attend scientific discovery, he has challenged himself to fulfill the correspondent societal responsibility of making distinctive contributions to the broad issue of human resource development."

Dr. Tapia was appointed by President Clinton to the National Science Board in 1996, and in 1992 he became the first native-born Hispanic person to be inducted into the National Academy of Engineering. He also is a lifetime member of the American Association for the Advancement of Science (AAAS), has received the AAAS Mentoring Award, has been named Hispanic Engineer of the Year, and

Keynote Address

MENTORING AND NURTURING: KEYS TO ENGAGING UNDERREPRESENTED GROUPS

Dr. Richard Tapia

*Professor, Department of Computational and Applied Mathematics,
Rice University*

Member, National Science Board

Increased representation of women, Latinos, African Americans, and Native Americans in science, mathematics, and engineering will strengthen the Nation's economic well-being, and successful mentoring is the key to increasing representation of these groups, Dr. Richard Tapia told the symposium participants in his keynote address.

As mentors, educators must “teach, demonstrate, and demand unqualified excellence, yet be sensitive and understanding in the process,” Dr. Tapia reflected. The mentor serves many purposes, including giving direction and motivation to students as they continue on to undergraduate school, graduate school, and beyond; instilling values; promoting retention; encouraging professionalism; and teaching leadership skills.



Keynote speaker Dr. Richard Tapia of Rice University.

“Acknowledging and rewarding this important and valuable activity at high levels gives credibility to the activity and makes the job easier. That is why we are here today,” he said.

Dr. Tapia listed the groups that are underrepresented in science, mathematics, and engineering. Women are traditionally underrepresented, although their ranks are increasing. Underrepresented minorities include Hispanic Americans (Mexican Americans, Puerto Ricans, Cubans, and others, of whom Mexican Americans are the least represented), African Americans, and Native Americans. Domestic students also are underrepresented, with foreign students comprising a large part of the graduate population at U.S. universities.

A CRISIS IN AMERICA

Underrepresentation of women and minorities endangers the health of the Nation, not the health of the professions, Dr. Tapia asserted. The “naïve optimist” may believe that the supply of scientists, engineers, and mathematicians, and the health of the science and engineering professions will be maintained by turning to the Nation’s underrepresented groups. The reality, though, is that the health of the professions will be maintained by turning to foreign workers, as the Nation has done historically.

“Mentoring is an exercise of power—power in one’s own environment and power outside of one’s own environment. . . . The critical essence of mentoring is this power and the ability to make demands on both one’s students and one’s colleagues.”

**Dr. Billy Joe Evans,
University of Michigan**



“So why do we worry about underrepresentation?” he asked. “I think we have a crisis in America. No first world nation can maintain its economic health when such a large part of its population is outside of the economic mainstream activity, including all technological, scientific, and computational activity. . . . Don’t argue that we are saving the health of the professions. We are saving the health of the country.

“Importation is the easy fix. The hard fix is to work with the population that is underrepresented. . . . The hard fix is the one that we must really address.”

ESSENTIAL INGREDIENTS

Dr. Tapia stated that engaging underrepresented populations in science, mathematics, and engineering requires three essential ingredients: The participants must first, value the activity and successful participation; second, have the confidence in their ability to participate; and third, have appropriate and fair access to and preparation for participation at all levels. In addition, success requires a mentoring/nurturing component. His experience has shown that minority-serving undergraduate institutions successfully instill a sense of value, confidence, and mentoring/nurturing in underrepresented populations, whereas majority-serving institutions do a poor job of providing these ingredients. In contrast,

majority-serving institutions successfully provide access and preparation, while some minority-serving institutions do not.

Transitions from one level of preparation to the next are turning points for underrepresented minority students, Dr. Tapia added. “The ‘moment of truth’ is when a minority from a minority environment meets the majority system. It could be in the first grade. It could be in middle school. It could be in high school. It could be undergraduate school. It could be graduate school, or it could be when you go to work in mainstream America.”

“If it is not handled successfully, (the transition period) leads to these students dropping out and to underrepresentation. . . . We as mentors must deal with this effectively and realize that it is different for each individual.”

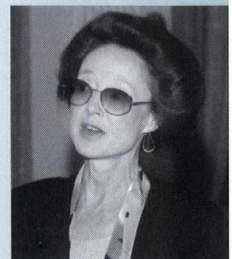
AFFIRMATIVE ACTION, PHASE TWO

Dr. Tapia also explored the issue of affirmative action and called for “appropriate modification and alignment of the mission, the various evaluation criteria, and the reward system.”

“After Proposition 209 in California and Hopwood in Texas, affirmative action as we knew it in the old days is dead. It’s gone. So we have to learn how to adapt, how to continue to go on,” he said. “I see affirmative action today as phase two—an opportunity to study existing evaluation criteria and to change appropriately so that the resulting evaluation criteria are fair and not exclusive.”

“As a Nation, we demonstrate an inexplicable addiction to the use of biased standardized tests and other one-dimensional qualifiers like SAT scores, GRE scores, rank in class, GPA, and number of publications,” Dr. Tapia explained. “But notice that neither science nor people are one-dimensional. We are multi-dimensional individuals. Science is multi-dimensional. Yet we turn to one-dimensional qualifiers.”

“I am particularly enthralled by your conceptualization of phase one and phase two affirmative action. You noted that we have to reassess the (admissions) evaluation criteria. My concern is who does that reassessment, because if we look at the traditional faculty in the institutions, it is predominantly white males.”



**Dr. Suzanne Brainard,
Women in Engineering Initiative,
University of Washington**

“Standardized tests have become the underrepresented minorities’ worst enemy,” he continued, noting that there is an “incredibly naïve belief that ordering has meaning at all levels.” In addition, “current evaluation criteria, strongly biased toward precocity, do not address creativity and do not work well.”

CHANGING FACULTY CULTURE

Dr. Tapia then addressed the need to modify the thinking of university faculty members, suggesting that faculty culture is a deterrent to underrepresented minority students’ success and comfort in science, mathematics, and engineering departments. The National Science Foundation recognizes this and has directed some programs toward trying to change the culture in departments, he said.

Rice University has developed a successful post-affirmative action program to heighten admission and retention of minority students. Two years after the Hopwood decision, which ruled that race and gender cannot be used in admissions or financial aid formulae, the University had record enrollment of 20 percent African Americans and Hispanic Americans in its freshman class.

“We have a model which I refer to as the threshold model,” Dr. Tapia explained. “In other words, a certain SAT level (e.g., 1050) should be expected. Everybody at about 1050 is said to be equivalent and then we deal with other factors and other decisions. If your score is very low, then the SAT will hurt you. But we are getting away from using the top-level scores of the SAT in a linear fashion. That has been very, very successful.”

Retention of underrepresented minorities also has been addressed effectively within Rice’s Computational and Applied Mathematics Program, with graduate enrollments of 57 percent women and 38 percent underrepresented minorities. This success has resulted in part because “the black groups and the brown groups have worked together extremely well,” the speaker said. “One of the things that we have to face in mentoring is that . . . just because women are underrepresented or blacks are underrepresented or browns are underrepresented that we all work together very effectively. This concept is something that has to be dealt with and nurtured, and it can be done.”

In addition, retention of minority undergraduate students at majority schools requires nurturing them and making them feel comfortable, Dr. Tapia believes. “We have students who are quite brilliant, yet we are driving them away from the sciences. Minority undergradu-

ates enter with the intention of majoring in science, engineering, or mathematics, and graduate, but not with a major in science, engineering, or mathematics. Basically, they are driven to the areas where they feel more comfortable and where they are able to maintain self-esteem, and that tends to be the humanities.”

SUCCESS ON THE HORIZON

Improved representation of women and minorities is on the horizon, Dr. Tapia acknowledged. Although women continue to be underrepresented in science, mathematics, and engineering, they increasingly are taking on leadership roles in organizations such as NSF, the American Association for the Advancement of Science, the National Science Board, and professional societies. However, a major concern is the “extreme lack of underrepresented minority leadership at the national level.”

“Very few minorities are leading the professional organizations or national committees,” Dr. Tapia stressed. “Political appointments alone will not solve this problem. We have to raise individuals who are competent professionals who can go on to lead. We must have competent people in a pool to choose from for this national leadership.”

“Part of the problem in having minorities and women get through the PhD level in (science, mathematics, and engineering) disciplines is the lack of resources that may be at their disposal and the discouragement that they receive in obtaining those resources. . . . It is important for the National Science Foundation to encourage industrial cooperation and involvement in mentoring programs and in the provision of funds in support of students. . . . Mentoring is not recognized broadly as an issue in industry, but needs to be addressed by this sector.”

Pat Wirth, AT&T Laboratories



CONCLUDING RECOMMENDATIONS

In conclusion, Dr. Tapia outlined several recommendations for faculty members and mentors, including to:

- Learn from the death of affirmative action and actively implement phase two.
- Concentrate on the front-end of the pipeline because the back-end is too late.
- Level the playing field.
- Involve all segments of society.
- Convince the Nation that underrepresentation is bad for the Nation.
- Become bold, proactive leaders of the revolution.
- Teach by example. Avoid expecting or asking for more than you yourself are willing to give, but be willing to give more.



Keynote speakers Dr. Richard Tapia (left), Rice University, and Dr. Julian Earls (center), NASA Lewis Research Center, with Dr. Neal Lane, Assistant to the President and Director, Office of Science and Technology Policy.

Focus Session

MENTORING PROGRAMS THAT WORK AND THE MENTORS WHO MAKE THEM WORK

Dr. Oliver McGee, Senior Policy Analyst in the Office of Science and Technology Policy, opened the focus session by noting that the Clinton Administration has placed a premium value on education and has made a vigorous investment in strengthening and diversifying the Nation's science and technology workforce. The appointment of Dr. Rita Colwell as the first female director of the National Science Foundation demonstrates this commitment. This commitment also is demonstrated by the establishment of the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring—a goal set forth in the Administration's blueprint science and technology document, *Science in the National Interest*.



Dr. McGee introduced the four focus session panelists, each of whom is a 1998 Presidential Award recipient, and explained that each panelist would discuss mentoring and mentoring programs.

Dr. Oliver McGee, Senior Policy Analyst,
Office of Science and Technology Policy,
Executive Office of the President,
during the focus session.



“The cornerstone of my mentoring philosophy is the idea that every student is sacred, that we as a Nation must view all of our children as essential resources, all of which are too valuable to lose.”

**Dr. Armando Rodriguez
Department of Electrical Engineering
Arizona State University**



Dr. Nina Roscher, Department of Chemistry, The American University.

Dr. Nina Roscher, Professor and Chair, Department of Chemistry, The American University

Dr. Roscher described mentoring as a one-on-one, “very human” activity and spoke about the need to support students, particularly older students, both in their academic work and in making connections with others students. “It is very important that we recognize that as the population changes... we are no longer talking about the 18- to 21-year-olds whose parents are paying all of the bills,” she maintained. “We often are dealing with students who need the support of the institution and the recognition that other things influence their lives.”

Dr. Roscher recalled her involvement several years ago in a re-entry program for women who were returning to science. Through this experience, she learned the importance of both the institution’s and fellow students’ support.

“I had not fully appreciated that until the time,” she said. “When you are dealing with older women who are coming back to school, you realize that many of the problems they have are not problems in the classroom. It is the outside activities that they have to be concerned about, whether it is their children, their spouses, the grocery shopping, cleaning the house, or whatever. They often have worked very hard at their studies, but they need to have support.”

Students often can provide support for each other, Dr. Roscher said, suggesting that one role of mentors and faculty members is to help students make contact with other students who face similar challenges.

**Dr. Alfonso Albano, Professor, Department of Physics,
Bryn Mawr College**

Dr. Albano referred to keynote speaker Dr. Richard Tapia's remark that at many universities, the attitude of faculty members who teach introductory science courses has been "sink or swim," with faculty serving as filters and gatekeepers for higher level science studies. In this scenario, Dr. Albano said, "only the most persistent and the most committed stay." The other students turn to other fields, and many of those who "drift off" are women or members of minority groups.



Dr. Alfonso Albano, Department of Physics, Bryn Mawr College

"It seems to me that if we are to reverse this, we have to stop viewing ourselves as filters and gatekeepers, but rather view ourselves as recruiters and facilitators," Dr. Albano recommended.

Recruitment into Bryn Mawr College's science programs begins before students come to the college, Dr. Albano explained. "We talk to prospective students. We have campus tour guides emphasize the science programs and the successes of our science programs. And when the students come on campus, we are available from day one."

The college's students come from many different backgrounds, and the transition to first-year science courses is "not always easy," he said. "So we try to see what has worked in other places that would validate different experiences and that would make it possible for students to show their competence and mastery in a variety of ways."

For example, students in introductory physics courses are required to keep a journal that includes readings of contemporary science issues described in newspapers, and eventually they begin to make connections to what they are doing in class. In addition, upper-level students conduct a physics clinic in which at least two physics majors are available to other students each Sunday through Thursday evening.

"The mentor is a critical node in the (graduate) student's network. She or he opens doors for, guides and directs, encourages, and fosters the independence of the student."

**Ralph Taylor
TIMES'**

“It is in dealing with extrinsic factors, when institutional and social barriers are encountered, that mentoring can be most useful.”

Dr. Aubrey Gorbman
Professor of Zoology Emeritus
University of Washington

Intermediate-level courses in the Bryn Mawr physics department are “very laboratory intensive and very individualized,” with students progressing at their own pace, Dr. Albano continued. “By the time they are juniors or seniors, they help run the program. We try to give them a feeling of ownership in the department.”

“We also try to make the department a home for them,” he said, noting that the faculty works to build long-term relationships with students. “Our contacts with them do not end after they graduate because by the time they graduate, we’ve become friends. . . . It’s not just a teacher and a student concerned just with the science. It’s a mentor and a mentee. It’s a friend and another friend.”

**Susan Staffin Metz, Director, Office of Women’s Programs,
Stevens Institute of Technology**



Ms. Susan Staffin Metz,
Office of Women’s Programs,
Stevens Institute of Technology.

Ms. Metz spoke about the women’s programs at Stevens Institute of Technology, which was founded in 1870 and was all male until 1971. “In 1971, no one knew what engineering was,” she said. “Teachers didn’t know. Guidance counselors didn’t know. Parents didn’t know. And young women who had the potential to become good engineers and scientists didn’t know either.”

Stevens Institute’s women’s programs were initiated in 1978 and began receiving funding from corporations that understood that women and minorities were key components of the future work force. The Exploring Career Options in Engineering and Science (ECOES) Program was the Office of Women’s Programs’ first summer program and continues as a cornerstone of the efforts to reach out to pre-college women. Two thousand young women in 10th and 11th grades have graduated from the summer programs. Follow-up evaluations have shown that 75 percent of graduates enter university engineering programs, and at least 13 percent enter science programs.

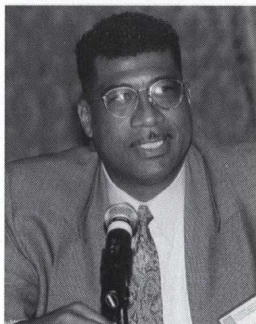
"About four years ago, because the program is so terrific and these kids have such a great experience, our administration decided that they wanted to have the program go co-ed," Ms. Metz reflected. "One of the values of becoming co-ed is that, because this is a long-term program and funding for long-term programs is difficult to come by, Stevens institutionalized this program. Now it is self-sustaining," she commented.

Ms. Metz recalled some of the young women who have been influenced by the Stevens Institute programs. "I remember Sarah, who attended some years ago," she said. She had an 800 math SAT score and a 700 verbal SAT score. Her comment at the end of ECOES was 'I didn't think I could make it as an engineer until I met a real one.' She has since gone on to Cal Tech and become incredibly successful. What struck me was the lack of self-confidence in a young woman who is so incredibly talented academically."

Many students are unfamiliar with the field of engineering and do not consider it as a career option because they are not exposed to engineering role models and are not encouraged to enter the field, Ms. Metz asserted. "When you look at K-12 curriculum, the word engineering never comes up. . . . So how can we possibly expect them to choose that field?"

In closing, she suggested that "We need to work with the professional associations and Madison Avenue and NBC and ABC and CBS and *Glamour* magazine and *People* magazine and get some of this information out there to people at a young age."

Dr. Ralph Taylor, Executive Director, TIMES²



Dr. Ralph Taylor, TIMES².

"We need to instill in young people that they can be successful in this arena, and the only way they are going to begin to understand that is to have real-life experiences in engineering, math, and science at a very, very young age," Dr. Taylor told the symposium participants. The TIMES² program, established more than 20 years ago, provides such experiences through charter schools, after-school programs, Saturday academies, and summer science and mathematics camps.

"We have to go back to K-12," he said. "You cannot expect children to come into college and take their first calculus class. . . . We need to invest in K-12 programs like ours that have a success story and a success rate."

“Students are more likely to be successful if they are highly motivated, if they are pursuing a field of interest, if they are free of financial problems, and if they understand the requirements for success in their chosen field. All of these can be influenced by mentoring.”

**Dr. Winser Alexander
Department of Electrical Engineering
North Carolina State University**

TIMES² emphasizes the importance of English skills in addition to mathematics and science skills. “To be a technical person, you have to write technically. You have to speak technically. You have to read technically,” Dr. Taylor pointed out. “In order to do that, you have to have command of the English language. Everything we do with our program and our students has a strong emphasis on English.”

The TIMES² program also provides career role models. At the sixth and seventh grade levels, role models speak to the students about their careers, and the students learn about careers through reading and interacting with teachers. In addition, the children are assigned jobs, including operating a patent office at the school.

Mentors are involved at every level of the TIMES² academic program, although Dr. Taylor believes that “networking” might better describe the function of many mentoring programs.

In conclusion, Dr. Taylor said his experience has shown that “children want to rise to the level of adult expectations. If we as adults have low expectations, then those are the results we are going to get.” On the other hand, he believes that some children will surpass adult expectations and even exceed adults’ capacity.

Keynote Address

INTRODUCTION OF KEYNOTE SPEAKER

Dr. Jane Stutsman, Deputy Assistant Director of Education and Human Resources at the National Science Foundation, introduced the symposium's second keynote speaker, Dr. Julian Earls, Deputy Chief of Operations at NASA Lewis Research Center.

As a scholar, author, teacher, humanitarian, athlete, and orator, Dr. Earls could be termed a "renaissance man," Dr. Stutsman said. Dr. Earls has earned numerous degrees, including a doctorate in radiation physics from the University of Michigan, and he is a graduate of the Harvard Business School's prestigious Program for Management Development. In addition to holding numerous academic honors, he has served on the boards of many universities. He is co-founder of an organization whose members make personal contributions toward scholarships for black students who attend historically black colleges and universities, and he was inducted into the inaugural class of the National Black College Alumni Hall of Fame.



Dr. Jane Stutsman, Deputy Assistant Director of Education and Human Resources, NSF, introduces keynote speaker Dr. Julian Earls.

"One could argue that a good mentor teaches not one but both sides of the ancient sophistic divide: virtue as well as technical proficiency."

**Dr. Gerry Madrazo
Mathematics and Science Education Network
University of North Carolina at Chapel Hill**

Keynote Address

OF RUNNERS AND ROLE MODELS: MAKING A DIFFERENCE

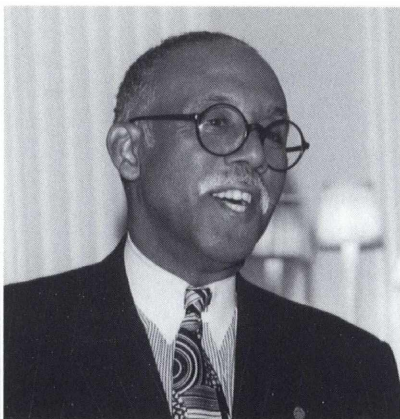
Dr. Julian M. Earls

Deputy Chief of Operations

NASA Lewis Research Center

Someone once said that you make a living by what you get, and you make a life by what you give. You are making a life not only for yourselves but also for those you touch," Dr. Julian Earls told the 1998 Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring recipients, whom he saluted during his keynote address.

"You did not set out to get a Presidential Award," Dr. Earls noted. "You decided that in the spirit of humanity you wanted to share the exceptional abilities and skills you have with others and to help others not just to be like you, but to be better than you. . . . That is what is special about the awardees: You do not look down because of your success or because of your achievement. You treat people with respect."



Dr. Julian Earls, Deputy Chief of Operations, NASA Lewis Research Center, presents his keynote address.

Throughout his remarks, the speaker compared his avocation of running to life in general and to academic and professional success in science, mathematics, and engineering specifically.

"Runners say that the will to win means absolutely nothing if you do not have the will to prepare," Dr. Earls said. "My goal is always to do better than I did in the most recent race—to improve upon my personal record. That is what we have to do to a greater degree—to use you as role models in helping students to understand that the greatest competition is themselves."

Dr. Earls highlighted the importance of encouraging students and other “mentees” to challenge themselves and to be persistent in their efforts to reach their goals.

“I tell my physics students, ‘If you take physics and fall flat on your face, you are a lot closer to the Nobel Prize in physics than those who never took the course,’” the speaker said. “If you go out for the wrestling team and get pinned within three seconds, you are a lot closer to the state wrestling championship than those who never got on the mat.”

One cannot learn to swim without getting wet, Dr. Earls continued. “You are teaching people how to swim. You are teaching people how to swim upstream.”

Dr. Earls also spoke about the need to make the most of one’s time. “At the beginning of every day, you have 86,400 seconds. You cannot carry any of that over to tomorrow. You cannot borrow it. You cannot lend it. . . . No one gets more than you. No one gets less than you.

“Isn’t it amazing how easily people can decide what they would do with financial resources, yet how readily too many of us waste the most special, the most valuable of all God’s gifts, the gift of time? You have used that time touching lives. That is why you are here. I just cannot say enough about how impressed I am with you and your contributions.”

“You are here because you are always driving for continuous improvement,” he emphasized. You are here because you epitomize what an education should be. You are here because of the message you give to your mentees about the value of education.”

Science will never be able to reduce this type of human commitment to a formula, Dr. Earls suggested. “It will never be able to reduce the value of what you do for the students—for the people you serve—to arithmetic. The challenge of accomplishment in living, the depth of insight into beauty and truth, respect, help one for another, these things shall always surpass the scientific mastery of nature.”

“You are the heroes and ‘sheroes,’ You are the ones who make the difference in the lives of the people in this Nation.”

“The most valuable mentor is one who is honest and provides direct yet supportive reality checks on performance, expectations, and requirements for success.”

**Dr. Caroline Kane
Coalition for Excellence and Diversity in
Mathematics, Science, and Engineering
University of California at Berkeley**

THE \$10,000 QUESTION: HOW THE GRANT FUNDS WILL BE USED

Recipients of 1998 Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring discussed how they intend to use their \$10,000 grants.

**Dr. Sheila Browne, Professor, Chemistry Department,
Mount Holyoke College**



Dr. Sheila Browne, Chemistry Department, Mount Holyoke College.

Dr. Sheila Browne assured the symposium participants that her \$10,000 grant would be well-used, but said that “the money is going to be one of the smaller parts of what I take back” from the symposium. The greatest benefit, she said, is that she now feels empowered to build institutional support for mentoring and for programs that support the needs of minority students.

Some of her grant funds will go toward helping students to make transitions. The parents of many of the students with whom she works at Mount Holyoke College did not graduate from high school, she said. As a result, the students are unprepared to make needed transitions, that they enter college “not knowing what the route is” and later face the transition to graduate school.

In addition, Dr. Browne said she will commit grant funds to training mentors for minority students, building on Mount Holyoke’s existing workshops to provide such training. For faculty members who currently serve as mentors to majority students and males, such workshops can “make them very powerful in mentoring minority students.”

“I feel like I can go out and conquer the world now,” she said during the symposium. “I am going to be much more ready to ask for things as a right because I can see the power of where we’re going.”

**Dr. Herbert Silber, Professor, Chemistry Department,
San Jose State University**

"My favorite student is the student who has some ability and doesn't know it, which is a lot of the minority students we see," said Dr. Herbert Silber. "Even those who have very high ability have never been told that they are doing well, they are smart, and they are going to succeed. I have become a cheerleader for these students."

He said he understands the needs of these students because, like himself, most of them are the first in their families to be college educated. "I don't want the students to be on their own. I think it is important that mentors help them."

Dr. Silber noted that his institution, San Jose State University, has received generous funding from the National Institutes of Health to assist minority students. However, he said, the Presidential Award grant "is the most powerful grant of all those I have because it is the one that says to the university, 'You have been an outstanding mentor!'"

Dr. Silber said he hopes to parlay his Presidential Award grant into matching funds to create an endowed award for a mentored student and perhaps a faculty mentor. "It is up to the university to see if they will make a commitment toward a mentoring award," he said.

**Dr. Jesse Nicholson, Professor and Chair, Department of Chemistry,
Howard University**

Dr. Jesse Nicholson said he would like to obtain matching funds for his \$10,000 grant, with the goal of establishing an endowed, pre-freshman program. Under such a program, he said, "You bring in students, you give them research experience, you let them interact with graduate students and the successful undergraduate students and the faculty members." In doing so, the students begin to understand the role of scientists and the opportunities that are available to them.

Corporate support is a key to successful funding of such a program, Dr. Nicholson stressed. He said he would first ask his university to match the \$10,000 to establish the pre-freshman program and would then ask the private sector to match it.



Dr. Herbert Silber,
Chemistry Department,
San Jose State University.



Dr. Jesse Nicholson,
Department of Chemistry,
Howard University.

“If the university is willing to buy into it, then companies may be willing to buy into it because the young people need it,” he said.

Dr. Nicholson recommended that his fellow Presidential Award recipients make linkages with corporate decision makers and establish mentoring program advisory committees composed of corporate, government, and faculty representatives. Such committees can empower both the committee members and the mentoring programs they serve, he said.

Dr. Caroline Kane, Chair, Coalition for Excellence and Diversity in Mathematics, Science, and Engineering, University of California at Berkeley



Dr. Caroline Kane, Coalition for Excellence and Diversity in Mathematics, Science, and Engineering, University of California at Berkeley.

The Coalition for Excellence and Diversity in Mathematics, Science, and Engineering is a group of seven student scholars programs on the Berkeley campus that provide feedback and advice to one another and support students in the scholars programs across the disciplines. As a group, the scholars programs can identify, solve, and prevent problems in ways that would not be possible individually.

Dr. Kane, who accepted the Presidential Award on behalf of the Coalition, said that the rewards of the coalition “are the intangibles of seeing students succeed and go on with their lives and their professional careers. Our programs continue to encourage and develop that strong sense of community and giving back to the community because we have all had assistance in mentoring to get to where we are.”

Dr. Kane added that the \$10,000 Presidential Award grant amount is approximately the sum total of the Coalition’s funding, “which we are able to glean by bits and pieces in tiny amounts from a variety of different offices on campus.” Like the other recipients, she said that she is “very, very confident” that the Presidential Award will enable the Coalition to obtain matching funds to expand some of the joint activities.

Roundtable Discussion

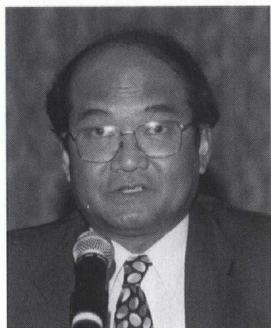
MENTORING AND THE FUTURE

Recipients of 1998 Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring discussed their views of mentoring and changes that are needed.

Dr. Gerry Madrazo, Executive Director, Mathematics and Science Education Network, University of North Carolina

"Time is running out for higher education to adapt to world forces that are changing the nature of business, education, and society," Dr. Gerry Madrazo asserted during his roundtable remarks. Higher education must focus on many issues, ranging from racial discrimination to integration of multidisciplinary perspectives that can benefit science, mathematics, and engineering education.

"There is an urgency, for example, in looking at affirmative action," Dr. Madrazo said.



Dr. Gerry Madrazo,
Mathematics and Science
Education Network, University
of North Carolina.

"We have been willing to engage in a debate about whether affirmative action makes sense instead of forcing the other side to engage in the real debate. We should begin this debate not with affirmative action, but with racial discrimination, as something which is concrete and which is contemporary, and which affects the day-to-day lives of millions in this country."

Dr. Madrazo called on the symposium participants to take other important steps, as well. These steps include to: first, improve undergraduate education in science, mathematics, engineering, and technology; second, focus on the effective use of technology, including for distance learning; third, foster racial and ethnic diversity among students and faculty members; fourth, shift operational thinking from seeking short-term success to pursuing long-term goals; fifth, become involved in improving the quality of primary and secondary education; and sixth, diversify sources of financial support beyond Federal and state funding.

Dr. Allan Butterfield, Professor of Chemistry; Director, Center for Membrane Sciences; and Faculty Associate, Sanders-Brown Center on Aging; Department of Chemistry; University of Kentucky

"I believe very strongly in mentoring of both students and young faculty," Dr. Allan Butterfield told the symposium participants. "My philosophy of mentoring can be summarized very succinctly: Absolutely require students and faculty to achieve the highest possible standards and accept nothing less, but provide for them your time, your encouragement, and your resources to help them to achieve those very standards."



Dr. D. Allan Butterfield,
Department of Chemistry,
University of Kentucky.

Dr. Butterfield said that many of his students are from the Appalachian region of Kentucky. They are "not always from the best academic high school situations, but they are all intrinsically bright, eager, motivated, and hard working." As a mentor, he provides them with "a good deal of structure and encouragement" and yet demands independence and critical thinking.

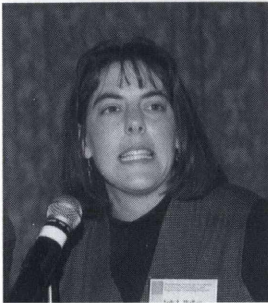
Speaking of his graduate students, he noted that, "If you are willing to work with them and take a little time to bring them up to snuff, these folks can compete with anyone from the more prestigious universities."

Dr. Butterfield also spoke about the need to mentor young faculty members. This type of mentoring involves providing advice about how to be an effective faculty member or how to apply for Federal funding, for example.

"In my view, to be an effective mentor in science, particularly in a school like the University of Kentucky, which is a comprehensive research institution, one needs to enjoy the support of one's colleagues," he pointed out. "The only way that is going to happen is if one is respected for one's scholarship."

"I believe that effective mentors can and do make a difference in individuals and in whole disciplines," he continued. "I've found great pleasure in helping others to achieve their goals just as others help me to achieve mine."

Dr. Judy Walker, Assistant Professor, Department of Mathematics and Statistics, University of Nebraska-Lincoln



Dr. Judy Walker, Department of Mathematics and Statistics, University of Nebraska-Lincoln.

Dr. Judy Walker summarized the philosophy toward mentoring held by the Department of Mathematics and Statistics at the University of Nebraska-Lincoln in a single sentence: "If you create a positive, supportive atmosphere in which qualified people are expected to succeed, they will."

Dr. Walker noted that the Department had received the Presidential Award based primarily on its success with women graduate students. Thirty-three men and 14 women had received Ph.D.s from the Department during the 1990s, compared to 23 men and no women during the 1980s. This increase in the number of women doctorates bestowed results from the Department's special efforts to support women graduate students. These efforts include: taking extra steps to recruit women graduate students; creating an atmosphere in which graduate students view themselves as professional colleagues of the faculty; hosting visitor lunches attended by colleagues from other universities and industry, women graduate students, and faculty members; maintaining ties with students after they graduate; providing travel support for graduate students who attend conferences; encouraging graduate students to participate in departmental seminars; giving graduate students full responsibilities for teaching a course; and treating graduate students as junior faculty members.

Dr. Su-Seng Pang, Jack Holmes Professor, Department of Mechanical Engineering, Louisiana State University and Adjunct Professor, Department of Mechanical Engineering, Southern University

Dr. Su-Seng Pang recommended that more funding be provided to minority undergraduate students so that they can spend more time doing research and less time working in retail stores or fast food restaurants to support themselves. With funding, students can improve their qualifications while relieving their financial problems.



Dr. Su-Seng Pang, Departments of Mechanical Engineering, Louisiana State University and Southern University.

“When students can verbalize their aspirations, I know I have connected. Regardless of their background, students who experience success yearn to repeat it.”

Dr. Jesse Nicholson

Department of Chemistry, Howard University

Once students enter graduate school, he feels that it is important to talk with them daily or weekly and to bring together minority students as a group. In his departments, he said, “We put them together until they feel comfortable and they think that they belong to society. Everyone has a fair chance.”

Dr. Pang also spoke about how he would use his \$10,000 Presidential Award grant. He explained that he planned to give \$2,000 each to an elementary school, a middle school, and a high school to initiate a mentoring activity. The remaining \$4,000 would be used to support students in the Louisiana State University’s (LSU) summer minority engineering program and to support educational activities of the LSU’s student chapter of the American Society of Mechanical Engineering.

Dr. Winser Alexander, Department of Electrical Engineering, North Carolina State University



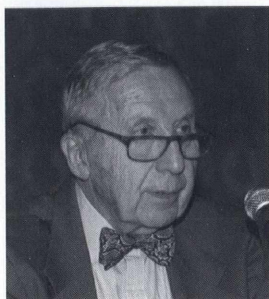
Dr. Winser Alexander,
Department of Electrical
Engineering, North Carolina
State University.

Dr. Winser Alexander said support for minority students has been accomplished through his role, not only as an individual faculty member, but also as the administrator for graduate programs in his department at North Carolina State University. He said that as an administrator for eight years, he was able to help recruit students and to provide an environment in which students could succeed.

For example, Dr. Alexander has worked to find financial support for students and to find advisors for students “because a research advisor and a mentor for their graduate work is one of the most important factors in graduate school success.” As a result of this supportive environment, his department has granted a large number of doctorates to African-American students, including female African-American students. In addition, he continues to support former students following graduation by communicating with them about career choices and how to succeed as faculty members at majority-serving institutions.

“Part of my success is their success,” Dr. Alexander said.

**Dr. Aubrey Gorbman, Professor of Zoology Emeritus,
University of Washington**



Dr. Aubrey Gorbman,
Department of Zoology,
University of Washington.

Dr. Aubrey Gorbman addressed issues surrounding the opportunities for women scientists at the predoctoral and postdoctoral levels. "This is a rather small segment of the range of mentorship that has been discussed, but I feel it is a very important one and one that we should pay attention to," he said. He explained that in 1946 he took a position as assistant professor at Barnard College in New York, where he worked for the next 17 years.

Dr. Gorbman said he has observed that "a woman often comes out second best when she is in competition with equally talented males in the same department." This gender bias, he continued, manifests itself not only in terms of advancement, but also in terms of assignment of teaching load, assignment of space, and other matters that are decided at the department level.

Dr. Gorbman recommended that faculty members in such situations "get into research and develop a reputation that is outside of your college or university. You should have a type of external pressure that you can assert on your department for betterment of your own situation." In one situation, he reflected, he encouraged a female postdoctoral associate to "enlarge her sphere of interests and to consider . . . bigger questions. She took this advice and very quickly developed a reputation such that within just a few years she became quite well known and had a big reputation."

In conclusion, Dr. Gorbman encouraged mentors to help their mentees to look more broadly at the questions at hand. "By changing the type of question that the student or the person is addressing, you can achieve things that were unheard of or unthought of to begin with," he said.

"Mentoring is standing for the success of students, for the accomplishment of their dreams, and the generation of their powerful future. . . . It is listening to them, being their guide, their friend, their advocate, and a catalyst for their development."

**Dr. Sheila Browne
Chemistry Department, Mount Holyoke College**

CLOSING REMARKS

Dr. Oliver McGee
Senior Policy Analyst
Office of Science and Technology Policy
Executive Office of the President

Dr. Oliver McGee concluded the Presidential Awards symposium by encouraging the award recipients to use their \$10,000 grants “to leverage and forge partnerships with universities and industry.”

“Government and university partnerships are part of President Clinton’s promise in his blueprint science and technology document, *Science in the National Interest*,” Dr. McGee said. “I cannot see a better way of initiating such partnerships than with your \$10,000 grant from the National Science Foundation. Use the power of the Presidential Award to reinvigorate your institution’s role in mentoring science, mathematics, and engineering talent. Use your award to help industry build and meet its science and technology human resources needs for the 21st century workforce.”

Dr. McGee noted that the Federal Government supports the work of tens of thousands of scientists and engineers at national laboratories and universities, and called upon the Presidential Award recipients “to help us make comprehensive recommendations on how best to utilize this pool of talent.”

“There is good news in science and technology nationally,” he continued. “The National Science and Technology Council Interagency Working Group (IWG) has been formed to address the U.S. science and technology workforce of the future. The two goals of this IWG are to address the future needs in the science and technology workforce and to look at existing programs at the Federal level, as well as at new programs that can be formed—most importantly those programs that can stand up to the legal muster given the current affirmative action challenges.”

In addition, Dr. McGee briefly discussed the development of a new national human resources policy on science and technology, a goal

that was set forth in the *Science in the National Interest* document. This document, he added, is “very, very important in policy development for the future of the science and technology workforce.”

Dr. McGee also called for the establishment of an advisory board for Presidential Award recipients.

“Now that we have a cadre of Presidential Awardees, we need to utilize you as a national resource,” he emphasized. “You are a valuable resource that we need to tap into continually. What you are doing on the front lines for mentoring—at the grassroots level in industry and universities—has strong Federal support, and there are mechanisms in place to help you in your job. We do not want you to go away from here thinking that you are on the front lines by yourself.”

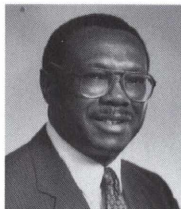
Dr. McGee closed his remarks by congratulating the Presidential Award recipients,” noting that “The pride on your faces yesterday was extraordinary. I tremendously enjoyed watching the excitement as you went into the White House to receive your awards.”

“If we are to increase the numbers of women and minorities in science, mathematics, and engineering, we should think of ourselves as recruiters and facilitators, rather than as filters and gatekeepers. . . . Recruiters, facilitators, mentors seek out the talented students, encourage them, nurture them, and convince them that they belong.”

**Dr. Alfonso Albano
Department of Physics, Bryn Mawr College**

RECIPIENTS OF THE 1998 PRESIDENTIAL AWARDS FOR EXCELLENCE IN SCIENCE, MATHEMATICS, AND ENGINEERING MENTORING

INDIVIDUAL AWARD RECIPIENTS



Dr. Winser E. Alexander

*Professor, Engineering and Computer Engineering,
Department of Electrical Engineering, North Carolina State
University*

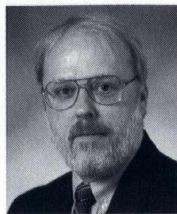
During the past 20 years, Dr. Winser Alexander has successfully promoted the advancement of African-American students by providing sound advice and mentoring at the graduate and pre-college levels. Dr. Alexander has successfully recruited African-American students into graduate engineering, resulting in enrollments of approximately 10 Ph.D. students each year from underrepresented groups over the past several years. During the past 10 years, the Department of Electrical Engineering at North Carolina State University has had eight African-American Ph.D. graduates, each of whom was mentored by Dr. Alexander. Dr. Alexander also is involved in weekly tutoring and mentoring of African-American high school students.



Dr. Sheila E. Browne

Professor, Chemistry Department, Mount Holyoke College

As one of two women and the only Native American in her Ph.D. class of 140 at the University of California, Berkeley, Dr. Sheila Browne understands firsthand the need for and importance of mentoring. Through her efforts with the New England Board of Education, she has provided opportunities for hundreds of high school, community college, and undergraduate science students. Dr. Browne is currently faculty mentor for the 50 members of Sisters in Science, a student organization. She has demonstrated exceptional performance in encouraging women—particularly women of color from the pre-college level to the doctoral level—to prepare for and succeed in science.



Dr. D. Allan Butterfield

Professor of Chemistry; Director, Center for Membrane Sciences; Faculty Associate, Sanders-Brown Center on Aging; Department of Chemistry; University of Kentucky

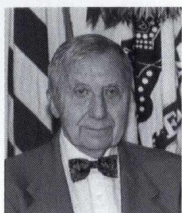
Dr. Allan Butterfield has built an excellent record of producing doctoral and master's degree students, many of whom are women. Over the years, he supported students at all levels and has helped 20 students from Appalachia to successfully pursue graduate work. Through his research projects, Dr. Butterfield offers many underrepresented undergraduates and graduate students the opportunity to experience groundbreaking laboratory research. Of Dr. Butterfield's many students, five females earned doctorates and eight females earned master's degrees. During 1998, four females are currently pursuing doctoral degrees and one is pursuing a master's degree with his guidance.



Dr. Billy Joe Evans

Professor, Department of Chemistry, University of Michigan

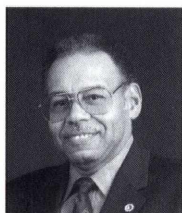
During more than 25 years at the University of Michigan, Dr. Billy Joe Evans has secured significant support for undergraduate and graduate programs that enhance minority participation in science. At the pre-college level, he has placed more than 200 inner-city minority high school students in authentic research settings. During 1998, approximately 50 of these students are still enrolled in undergraduate programs and at least a dozen have earned Ph.D. or M.D. degrees from several of the nation's leading universities.



Dr. Aubrey Gorbman

Professor of Zoology Emeritus, University of Washington

Dr. Aubrey Gorbman truly pioneered the concept of “science mentoring of women” by effectively advising a significant number of female Ph.D. candidates and postdoctoral associates at a time of significant underrepresentation. Dr. Gorbman has been retired for 12 years, yet he remains active as the experienced mentor that young researchers are happy to find. Over a span of 25 years, he advised 50 postdoctoral associates, including 13 women, and 16 Ph.D. students, including 9 women. Most of these women have made significant contributions and are considered to be role models. Dr. Gorbman also founded and meticulously edited the *Journal of Comparative Endocrinology* for 32 years. During that time, he included both women and minorities on the editorial board.



Dr. Jesse M. Nicholson

Professor and Chair, Department of Chemistry, Howard University

During his 32-year tenure at Howard University, Dr. Jesse Nicholson has served as advisor to 14 doctoral students, 9 master's degree students and countless undergraduate students. Under Dr. Nicholson's stewardship, there has been a 100 percent increase in total enrollment in Howard's chemistry program and in the number of students pursuing doctoral degrees in chemistry. The program annually produces 20 to 25 percent of the nation's African-American Ph.D.s in chemistry. Dr. Nicholson also collaborates in a pre-college program that allows high school students to experience hands-on scientific research at Howard.



Dr. Su-Seng Pang

Jack Holmes Professor, Department of Mechanical Engineering, Louisiana State University and Adjunct Professor, Department of Mechanical Engineering, Southern University

In addition to his research and teaching responsibilities as a professor at Louisiana State University and as an adjunct professor at Southern University, Dr. Su-Seng Pang advises and supports at least 30 minority undergraduate engineering/science students per year. He is also a leader in the state of Louisiana in supervising engineering/science minority Ph.D. students. His current "mentees" included three African-American doctoral students. Former mentees include four doctoral degree recipients, one of whom recently joined the Southern University faculty. Dr. Pang also is a leader among university faculty members in Louisiana who promote mathematics and science for middle school and high school students.



Dr. Armando A. Rodriguez

Associate Professor, Department of Electrical Engineering, Arizona State University

Soon after his arrival six years ago at Arizona State University, Dr. Armando Rodriguez developed a mentoring program entitled MoSART (Modeling, Simulation, Animation, and Real-Time Control), which cuts across the entire spectrum of undergraduate education, including reaching into the job market and graduate school. Through the MoSART program, Dr. Rodriguez has influenced more than 80 students to complete their degrees in a timely manner and to take advantage of opportunities such as internships, publications, and conference activities. He also has directed 10 master's degree and two Ph.D. recipients and is currently supervising 10 additional graduate students. Dr. Rodriguez has put forth an excellent example of an innovative approach to mentoring that can be replicated elsewhere.



Dr. Nina M. Roscher

Professor and Chair, Department of Chemistry, The American University

Dr. Nina Roscher has a 30-year history of mentoring outstanding women and minority scientists at the baccalaureate, master's, and doctoral levels. She has provided sustained academic support to her students, encouraging 25 students to complete master's degrees and 9 students to obtain doctorates. As a student, Dr. Roscher developed several peer-mentoring strategies. Dr. Roscher has also been highly successful securing funds and fellowships for her graduate students.



Dr. Herbert B. Silber

Professor, Chemistry Department, San Jose State University

Dr. Herbert Silber has a distinguished 25-year record of seeking out and mentoring minority and disadvantaged students at the high school, undergraduate, and graduate levels. The focal point of Dr. Silber's mentoring activity is the laboratory. He involves his students in significant research and supports their efforts, as evidenced by the publication of 90 papers he has co-authored with students. At the national level, Dr. Silber has been involved with the American Chemical Society's Summer Educational Experiences for the Disadvantaged (SEED) Program for the past 20 years; this involvement has included a very successful three-year appointment as chair of the National SEED Committee.

INSTITUTIONAL AWARD RECIPIENTS

AT&T Laboratories

Throughout its 25-year history, the AT&T program has had a significant impact on the number of women and minority master's and doctoral degree recipients in science and engineering. This has resulted in increased diversity in the science and engineering workforce. The AT&T program combines financial assistance with a mentoring component in conjunction with the AT&T laboratories. Summer research opportunities are provided for students to prepare and motivate them to pursue graduate degrees in the science or engineering fields. Once enrolled in graduate programs, AT&T mentors continue to work with students and to provide career guidance. As of 1998, approximately 300 students have been supported through the AT&T program.

Coalition for Excellence and Diversity in Science, Mathematics, and Engineering Mentoring, University of California at Berkeley

The Coalition for Excellence and Diversity in Science, Mathematics, and Engineering Mentoring focuses on the recruitment, retention, and provision of academic support, career training, and research opportunities for women and minority undergraduate students. The coalition, which serves 400 students each year, is truly a collaborative cross-institutional effort. Minority coalition participants graduate with engineering degrees at twice the national rate. The graduation rates for minority chemistry and biology student participants has also increased dramatically as a result of the coalition's programs.

***Department of Mathematics and Statistics,
University of Nebraska-Lincoln***

Between 1990 and the present, 13 doctoral degrees and 49 master's degrees in mathematics or mathematics-related fields have been awarded to women at the University of Nebraska-Lincoln (UNL), as compared to no doctoral degrees awarded during the entire decade of the 1980s. The increases in the number of mathematics or mathematics-related degrees earned by women attest to a climate highly supportive of women and to the effectiveness of the UNL approach. Women graduate students in the UNL Department of Mathematics and Statistics are encouraged to mentor high school students, meet regularly with role models, engage in research, attend professional meetings, and acquire teaching experience. Forty-five percent of the graduate student body of the UNL Department of Mathematics and Statistics has consisted of women.

Department of Physics, Bryn Mawr College

The Bryn Mawr College Department of Physics has developed a diverse program of effective replicable mentoring activities ranging from student recruitment, course strategies, research experiences, career counseling, and support networks. From 1993 through 1997, the college awarded undergraduate physics degrees to women at 10 times the national average. About one-third of the College's physics graduates pursue doctoral degrees in physics or in related fields. Between 30 and 50 female students participate in the program every year. Currently, 5 percent of Bryn Mawr College's graduating class consists of physics majors, which is approximately 100 times the national average.

***Mathematics and Science Education Network,
University of North Carolina***

Operating at 10 University of North Carolina campuses, the Mathematics and Science Education Network (MSEN) employs a pre-college program for students and a teacher professional development component to enhance K-12 science and mathematics student achievement. Operating since 1984, the MSEN program has an annual enrollment of nearly 3,000 seventh and eighth grade students and involves 5,000 teachers. About 1,000 MSEN participants have graduated from high school. In 1994, 65 percent of the MSEN participants who graduated from college pursued a math- or science-related major.

***Office of Women's Programs, Stevens Institute of
Technology***

During the past 20 years, the Office of Women's Programs (OWP) at the Stevens Institute of Technology has offered a wide array of mathematics, science, and engineering programs in support of women at the pre-college and college levels. The OWP also has served as a national model by developing and implementing several initiatives. These initiatives provide other colleges and universities with the resources, curricula, materials, and technical expertise required to mentor students effectively and to increase the representation of women in engineering in the United States. More than 17,000 young women in grades 7 through 11 have participated in OWP engineering and science career awareness programs.

TIMES², Providence, Rhode Island

Since 1979, the TIMES² Program (To Improve Mathematics, Engineering, and Science Studies) has encouraged urban minority students to pursue careers in science, engineering, and mathematics by offering several unique features. These features include a 32-hour elementary school curriculum to teach young children to enjoy exploratory science and mathematics; Saturday Academies that introduce middle school students to science, engineering, and mathematics; and tutoring, mentoring, and field trips for high school students. More than 800 TIMES² students have graduated from college.

Women in Engineering Initiative, University of Washington

In 1989, the Women in Engineering Initiative (WIE) served 50 women. Today, it serves more than 1,300 students a year on the campus of the University of Washington and more than 3,000 students off campus by providing mentoring activities aimed at increasing the number of women in science and engineering. Between 1990 and 1997, the WIE has increased retention rates among undergraduate women from 50 percent to 74 percent. WIE research on mentoring also has produced a nationally disseminated cross-gender, cross-racial curriculum for training mentors and mentees in science and engineering.

AGENDA

Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring 1998 Awards Program and Symposium

Mentoring for the Development of a Scientific and Technological Workforce for the 21st Century

September 10-11, 1998

ITT Sheraton Luxury Collection Hotel
2100 Massachusetts Avenue, NW
Washington, DC

Thursday, September 10, 1998

- 7:45 a.m. - 8:15 a.m. Registration
- 8:15 a.m. - 8:45 a.m. Greetings and Introduction of the 1998 Awardees
Dr. Roosevelt Calbert
Division Director, Human Resource Development
National Science Foundation
- Opening Remarks
Dr. Arthur Bienenstock
Assistant Director for Science,
Office of Science and Technology Policy
Executive Office of the President
- 8:45 a.m. - 9:30 a.m. Introduction of Keynote Speaker
Dr. Luther S. Williams
Assistant Director for Education and Human Resources
National Science Foundation
- Keynote Speaker
Dr. Richard Tapia
Professor, Department of Computational and Applied
Mathematics, Rice University
Member, National Science Board
- Respondents
1998 Presidential Mentoring Awardees
- 9:30 a.m. - 9:45 a.m. Break

- 9:45 a.m. - 11:00 a.m. **Focus Session: Mentoring Programs That Work and the Mentors Who Make Them Work**
Moderator
Dr. Oliver McGee
Senior Policy Analyst, Office of Science and Technology Policy
Executive Office of the President
Panelists
1998 Presidential Mentoring Awardees
Respondents
1998 Presidential Mentoring Awardees
- 12:00 noon - 1:45 p.m. **Awards Ceremony at Old Executive Office Building and Visit to White House Oval Office**
- 2:00 p.m. - 4:00 p.m. **Reception**

Friday, September 11, 1998

- 8:00 a.m. - 8:45 a.m. **Buffet Breakfast**
- 8:45 a.m. - 10:30 a.m. **Introduction of Keynote Speaker**
Dr. Jane T. Stutsman
Deputy Assistant Director, Education and Human Resources
National Science Foundation
Keynote Speaker
Dr. Julian M. Earls
Deputy Chief of Operations
NASA Lewis Research Center
- 10:30 a.m. - 11:00 a.m. **Roundtable Discussion**
1998 Presidential Mentoring Awardees
- 11:15 a.m. - 11:30 a.m. **Closing Remarks**
Dr. Oliver McGee
Senior Policy Analyst, Office of Science and Technology Policy
Executive Office of the President

ABOUT THE NATIONAL SCIENCE FOUNDATION



SF is an independent federal agency created by the National Science Foundation Act of 1950 (P.L. 81-507). Its aim is to promote and advance progress in science and engineering in the United States. The idea of such a foundation was an outgrowth of the important contributions made by science and technology during World War II. From those first days, NSF has had a unique place in the Federal government: it is responsible for the overall health of science and engineering across all disciplines. In contrast, other federal agencies support research focused on specific missions, such as health or defense. The Foundation is also committed to ensuring the nation's supply of scientists, engineers, and science and engineering educators.

NSF funds research and education in science and engineering. It does this through grants and cooperative agreements to almost 2,000 colleges, universities, K-12 schools, businesses and other research institutions in all parts of the United States. The Foundation accounts for about one-quarter of federal support to academic institutions for basic research.

NSF receives approximately 30,000 proposals each year for research and education and training projects, of which approximately 10,000 are funded, and several thousand applications for graduate and postdoctoral fellowships. These typically go to universities, colleges, academic consortia, nonprofit institutions, and small businesses. The agency operates no laboratories itself but does support national research centers, user facilities, certain oceanographic vessels, and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, U.S. participation in international scientific efforts, and educational activities at the K-12 level as well as universities and colleges.

The Foundation is led by a presidentially appointed Director and governed by the National Science Board (NSB). The Board is composed of 24 members, representing a cross section of American leadership in science and engineering research and education; appointed by the President to 6-year terms, with one-third appointed every 2 years; and selected solely on the basis of established records of distinguished service. The

NSF Director is a member *ex officio* of the Board. In addition to governance of the Foundation, the Board serves the President and the Congress as an independent advisory body on policies affecting the health of U.S. science and engineering and education in science and engineering.

NSF is structured much like a university, with grants-making divisions for the various disciplines and fields of science and engineering, and for science, math, engineering and technology education. NSF also uses a variety of management mechanisms to coordinate research in areas that cross traditional disciplinary boundaries. The Foundation is helped by advisors from the scientific community and from industry who serve on formal committees or as ad hoc reviewers of proposals. This advisory system, which focuses on both program direction and specific proposals, involves approximately 50,000 scientists and engineers a year. NSF staff members who are experts in a certain field or area make award recommendations; applicants get anonymous verbatim copies of peer reviews.

Awardees are wholly responsible for doing their research and preparing the results for publication; the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals on behalf of all qualified scientists and engineers and strongly encourages women, minorities, and people with disabilities to compete fully in its programs. In accordance with federal statutes and regulations and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving financial assistance from NSF.

For more information on NSF programs and plans, see NSF's website at <http://www.nsf.gov/>.

DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES

The National Science Foundation's Directorate for Education and Human Resources (EHR) is responsible for the health and continued vitality of the Nation's science, mathematics, engineering, and technology education and for providing leadership in the effort to improve education in these areas. EHR has five major long-term goals.

- To help ensure that a high quality school education in science is available to every child in the United States and that it is sufficient to enable those who are interested, to pursue technical careers at all levels, as well as to provide a base for understanding by all citizens.
- To help ensure that the educational pipelines that carry all students to careers in science, mathematics, and engineering yield numbers of adequately educated individuals who can meet the needs of the U.S. technical workplace.
- To help ensure that those who select a career in a science or engineering discipline have available the best professional undergraduate and graduate education and that opportunities are available at the college level for interested non-specialists to broaden their scientific backgrounds.
- To encourage the development of a cadre of professionally educated and trained teachers to ensure excellence in school education for every student and learner.
- To support informal science education programs and to maintain public interest in and awareness of scientific and technological developments.

These goals provide the focus for the various activities of the Directorate's seven divisions and offices.

DIVISION OF HUMAN RESOURCE DEVELOPMENT

The Division of Human Resource Development of the Directorate for Education and Human Resources supports programs that focus on student achievement, teacher development, and research-oriented training activities designed to increase the participation and advancement of underrepresented groups and institutions at every level of science, mathematics, engineering, and technology education and research.

The programs of the Division of Human Resource Development reflect the National Science Foundation's commitment to developing the resources of the scientific and technical community as a whole. This Division has primary responsibility for broadening participation of underrepresented groups in science, engineering and mathematics (SEM). The approach includes:

- A coordinated set of efforts to prepare, attract, and retain increased numbers of minority students in science, engineering, and mathematics at the undergraduate and graduate levels.
- Activities for women and girls that can produce immediate and long-term positive changes in the infrastructure of SEM research and education.
- Efforts to facilitate greater involvement of students and faculty with disabilities in science and engineering and in NSF-supported activities.
- Activities to strengthen research and training capabilities of academic institutions with significant minority student enrollments.

These activities can be implemented in all NSF-funded disciplines and, except where noted, in all academic institutions and nonprofit organizations.

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090 or through FIRS on 1-800-877-8339.

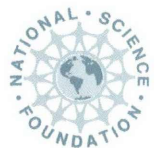
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