

## **FEDERAL GOVERNMENT PERSPECTIVES ON DIVERSITY**

Moderator: Suzanne G. Brainard, Director, Center for Women in Science & Engineering  
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### **Speakers:**

Margaret Chu, Toxicologist, The National Center for Environmental Assessment  
Office of Research and Development, U.S. Environmental Protection Agency,  
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Arthur Bienenstock, Associate Director for Science  
Office of Science and Technology Policy, Executive Office of the President  
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## **INTRODUCTION**

Key representatives from government agencies from the Office of Science and Technology, Executive Office of the President; Office of Research and Development, U.S. Environmental Protection Agency; and Engineering Infrastructure Division, National Science Foundation discussed their perspectives on under-represented groups in engineering. The presentations provided a forum to help participants understand how agency policies are made and enacted.

## **MEETING THE CHALLENGE: SCIENTISTS AND ENGINEERS AND ENVIRONMENTAL DECISION MAKING – Margaret M. L. Chu, Ph.D.\***

Science and technology are used as inputs for assessing risks in environmental decisions. Science and technology also provide solutions to correct or prevent environmental problems. In the USEPA, risk assessment and risk management is used as a framework for environmental decisions. In this context, science and technology are but two of the elements in regulatory decisions. Other elements include: social-economics, laws, political factors, risk perception and public pressure.

In addition to research and development, scientists and engineers play many non-traditional roles in support of environmental decisions. For example they may be advisors, policy analysts, policy makers, managers, or program administrators.

## **MOVING BEYOND INDIVIDUAL PROGRAMS TO SYSTEMIC CHANGE**

Environmental problems results from the industrial economy. The 1992 National Academy of Engineering report "Technology and Environment described the paradox of technology. To achieve technological and environmental goals scientists and engineers face evolving challenges to prevent environmental degradations.

Both institutional and individual imperatives for maximizing the potentials of scientists and engineers are needed to meet these goals. EPA supports intramural and extramural programs (<http://www.epa.gov/ord>) in environmental science and engineering to meet these challenges.

It was stated that the intersection of technology and environment in a sense has been the blind spot in our system of knowledge, and this gap is at the root of today's environmental crisis (Meyer-Abich, 1979 cited in Technology and Environment, NAE, 1992). I like to suggest that because of the gender difference in many aspects of our lives, women engineers are poised to bridge the blind spot in our system of knowledge regarding the interaction of technology and environment. And I am hopeful that women will lead the next generation of technologies to preserve the environment.

\* The views expressed are those of the author and do not necessarily reflect the views or policies of the U.S. Environmental Protection Agency.

#### **THE U.S. SCIENCE, TECHNOLOGY & ENGINEERING WORKFORCE – Arthur Bienenstock**

The nation presently needs more science, technology and engineering (ST&E) workers than are produced from among its citizens and permanent residents, as evidenced by the current strong dependence on immigration and significant shortages in some areas like information technology. At the same time, the ST&E workforce is vital to maintaining the productivity increases that have helped to keep the U.S. economy vibrant, as well as to improve our health and environment and to maintain national security.

As our population ages and the ratio of workers to retirees decreases, the nation will have to achieve even greater increases in worker productivity if the average standard of living is to be maintained. If not, some economic adjustment, such as a decline in the value of the dollar, is likely. This would impact the living standard of almost all of our citizens, including those who have saved carefully for retirement. Since science and technology are significant drivers for productivity increases, it is prudent that the nation maintain the fraction of its total workforce that is comprised of ST&E workers over the next half century.

Over the same period, immigration could become an unreliable source of such workers. Nations that have provided most of these immigrants are recognizing their high value and are making concerted efforts to keep them at home. Of particular importance are their

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efforts to improve their university systems, which could result in fewer of their young people coming to the U.S. for higher education. These students have been an important source of ST&E workers.

The composition of the ST&E workforce shows differences in participation by various ethnic and gender groups. Non-Hispanic white males are the majority participants, but their participation rate is declining. Women now form a significant fraction of the overall ST&E workforce, but their participation in engineering, information technology and the physical sciences is low. Asians have a high participation rate, but form a relatively small fraction of the U.S. population. African-Americans and Hispanics have a low participation rate, but comprise an increasing fraction of the population. The U.S. Census Bureau projects that the fraction of the population that is African-American and Hispanic will rise from about 24% to about 40% over the next 50 years.

If the participation rates of all the groups remain the same as they presently are and the demographic projections are correct, then the fraction of the workforce comprised of ST&E workers will decrease significantly in an era when increases are likely to be needed. Thus, it is important that these participation rates be increased.

One important route to such increases is to improve K-12 science and mathematics education. Better-prepared students are more likely to be interested in ST&E and are more likely to enroll in, and succeed in, college ST&E programs. This is one of the reasons the President has emphasized science and mathematics education in various budgetary initiatives and has proposed funding increases for the Interagency Education Research Initiative (IERI). The IERI is a new program in which the Department of Education, the National Science Foundation and National Institute of Child Health and Human Development will fund large-scale research on how to improve K-12 education.

Also, on September 10, 1998, the President directed the National Science and Technology Council (NSTC) to develop recommendations on how to achieve greater diversity throughout our scientific and technical work force. The NSTC's Interagency Working Group (IWG) on the 21<sup>st</sup> Century Science and Technology Workforce has been charged with this responsibility. The recommendations, which relate to college-level training and federal employment, will be presented in its forthcoming report. Subsequently, the IWG will turn its attention towards recommendations related to the pre-college population.

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